UNCTAD

Economic Development in Africa Report 2018

Migration for Structural Transformation

Background Paper

Exploring the Relationship Between Migration and Structural Transformation in Africa: An Empirical Analysis

Faiçal Belaid, *IHEID Geneva* **and Anja Slany** *Ruhr-Universität Bochum*

Background Paper No. 2

May 2018

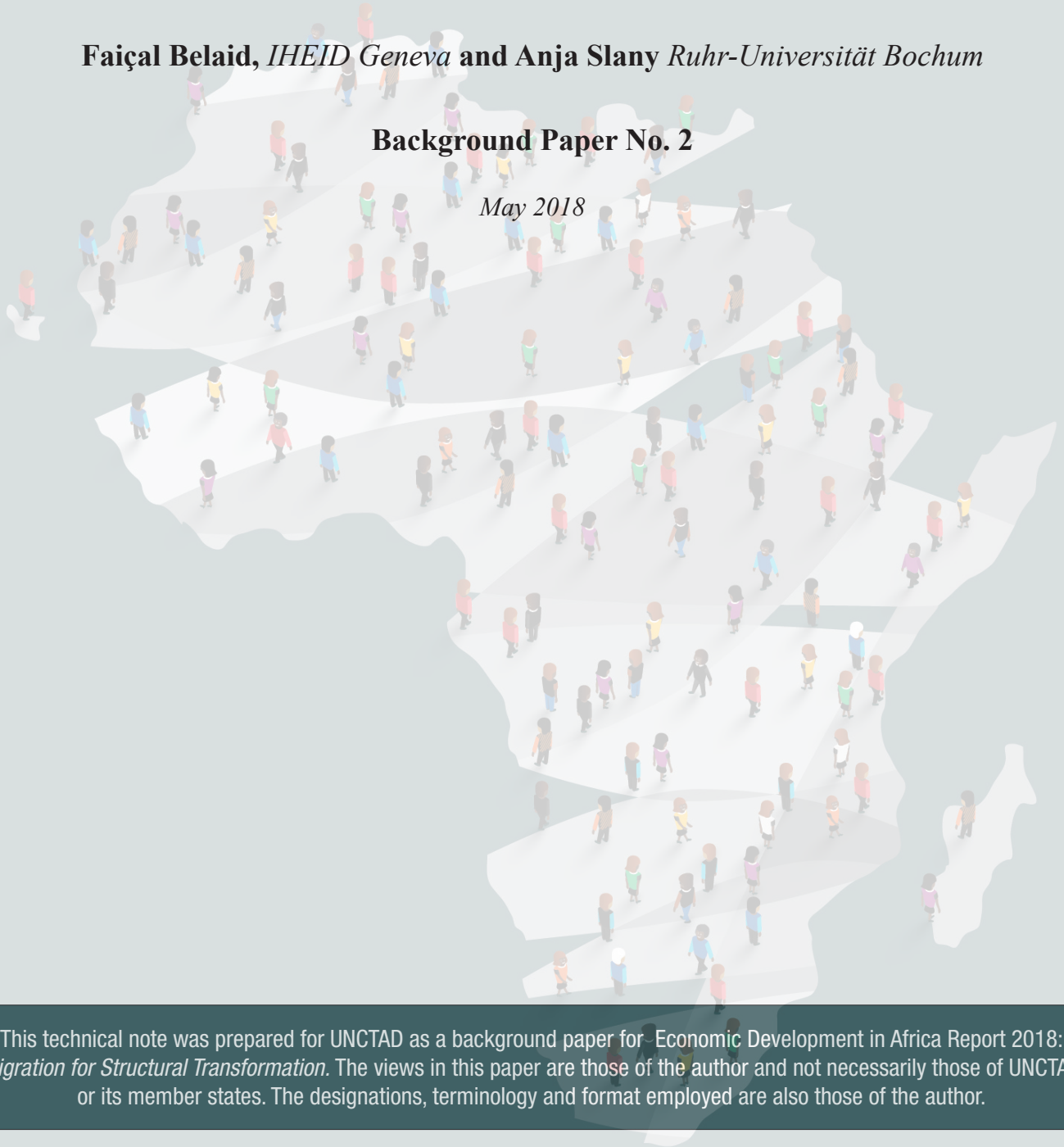


Table of Contents[1]

[1]

Acknowledgements

This background paper was prepared by Mr. Faicel Belaid and Ms. Anja Slany. The authors would like to thank Ms. Lisa Borgatti, Ms. Milasoa Cherel-Robson, Mr. Junior Davis, Ms. Julie Litchfield and Mr. Giovanni Valensisi for comments on earlier drafts of this paper.

1. Introduction

This technical note tries to empirically respond to the main objective of this report that is to contribute to a better understanding of the relationship between migration and structural transformation in destination and sending African countries.

Regarding international migration, the analytical lenses of the defenders of the free flow of labour generally focuses on demonstrating the positive impact of the influx of foreign migrant workers on the receiving economy. Arguing that border controls are analogous to trade barriers, many analyses of the economic impact of migration show that more migration would increase the world's GDP far more than trade liberalization. Earlier analyses were based on the traditional assumption of neo-classical trade and economic models whereby all productive resources are fixed in quantity and constant in quality across nations. Additional assumptions included that of full employment in all regions of the world. Using this as a point of departure, these models asked what would happen if workers migrated from lower to higher wage countries. Findings showed that world GDP would more than double (Hamilton and Whalley, 1984). More recent pro-migration arguments focus on demonstrating the cost-effectiveness of a free flow of labour for destination countries. Labour liberalization is seen as the last frontier of globalization. A growing body of work argues that dismantling labour market segmentations internationally is wealth generating, pro-poor and leads to more egalitarian distributional outcomes (Rodrik, 2012; Clemens, 2014; Prichett and Smith, 2016; Anderson and Winters, 2008).

Structural transformation is defined as the change in the long-term composition and distribution of economic activities. A normative perspective of structural transformation often emphasizes desirability in the direction of change (UNIDO, 2013). For instance, Ocampo (2005), Ocampo and Vos (2008) and UNDESA (2006a) argue that structural transformation can be defined as the ability of an economy to continually generate new dynamic activities characterized by higher productivity and increasing returns to scale.

The related literature has considered many proxies for structural transformation. In the context of developing countries, Taylor and Martin (2001) argue that rural-to-urban migration is a necessary component of the economic development process. This is because the migration of labour out of the agriculture sector has been a feature of the growth path of every developed country. From a macroeconomic perspective, every economy has its own distinct growth path (World Bank, 2008), however, the common feature is that as economic growth takes place, labour moves out of agriculture towards the manufacturing and service sectors.

UNIDO (2013) argues that structural transformation is crucial for sustained job creation. From this angle, structural transformation is seen as an indicator that shows the capacity of a given economy to persistently create new fast-growing activities and businesses distinguished by higher value added and productivity and increasing returns to scale. UNIDO (2013) states that manufacturing provides greater opportunities than other economic sectors to accumulate capital, exploit economies of scale, acquire new technologies and, more importantly, stimulate technological change. The economic development literature shows that the role of manufacturing shifts as structural transformation progresses. At lower levels of income, the presence of low capital-intensive technologies enables enhancements in both productivity and employment. However, as the capital intensity of technology grows, productivity benefits dominate and employment changes direction towards manufacturing-related and services sectors.

In addition, most recent literature considers structural transformation as a reallocation of resources from lower to higher productivity activities both *between* and *within* sectors. Therefore, structural transformation can generate both static (increased economy-wide labour productivity as workers move to more productive sectors) and dynamic gains (positive externalities due to workforce skills upgrading and enhanced technological capabilities), thus simultaneously generating productivity growth *within* sectors and shifts of labour from lower to higher productivity sectors. For many African countries with a large share of employment in the agricultural sector, within-sector productivity changes and upgrading potential within sectors is equally important as traditional views of across-sector changes.

This paper adopts an innovative and advanced approach and considers different concepts of structural transformation. The first empirical exercise seeks to quantitatively examine the channel through which migration patterns impact the reallocation of production factors across sectors. To do so, the paper considers a sample of 50 African countries[1] and first estimates static panel data models to take account of African countries' specificities. Second, and to handle the problem of endogeneity that might arise due to the reverse causality between migration and economic development, we use dynamic panel data models.

The second empirical exercise emphasizes the positive linkages of migration on within-sector productivity increases using the Groningen Growth and Development Centre, GGDC-10 Sector Database. Since labour tends to migrate from low-productivity to high-productivity sectors /

[1] The list of countries included in this study is presented in Appendix n°1. Data are available for all 54 African countries except some missing information for Sudan, South Sudan, Ethiopia and Eretria.

countries the section also discussed sectoral[2] employment and value- added data for selected African countries from which we can identify labour productivity changes at the sectoral level and its link to migration.

Our study provides evidence that migration does contribute to structural transformation within destination and sending countries. Further, we find that the positive effect of immigration on structural transformation is more pronounced when immigrants are, on average, better educated than the local population in the destination country. Thus, this study confirms the importance of educated immigrants' effect for the nexus between migration and structural transformation in Africa. In addition, the aforementioned effect of immigration is found to be more pronounced in African countries that have faced armed conflicts or civil war. This latter result provides some evidence for the view that economic reconstruction within African countries that have suffered from conflict can be achieved through boosting intra-African migration. Our results remain robust to a variety of variables and models' specifications.

2. Literature review

It has been argued that immigration can have positive impacts on economic growth through a variety of channels. For example, Van Der Mensbrugghe and Roland-Holst (2009) suggest that this positive effect of immigration can be observed through improvements in the efficiency of international resource allocation. Dustmann and Frattini (2014) argue that immigration can make a positive fiscal contribution in the destination countries. Gagnon (2014) maintains that migration reduces dependency ratios. Moreover, Chellaraj et al. (2008) argue that immigration can increase innovation and specialization through higher numbers of patent applications and grants issued per capita. Bove and Elia (2016) state that the most important impact that migration has on economic development is through its effect on the level of heterogeneity of the receiving country. This supports Collier (2013) who finds that migrants increase the diversity of society even though not all immigrants are ethnically different from the native population.

[2] Agriculture (Agriculture, Hunting and Forestry, Fishing), Mining (Mining and Quarrying), Manufacturing, Utilities (Electricity, Gas and Water supply), Construction, Trade services (Wholesale and retail trade, Hotels and restaurants), Transport Services (Transport, Storage and Communications), Business services (Financial intermediation, Real estate, renting and business activities), Dwellings (as part of Business services), Government services (Public administration and defense, Education, health and social work), Personal services (Other community, social and personal service activities, activities of private household)

2.1. Migration and structural transformation: the channel of human capital effect

The literature on migration argues that immigrants constitute human resources which are relevant for innovation and technological progress (Bodvarsson and Van den Berg, 2013); such as the impact of education, the level of heterogeneity in immigrants' composition should promote human capital formation and enhance the adoption of new technologies (Nelson and Phelps, 1966). To date, the effect of human capital on economic growth remains a controversial question. Much of the recent cross-country growth literature shows that different economies obey different linear models when grouped together according to their initial level of economic development (Durlauf and Johnson, 1995; Kalaitzidakis and al., 2001). Durlauf and Johnson (1995) find that the coefficient of the secondary enrollment ratio is one third higher in magnitude for the middle-income economies as compared to the high income. Krueger and Lindahl (2001) find a positive and significant impact of education on economic growth only for less-developed countries which are characterized by the lowest level of education. Similarly, Qadri and Waheed (2013) find that the benefits of human capital are larger in the low-income countries than in the whole sample. Vandenbussche et al. (2006) provide the theoretical reasoning underpinning the aforementioned results. They argue that rich countries are closer to the technological frontier which means that the strength of the "catch-up" impact recedes with the relative level of development. From this perspective, African developing countries should gain most from immigration inflows. Characteristics of migrants (education, cultural diversity, age, gender, skills, etc.) should be considered when examining the effects of migration on structural transformation.

2.2. Migration and structural transformation: the cultural diversity effect

There has been a highly disputed question among researchers regarding whether migration, through the channel of cultural diversity (the range of citizens with different sendings, religions, and traditions living and interacting together) negatively (Easterly and Levine, 1997) or positively (Ottaviano and Peri, 2006) impacts economic development. Horwitz and Horwitz (2007) argue that both positive and negative effects of cultural diversity on economic development may exist. These authors describe cultural diversity as a ‘‘double-edged sword". They argue that, on the one hand, the existence of a rich pool of different expertise and

experiences can eventuality create organizational synergies which leads to positive team outcomes. However, on the other hand, heterogeneous environments may also lead to coordination problems related, for example, to language diversity and a lack of trust that may increase transaction costs and create irreconcilable social divisions.

Bove and Elia (2016) using data on bilateral migration stocks that represent the number of people living and working outside their country of sending over the period 1960-2010, explore the impact of immigration on economic development through the channel of cultural diversity and the composition of the destination country. The authors argue that rather than the actual number of immigrants, their composition seems to be an important factor in stimulating the rate of technological progress in the destination country. This is because immigrants can bring a variety of ideas and abilities which make them a crucial factor contributing to the process of technological progress. Bove and Elia (2016) support the claim that diversity has productivity-enhancing impacts and especially in the presence of complementarity of skills (Lazear, 1999). In fact, as workers from different backgrounds bring their various skills, experiences, and abilities in day-to-day interactions with locals, diversity within a team can improve its performance. Bove and Elia (2016) find both opposite effects of migration on economic development through diversity may also exist. On the one hand, the authors state that cultural diversity impacts the predisposition of citizens of a given country to trust the citizens of another country which impairs the level of coordination among actors, raises divergences in policy preferences and can lead to incompatible expectations. However, on the other hand, a diverse range of societal norms, customs, and ethics can promote technological innovation, the spread of new ideas, and the production of a greater variety of goods and services. Bove and Elia (2016) conclude that migration, through diversity, plays a role in determining patterns of economic growth because of its influence on technological innovation and human capital. But at the same time, the authors argue that the net impact is unclear and needs to be determined from the data related to the specificity of each context.

In the US context, Ottaviano and Peri (2006) find that US-born workers who live in metropolitan zones characterized by a higher share of foreign-born workers experienced a significant rise in their salaries, implying that a more multicultural urban environment makes US-born workers more productive. Within the same context, Ager and Brȗckner (2013) examine the impacts of mass immigration to the US between 1870 and 1920 and find that

increases in the cultural diversity of US counties lead to higher output per capita. In the context of African countries, Easterly and Levine (1997) find support for the negative effect of diversity on economic growth. The authors suggest that this can partially explain the relatively poor economic performance of the African continent. Alesina, Harnoss, and Rapoport (2016) find that diversity of skilled immigration positively affects economic development.

Skeldon (2008) examines the extent to which migration can be managed to enhance development and concludes that migration is an integral part of the outcome of the implementation of development policy. Consequently, development policy becomes the driver to be managed and migration the outcome, rather than vice-versa. Deane et al. (2013) argue, on the other hand, that migration can also present several drawbacks such as the role of mobility in the spreading of HIV in sub-Saharan Africa.

3. Structural transformation across sectors

3.1. Empirical approach

As we consider African countries in this study which are characterized by low productivity agriculture sectors, we proxy structural transformation using the logarithmic transformation of manufacturing value-added in millions of US$ (*LnManufacturing*). In order to allow comparisons with previous empirical studies, we also use the share of labour in both manufacturing and services in total employment and GDP per capita (converted at 2005 constant prices). Data are obtained from UNCTAD Statistics for the period[3] 1970-2013.

The independent variable: migration

As this empirical study focuses on the effect of migration on structural transformation in destination and sending African countries, the variables stocks of immigration and emigration are our independent variables of interest. Bove and Elia (2016) define migrant stocks as the number of people born in a country other than that in which they live. Data on migrant stocks are collected from the World Bank for the sub-period 1970-2000 and recently integrated until 2013. For the sub-period 1970-2000, we use the Global Migration Database of the United Nations

[3] When we use the share of labour in both manufacturing and services in total employment as our dependent variable and due to data availability, the analysis period is 1990-2013.

Population Division (UNPD) constructed through a collaboration between the UNPD, the United Nations Statistics Division, the World Bank and the University of Sussex. The estimates are obtained from more than 1,100 national individual census and population register records for more than 230 destination countries and territories over five decades. Each census round was organized every 10 years. The UNPD's database on migration was extended until 2013 by Ratha et al. (2016) through using data from new censuses and country sources from Sub-Saharan Africa, Latin America and the Caribbean[4].

Migration represents our independent variable of interest that shows how either the level of immigration or emigration relates to a given African country. We proxy immigration using the logarithm of total immigrants in a country *i* and is calculated as follows:

$$LnImmigration_{it} = Ln\left(\sum_{\substack{k=1 \\ kk=1}}^{54} M_{kit}\right)$$

where M_{kit} is the total number of foreign people living in country *i* at year *t* and born in countries *k.* For the variable emigration, we use as a measure the logarithm of total emigrants from country *i* to other African countries and is calculated as follows:

$$LnEmigration_{it} = Ln\left(\sum_{\substack{j=1 \\ ii=1}}^{54} M_{ijt}\right)$$

where M_{ijt} is the total number of foreign people living in countries *j* at year *t* and born in country *i*.

The control variables

As economic growth predictors[5], we take the investment ratio as a proxy for capital and measured using the ratio of gross fixed capital formation over GDP (*Investment*), the final consumption expenditure share of GDP (*Consumption*), the trade to GDP ratio as an indicator of a country's openness to global economy and global trade (*Trade*). In addition, and in order to take into consideration the effect of a country's openness to an African economy, we consider the ratio of exports and imports with African countries to total trade of a given country.

[4] Ratha and Shaw (2007) and Ratha and al. (2016) provide a thorough description of the migration data collection methodology and discuss the comparability of migrants' statistics.

[5] Barro (1991) and Barro and Sala-i-Martin (1992) provide an interesting discussion about the standard set of economic growth predictors.

Following Barro and Lee (2013), we take into consideration an indicator of human capital which is proxied using the average years of school attainment of the population aged 25 and over (*Education*). Information on this indicator is available in Barro and Lee (2013) and covers only 35 countries. Information on population is also considered (*LnPopulation*), and we control for the geographical location of African countries considered in the sample through adding dummies for regional zones (North, South, East and Middle Africa[6]).

The econometric methodology

In the first stage of the empirical analysis, we exploit the panel data nature of our dataset, which enables us to take into consideration the unobserved country-specific effects. As migration stocks are observed at ten years intervals, we consider five-time periods which correspond to the following sub-periods: [1970-1980], [1980-1990], [1990-2000], [2000-2010] and [2010-2013]. Following Bove and Elia (2016), our dependent variable structural transformation is measured as the annual average value over each sub-period. The explanatory variables immigration and emigration and the control variables are measured in the initial year of each sub-period. This specification strategy allows us to take into consideration the changing nature of African societies over time and to remove short-time variations. To do so, the following baseline model was estimated:

$$\begin{aligned}\text{LnManufacturing}_{it} = {} & \beta_0 + \beta_1 \text{LnImmigration}_{it} + \beta_2 \text{LnEmigration}_{it} + \beta_3 \text{LnImmigration}_{it} \times \text{DummyEducImmigrants} \\ & + \beta_4 \text{LnImmigration}_{it} \times \text{DummyManufImmigrants} + \beta_5 \text{LnImmigration}_{it} \times \text{DummyInstability} \\ & + \beta_6 \text{LnPopulation}_{it} + \beta_7 \text{Investment}_{it} + \beta_8 \text{Consumption}_{it} + \beta_9 \text{Trade}_{it} + \beta_{10} \text{Inflation}_{it} \\ & + \beta_{11\text{-}14} \text{Dummy Region}_{it} + \theta_i + \delta_t + \varepsilon_{it} \qquad \textbf{(1)}\end{aligned}$$

As we use a log-log model, the regression coefficients represent the elasticity of our dependent variable with respect to our independent variables of interest (*LnImmigration* and *LnEmigration*). In other words, the coefficients β_1 and β_2 represent the estimated percent changes in manufacturing value-added for a one percent change in immigration and emigration, respectively.

As this paper aims also to investigate the channels through which migration patterns impact structural transformation in Africa, we examine the effect of educated migrants on structural transformation in destination African countries through the channel of promoting human capital formation, innovation and the adoption of new technologies (Bodvarsson and Van den Berg, 2013; Nelson and Phelps, 1966). To verify whether educated migrants play a role in fostering structural transformation in receiving countries and as we do not have information on

[6] The dummy variable West is not included in the equation to avoid multicollinearity problem.

migrants' characteristics (including education, skills, etc.), we use an interaction between the variable immigration and a binary variable (*DummyEducImmigrants*) that takes 1 if the weighted average[7] level of years of schooling in all sending countries is higher than the level of years of schooling in the destination country *i* and 0 otherwise. Thus, β_3 measures the additional effect of migration on structural transformation when immigrants are, on average, higher educated than local people in the destination country *i*. Similarly, and in order to take into consideration the level of the shares of manufacturing value-added in sending countries, we use an interaction between the variable immigration and a dummy variable (*DummyManufImmigrants*) that takes 1 if the weighted average[8] of the shares of manufacturing value-added in all sending countries is higher than the share of manufacturing value-added in the destination country *i* and 0 otherwise. Thus, β_4 measures the additional effect of migration on structural transformation when immigrants are, on average, coming from higher manufactured countries than the destination country *i*. In addition, we try to empirically examine the effect of immigration on structural transformation in African countries that have encountered armed conflict or civil war. We do so by constructing a new variable using the interaction between the variable *LnImmigration* and a binary variable *DummyInstability* that takes 1 if a given country has faced an armed conflict or civil war and 0 otherwise. Thus, β_5 captures the additional effect of immigration on structural transformation in countries that have suffered from conflict.

As the literature relating to the relationship between migration and economic development suggests that there might be a bi-directional causal relationship between both variables, this may cause an endogeneity problem. This is because it has been argued that migration can be thought of as being itself affected by economic development either in sending or destination countries. Thus, migration can be the impact rather than the cause of economic development (Skeldon, 2008). Bove and Elia (2016) argue, for instance, that countries that have higher economic growth rates might attract more immigrants from different sendings. From this angle, we may encounter an endogeneity issue for the variable migration in specification (1). In addition, as the empirical literature emphasizes the dynamic nature of economic development, we use a dynamic panel data model where the lagged value of structural transformation is included as an independent variable.

[7] The weighted average of schooling is calculated as the sending countries' levels of education multiplied by the share of immigrants coming from each country *k* over the total immigrants in country *i*.

[8] The weighted average of the variable share of manufacturing value-added is calculated as the sending countries' levels of shares of manufacturing value-added multiplied by the portion of immigrants coming from each country *k* over the total immigrants in country *i*.

This model is estimated using generalized method of moments (GMM) approach which allows us to handle endogeneity issues that might be caused by other sources (measurement error, unobserved country specific-effects, etc.). In this paper, we use the two-step GMM-in-system of Blundell and Bond (1998). This method combines in one system both equations in first differences and in levels (Arellano and Bover, 1995; Blundell and Bond, 1998). We obtain robust standard errors using Windmeijer's (2005) finite sample correction. We also use the over-identifying restrictions test of Sargan in order to test the validity of different instruments. We also test the null hypothesis of absence of serial correlation of the residual.

3.2. Results

This section shows and discusses the findings of the empirical analysis of the relationship between migration and structural transformation in Africa. Table 2 shows the results when we use static panel data models[9]. Models 1 and 2 display the results for destination countries and models 3 and 4 show those related to sending countries. Model 5 presents the results when both sending and destination countries are considered in the same equation. In models 6, 7 and 8 we examine the relationship between migration and structural transformation while controlling for the effect of educated migrants, migrants coming from countries with more manufacturing, and the level of stability, respectively. All specifications are globally significant with good adjustment quality. Our findings in models 1 and 2 indicate that migration is positively and significantly associated with structural transformation in destination African countries. As it is shown in specifications 1 and 2, a one per cent increase in the stocks of immigrants is associated with 0.12 per cent and 0.16 per cent increase in the manufacturing value-added, respectively.

However, migration does not seem to have a significant effect on structural transformation in sending countries as the coefficients of emigration are not significant in models 3 and 4. Regarding our control variables, the findings show that only population is statistically significant. In fact, a one per cent increase in population is associated with a 0.8 per cent to 0.9 per cent increase in manufacturing value-added. Regarding the regional dummies, our results indicate that countries which are in North, South or Middle Africa are more likely to have a higher level of manufacturing value-added compared to Western African countries (the excluded region). In model 5, when both variables immigration and emigration in are introduced in the same equation, our results remain unchanged.

9 We estimate these models using the within estimator for fixed effects specification or the generalized least square for the random effects specification. The choice of the method is based on the result of a Hausman test.

In model 6 we introduce the interaction variable that captures the effect of educated migrants on structural transformation in destination countries. The results show that the coefficient of immigration is no longer significant although positive. Interestingly, the coefficient of the interaction variable is positive which means that there is an additional positive effect of educated migrants on structural transformation within destination countries. However, this additional effect is not significant. In model 7 we add the interaction variable that captures the effect of immigration when immigrants are coming from countries with a higher share of manufacturing value-added than in the destination country. The results in model 7 confirm the positive and significant effect of migration on structural transformation in destination countries. However, it shows a positive but non-significant coefficient of the interaction variable. In model 8 we check whether the effect of migration on structural transformation in destination countries is impacted by the level of the overall stability in those countries (i.e. in the presence of armed conflict and civil war). To do so, we use an interaction variable between *LnImmigration* and a binary variable *DummyInstability* that takes 1 if a given country has faced internal conflict (armed conflict or civil war) and 0 otherwise. The results of model 8 show a positive and significant coefficient of this interaction variable. This means that the effect of immigration on structural transformation is more pronounced in countries that have encountered a deterioration in their overall stability compared to countries in which there has been an established peace. One potential explanation of this finding would be that there is often less economic development in African countries that have faced conflict and therefore there is more development (via reconstruction efforts) to be gained, and partially through attracting immigrants from more developed African countries.

We use two other measures of structural transformation, namely, (a) the logarithmic transformation of GDP per capita (*LnGDP*) and (b) the share of labour in both manufacturing and services in total employment. Appendix 2 summarises the findings when these two indicators are used as the dependent variable. When using *LnGDP*, we find similar results on the effect of migration on structural transformation within destination and sending countries. In fact, we find that a one per cent increase in the stock of immigrants is associated with a 0.09 per cent to 0.1 per cent increase in GDP per capita. For sending countries, we found no evidence for a significant effect of emigrants. In addition, the positive effect of migration on structural transformation in destination countries is more pronounced in countries that have a lower ratio of years of schooling compared to the weighted average of years of schooling of all sending countries. This confirms the importance of educated migration.

Table 1: Results of Static Panel data models								
Dependent variable	LnManufacturing							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LnImmigration	0.126*	0.164**			0.168**	0.045	0.125*	0.150**
	(0.070)	(0.066)			(0.067)	(0.099)	(0.067)	(0.068)
LnEmigration			-0.070	-0.001	0.030	0.006	0.026	0.025
			(0.084)	(0.101)	(0.115)	(0.144)	(0.115)	(0.110)
LnImmigration × DummyEducImmigrants						0.090		
						(0.078)		
LnImmigration × DummyManufImmigrants							0.055	
							(0.050)	
LnImmigration × DummyInstability								0.145*
								(0.074)
LnPopulation	0.846***	0.897***	0.907***	0.989***	0.879***	0.889***	0.859***	0.896***
	(0.162)	(0.145)	(0.086)	(0.139)	(0.134)	(0.162)	(0.136)	(0.136)
Investment	0.180	-0.078	0.401	0.124	-0.084	0.011	-0.054	-0.135
	(0.302)	(0.265)	(0.264)	(0.204)	(0.264)	(0.304)	(0.258)	(0.264)
Consumption	-0.156	-0.017	-0.181	0.029	-0.020	0.033	-0.026	-0.019
	(0.175)	(0.146)	(0.192)	(0.147)	(0.145)	(0.169)	(0.151)	(0.148)
Trade openness		0.175		0.170	0.165	0.237	0.159	0.115
		(0.329)		(0.323)	(0.338)	(0.437)	(0.340)	(0.336)
Inflation		-0.037		-0.054	-0.038	-0.102	-0.039	-0.016
		(0.034)		(0.032)	(0.034)	(0.067)	(0.034)	(0.035)
North			1.764***					
South			1.965***					
East			0.125					
Middle			0.734**					
Constant	-3.648	-4.960**	-2.985***	-4.602*	-5.067**	-3.562	-4.203*	-5.022**
Observations	237	196	243	202	196	150	196	196

R-squared	0.440	0.540	0.77	0.524	0.541	0.536	0.546	0.5549
Number of code	49	46	49	46	46	33	45	46
Model	FE	FE	RE	FE	FE	FE	FE	FE
Hausman test (p-value)	0.004	0.015	0.193	0.028	0.01	0.00	0.00	0.00
Breusch–Pagan test (p-value)			0.000					
F statistic	11.23***	17.59***		15.36***	15.91***	10.93***	14.24***	14.54***
Wald Chi-squared statistic			448.9***					

Asterisks indicate significance at 10per cent (*), 5per cent (**) and 1per cent (***). Robust standard errors are reported in parentheses and corrected for potential heteroskedasticity and autocorrelation within each country. Standard errors of regional dummies and the constant are not reported to save space.

The findings in Appendix 2 also confirm our previous results of a more pronounced impact of migration on structural transformation in African countries that have faced a deterioration in their overall stability. When the share of labour in both manufacturing and services in total employment is used as a dependent variable, both immigration and emigration do not seem to significantly affect structural transformation in African countries.

As discussed earlier in this study, one may be concerned about the potential existence of reverse causality between migration and structural transformation as the economic conditions in destination (sending) countries may present crucial incentives for immigrants (emigrants) which if not taken into consideration might bias the findings. Therefore, we estimated a dynamic panel data model. Table 2 presents the results for several specifications of our dynamic panel data model. As discussed above, to estimate these different specifications we use GMM in a system (Blundel and Bond, 1998).

Table 2: Results of Dynamic Panel data models

Dependent variable	**LnManfacturing**				
	(1)	(2)	(3)	(4)	(5)
nManfacturing	0.507***	0.715***	0.55***	0.844***	0.691***
	(0.182)	(0.103)	(0.181)	(0.169)	(0.180)
LnImmigration	0.428**		0.306	0.257**	0.064
	(0.204)		(0.206)	(0.107)	(0.139)
LnEmigration		0.302*	0.188	0.214	0.314*
		(0.166)	0.306	(0.150)	(0.167)
LnImmigration × DummyEducImmigrants			0.012		
			(0.156)		
LnImmigration × DummyManufImmigrants				-0.105	
				(0.083)	
LnImmigration × DummyInstability					0.101
					(0.168)
LnPopulation	0.001	-0.102	-0.300	-0.383*	-0.091
	(0.262)	(0.187)	(0.427)	(0.221)	(0.261)
Investment	0.312	-0.181	-0.007	0.101	0.124
	(0.338)	(0.312)	(0.350)	(0.523)	(0.269)
Consumption	0.311	-0.043	-0.075	-0.120	0.076
	(0.273)	(0.171)	(0.277)	(0.152)	(0.186)
Trade openness	1.116	0.987**	0.322	0.659*	0.332
	(0.703)	(0.408)	(0.403)	(0.340)	(0.627)
Inflation	0.228	0.129	-0.102	0.288***	0.247
	(0.235)	(0.117)	(0.261)	(0.097)	(0.155)
Constant	-0.497	0.945	3.726	2.058	-0.100
Observations	164	170	123	164	164
Wald Chi-squared statistic	140.64***	249.34***	701.42***	272.38***	159.06***
AR 2 (p-value)	0.927	0.117	0.245	0.107	0.158
Hansen-J test of over-identification (p-value)	0.739	0.291	0.999	0.536	0.587

Note: Asterisks indicate significance at 10per cent (*), 5per cent (**) and 1per cent (***). Z-Statistics of system GMM model are reported in parentheses and based on Windmeijer-corrected standard errors. Region dummies are not reported.

The results displayed in Table 2 above confirm the positive and significant effect of migration on structural transformation for destination countries. In fact, we find that a one per cent increase in the stock of immigrants is associated with a 0.26 per cent to 0.43 per cent increase in manufacturing value-added. Interestingly, when we estimate dynamic panel data models, the effect of migration on structural transformation within sending countries becomes positive and significant. We find that a one per cent increase in the stock of emigrants is associated with a 0.30 to 0.31 per cent increase in manufacturing value-added in sending countries. In addition, both coefficients of the interaction variables between immigration and educated immigration and immigration and overall stability in destination countries are positive but no longer significant. Interestingly, we find that trade openness to African economies is positively and significantly associated with structural transformation. This result may be interpreted in the way that both migration and trade are substitutes.

In Appendix 3, we use the GMM method and estimate dynamic panel data models using as a proxy for structural transformation the variable *LnGDP*. The results confirm the positive and significant effect of migration on structural transformation for both destination and sending countries. However, no evidence is found for the aforementioned channels through which migration impacts structural transformation. It should be noted that we do not estimate dynamic panel data models for the dependent variable share of labour in manufacturing and services in total employment. This is because available data on this variable only begins in 1990 which does not give us sufficient time periods to use the GMM method.

4. Structural transformation within sectors

4.1. Labour productivity at the sectoral level

Labour tends to migrate from low-productivity to high-productivity sectors/countries but this would imply perfect factor mobility and perfect information. Sectors that tend to have high labour productivity, often beyond national productivity levels, are those characterized by the engagement of large (capital intensive) firms in mining or utilities. Similarly, some services sectors such as business services are also characterized by high labour productivity. At the same time, the share of employment in those sectors is relatively low. Structural transformation as a shift in the composition of value added and employment towards those sectors with higher labour productivity would imply that aggregate productivity can be enhanced by the allocation of employment towards higher productivity activities. Migration can play an important role in fostering structural transformation by attracting additional labour to high productivity sectors.

The main corridors of intra-African migration in Western and Southern Africa reflect major labour movements within key economic sectors (e.g. construction, mining and services). For instance, migration from Southern African countries to South Africa has increased between 2000 and 2013, mainly from Zimbabwe and Lesotho; South Africa is the top migration destination country in the region. In terms of industry, foreign-born migrants are more likely to work in construction and trade, but also in agriculture and domestic work. Utilizing the Africa 10-sector database which provides sectoral[10] employment and value-added data for 11 African countries[11] for the period 1965 to 2010, we can identify labour productivity changes at the sectoral level and its link to migration. We note that the bulk of structural change in African countries comes from *within-sector* productivity growth rather than between-sector productivity growth.

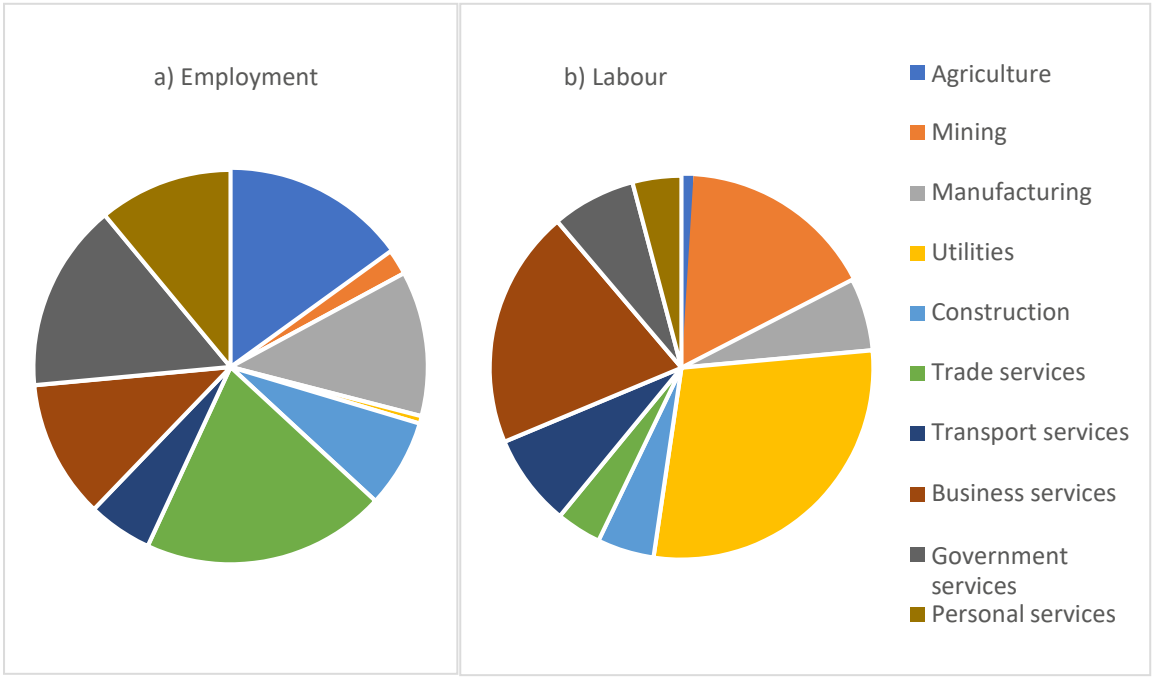
10 Agriculture (Agriculture, Hunting and Forestry, Fishing), Mining (Mining and Quarrying), Manufacturing, Utilities (Electricity, Gas and Water supply), Construction, Trade services (Wholesale and retail trade, Hotels and restaurants), Transport Services (Transport, Storage and Communications), Business services (Financial intermediation, Real estate, renting and business activities), Dwellings (as part of Business services), Government services (Public administration and defense, Education, health and social work), Personal services (Other community, social and personal service activities, activities of private household)

11 Botswana, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Nigeria, Senegal, South Africa, Tanzania and Zambia

To measure *within-sector* productivity growth, the analysis follows McMillan et al. (2014) and Timmer et al. (2014), and decomposes growth in average labour productivity over10 years into productivity gains *within-sector* and gains from the reallocation of resources between sectors.

Considering South Africa as a main destination country, *Trade services* is the sector with the largest employment share (20 per cent of total employment), followed by *Government services* (15.4 per cent) and *agriculture* (15.0 per cent) (see Figure 1). The country traditionally experienced high migration to the *mining* and *agriculture* sector. In contrast to other top migration receiving countries (e.g. Nigeria and Ethiopia), the South African labour market is less concentrated and more diversified. Nigeria and Ethiopia are both characterized by a high share of employment in the agriculture sector (58 per cent in Nigeria and 75 per cent in Ethiopia) followed by Trade services. Turning to labour productivity, it is unsurprising that the sectors with the highest labour productivity have the lowest employment share. In South Africa, the sectors *utilities*, *business services*, and *mining* are capital intensive and the most labour-productive. However, the *utilities* and *mining* sectors also experienced a reduction of employment to less than one per cent (of total employment) and two per cent which points to a potentially negative trend of sectoral allocation.

Figure 1: South Africa, sectoral composition, employment and labour productivity, 2010



Source: Authors' calculation based on Groningen Growth and Development Centre, GGDC-10 Sector Database.
Note: Labour productivity based on thousands of 2005 PPP dollars.

Similarly, the sectors with the highest labour productivity in Nigeria and Ethiopia, *mining* and *business services*, respectively, have experienced a reduction (0.27 per cent in 1991 to 0.19 per cent in 2010 - *mining* in Nigeria) or only a slight increase of employment share (0.01 per cent in 1991 to 0.4 per cent in 2010 - *business services* in Ethiopia).

According to the literature (e.g. Rogerson, 1999), the construction sector in South Africa has experienced a growing presence of foreign migrant workers. The sector attracts foreign labour mainly from Mozambique, Zimbabwe, Swaziland and Botswana. Between 1991 and 2010, the employment share in this sector has slightly increased from 5 per cent to 7 per cent, but labour productivity is low compared to national productivity levels (See Figure 1).

Looking at productivity changes over time, aggregate labour productivity can be further decomposed into *within-sector* changes and structural change between sectors (Timmer et al., 2014)[12]. Total labour productivity in African countries is mainly driven by *within-sector* productivity changes rather than sectoral allocation what is shown graphically for South Africa, Zambia and Botswana. Within the main corridors to South Africa from Mozambique, Zambia and Botswana, migration can be important to overcome skills shortages. Zambia experienced its highest productivity growth in the *construction* sector with a low and stagnant employment share of around one per cent of total employment. Aggregate productivity changes are also driven by the *agriculture* sector which experienced the second highest productivity increase and the highest employment share at around 73 per cent in 2010. The *mining* sector in Zambia, mainly based on copper, also experienced an increase in labour productivity but the employment share remains low at two per cent. However, driven by the commodity price boom during 2000-2010, the sector's contribution to GDP expanded by more than 10 per cent.

Mining is considered to have a significant impact on the whole economy by strengthening forward and backward linkages. In Zimbabwe, the mining sector used to have well-developed linkages to the economy and employed mostly local skilled labour at the professional and managerial levels. However, the economic crisis since early 2000s caused a significant loss of indigenous skills with more than half of the industry's skilled personnel emigration from the country (Fessehaie et al., 2016).

[12] $\Delta Y_t = \sum_i \theta_{i,t-k}\,\Delta y_{i,t} + \sum_i y_{i,t-k}\,\Delta\theta_{i,t} + \sum_i \Delta y_{i,t}\,\Delta\theta_{i,t}$ where Y_t and $\boldsymbol{y_{i,t}}$ refer to economy-wide and sectoral labour productivity and $\boldsymbol{\theta_{i,t}}$ captures the share of employment in sector *i* at time *t*. Δ denotes changes in productivity ($\Delta y_{i,t}$) or employment shares ($\Delta\theta_{i,t}$).

This skilled migration flow to neighbouring countries is likely to influence labour productivity at the destination country. The sectoral decomposition of productivity growth in Botswana could provide a first indication here. While there is a sectoral allocation trend away from mining (a reduction of employment share from 2.9 per cent in 1991 to 1.5 per cent in 2010), labour productivity has experienced the largest increase of all sectors.

Regional resource mobilization can be an important driver to further increase employment shares in the sectors with high labour productivity increases, which could foster overall productivity increases and income. Resource mobilization should not only be considered on a regional dimension but also within a country. Looking at the share of female employment by sectors, it should be noted that, for instance in South Africa, women mainly engage in Government services, the sector with the second highest productivity growth. In Nigeria and Ethiopia, women mainly work in services sectors (trade services and government services) but also in the manufacturing sector which points to potential for structural transformation.

In the following, the question whether immigration within Africa can spur sectoral and overall productivity will be addressed empirically.

4.2. Empirical evidence for the role of migration

To be able to explain causality and the economic effects of migration on productivity, equation (**2**) is estimated exploiting the whole of the Africa sector database.[13] Following the literature on sectoral productivity changes (see Trenczek, 2016) *within sector change*$_{ikt}$ refers to the *within-sector* component of total productivity $(\Delta y_{i,t} \ \theta_{i,t-k})$ by sector *k*, country *i* and time period *t* (1970-1980, 1980-1990, 1990-2000, 2000-2010[14] (see equation **2**). *Ln Labour productivity*$_{ikt-1}$ is sector *k*'s productivity level in the initial year (1970, 1980, 1990, 2000). The main variables of interest are the lag of stock of migration by receiving and sending country.

13 The effect of migration on aggregate productivity by driving factor is also empirically investigated but not reported here due to the small number of observations. Generally, we also find a positive effect of immigration on the Within component and on Total productivity in the static model.

14 The time periods are limited to the availability of data starting 1964 (Botswana), 1969 (Kenya), 1966 (Malawi), 1970 (Mauritius, Senegal) and 1965 (Zambia)

In addition, the regressions control for lagged employment in sector *k* and lagged time-varying country-specific variables that are likely to influence the change in sectoral productivity: GDP per capita, trade openness (share of intra-African exports and imports of total trade), investment share (gross capital formation as per cent of GDP) and FDI (as per cent of GDP). Retaining the analogy to classical growth regression, factors of labour mobility (migration), investment rate and trade variables are all included. The model estimates a *lin-log* model testing the impact of migration on various sectors, with special attention to receiving migration sectors such as agriculture, construction, mining, manufacturing and services.

$$\text{Within sector change}_{ikt} = \delta \ln \text{Labor productivity}_{ikt-1} + \beta_1 \text{lnMigration\_Receiving}_{it-1} + \beta_2 \text{lnMigration\_Sending}_{it-1} + \beta_3 \text{lnMigration\_Receiving}_{it-1} \# \text{TradeOpenness}_{it-1} + \beta_4 \text{lnEmployment}_{ikt-1} + \beta_5 \ln \text{GDP per capita}_{it-1} + \beta_6 \text{Investment share}_{it-1} + \beta_7 \text{FDI}_{it-1} + u_{kt} + u_t + a_{ik} + \varepsilon_{ikt} \quad \textbf{(2)}$$

Interaction of migration with trade openness

Much of the literature discusses whether trade and migration are substitutes or complements (e.g. Egger et al, 2011). If they are substitutes, higher trade would reduce migration. It they are complements; higher migration would spur trade by raising income or through specific network effects. Standard theory argues that labour is transferred across borders either directly in the form of migration or via trade of labour-intensive goods. Hence, trade liberalization decreases the need for migration. (Trade liberalizations stimulates trade and favours a convergence in factor prices which reduces the incentives to migrate). In other words, a country with high-import tariffs would face higher immigration because labour seeks to access labour markets, gaining from higher wages. The role of wages in intra-African migration will be discussed below. However, migration and trade can also work as complements because trade is likely to increase with higher factor mobility (Markusen, 1983; Ethier, 1996).[15] In addition, immigrants increase the consumption of locally produced goods and services; networks of migrants may decrease trade costs (knowledge of markets, consumer tastes, regulation) and migrants can act as information providers between home and foreign countries. Using country-level data for the UK, Hijzen and Wright (2010) divide immigrants into skilled and unskilled labour, and output into skilled- and unskilled-intensive output to analyse the interaction of migration and trade.

15 See also UNESCAP (2014)

The authors found that skilled immigration complements trade and that unskilled labour is rather a substitute to trade (but insignificant). The empirical literature of the migration-trade nexus provides support for a pro-trade effect (Bandyopandhyay et al., 2008; Head and Ries, 1998; Rauch and Trindade, 2002; Wagner et al., 2002). For instance, Ehrhard et al. (2012) argue that a migrant network can overcome weak institutions in the destination country and foster trade because they alleviate contract enforcement. Similarly, Orefice (2012) provides evidence for a positive effect of preferential trade areas (PTA) on bilateral migration flows which increases when PTAs have visa and asylum provisions. In addition to that, the effect of a PTA on migration is even higher than on trade.

Against this background, the effect of migration on labour productivity is likely to depend on the country's openness to trade which influences the potential to exploit economies of scale and to have the capacity to employ a rising number of people in high-productivity sectors. In particular, the interaction between intra-African migration and trade depends on a country's openness towards regional trade. The hypothesis to be tested here is that a country that is open to regional trade could also increasingly benefit from incoming labour. We introduce the interaction of receiving migration and trade openness (intra-African trade as a share of total trade) to our model and expect a significantly positive coefficient of the interaction term. Tables 3 and 4 show the results from the Fixed-effects and the system-GMM regression.[16]

Baseline regression results

Table 3: Regression results – Fixed effects

	(1)	(2)	(3)	(4)
Variables	**Fe**	**Fe**	**Fe**	**Fe**
L.ln labour productivity	0.0899***	0.122***	0.136***	0.135***
	(0.0333)	(0.0373)	(0.0439)	(0.0439)
L. ln Immigration	0.389***	0.371***	0.0994	0.108
	(0.112)	(0.107)	(0.0642)	(0.0699)
L. ln Emigration	-0.0107	-0.000326	0.0780	0.0783

16 System-GMM is employed to control for endogeneity arising from including the lagged variable of labour productivity. In addition, the specification controls for endogeneity arising from reverse causality for sectoral employment, GDP per capita and Immigration.

	(0.178)	(0.177)	(0.0937)	(0.0939)
L. ln Employment		0.232*	0.205*	0.206*
		(0.125)	(0.122)	(0.122)
L. Intra-African trade openness (per cent total trade)			-0.413	0.684
			(0.419)	(3.782)
L. ln real GDP per capita			0.349**	0.344**
			(0.139)	(0.132)
L. Gross capital formation (per cent of GDP)			0.617*	0.601*
			(0.320)	(0.331)
L. FDI (per cent of GDP)			0.0424**	0.0402**
			(0.0199)	(0.0171)
cL.ln_MigrantDest#cL.shareBilTra_world				-0.0932
				(0.313)
Constant	-4.102**	-4.840***	-4.676**	-4.745**
	(1.601)	(1.591)	(1.927)	(1.997)
Observations	436	436	356	356
R-squared	0.266	0.276	0.384	0.384
r2_w	0.266	0.276	0.384	0.384
r2_a	0.256	0.264	0.364	0.362
Robust standard errors in parentheses				
Year-specific, country-sector-specific and sector-year-specific effects always included.				
*** p<0.01, ** p<0.05, * p<0.1				

Immigration seems to be positively associated with productivity increases. A one per cent increase in the stock of immigration leads to an increase in *within-sector* labour productivity over the next 10 years of roughly 0.4 per cent (Table 3, columns (1) and (2)). Although the estimates are not significant anymore, the positive coefficient can be confirmed in column (3) and (4) in Table 3 after controlling for country-specific economic conditions. The additional control variables all positively influence productivity increases. The highest elasticity is observed for the investment share.[17] With respect to decent employment, Junankar (2013) argues that a good job from a societal point of view includes investments in modern technology, more human capital and better management. A positive relationship to intra-African trade cannot be observed based on the interaction term with migration.

17 There has been a discussion in the literature whether there is a trade-off between employment and productivity increases. In some sense, productivity must be negatively correlated with employment because if employment decreases, *ceteris paribus,* labour productivity increases. We can confirm this when looking at the correlation of employment and sector productivity at time *t* (instead *t-1*). Using data from 1950 to 2010, Juankar (2013) also find that productivity growth is not accompanied by employment, shown in a significantly negative relationship for most specifications. The author employs fixed effects and system-GMM estimator using different sub-samples of countries and regions (low- and high-income countries as well as Asia and Sub-Saharan Africa)

Turning to the system GMM results, the positive effect of migration on productivity changes can be confirmed. In this setting, emigration has a negative effect on structural transformation. Against the hypothesis, it seems that a sending country is on average not able to benefit from emigration. In addition, after controlling for reverse causality of sectoral employment, the coefficient estimate is not significant anymore.

Table 4: Regression results – System GMM

	(1)	**(2)**	**(3)**	**(4)**
	sys_gmm	**sys_gmm**	**sys_gmm**	**sys_gmm**
L.ln labour productivity	0.00723	0.00448	0.00630	0.00541
	(0.00627)	(0.00637)	(0.00917)	(0.00416)
L. ln Immigration	0.0707**	0.109*	0.170***	0.235
	(0.0330)	(0.0593)	(0.0627)	(0.149)
L. ln Emigration	-0.0889*	-0.120*	-0.248***	-0.169***
	(0.0506)	(0.0658)	(0.0775)	(0.0501)
L. ln Employment		-0.0668	0.0673	0.0507
		(0.0946)	(0.132)	(0.0608)
L. Intra-African trade openness (per cent total trade)			1.496***	18.23
			(0.542)	(12.82)
L. ln real GDP per capita			0.441***	0.334***
			(0.144)	(0.109)
L. Gross capital formation (per cent of GDP)			0.963***	0.601***
			(0.327)	(0.178)
L. FDI (per cent of GDP)			-0.0276	-0.0721
			(0.0295)	(0.0540)
cL.ln_MigrantDest#cL.shareBilTra_world				-1.396
				(1.040)
Constant	0	0.902	-2.541**	-3.186*
	(0)	(0.625)	(1.259)	(1.694)
Observations	436	436	356	356
ar1p	0.00824	0.00826	0.708	0.491
hansenp	0.109	0.0370	0.0603	0.0213
sarganp	0	0	0	0
ar2p	0.00702	0.00876	0.0863	0.196
Robust standard errors in parentheses				
Endongeous variables: L.ln_labour productivity, ln Emigration, ln Employment, ln real GDP per capita				

Year-specific and country-sector-specific effects always included.				
*** p<0.01, ** p<0.05, * p<0.1				

In an additional robustness check that aimed to establish a stronger link to existing migration trends, only sectors that have been identified as a driver for main migration destinations are included in the regression. These are agriculture, manufacturing, construction, trade services and business services. The positive impact of migration on sectoral productivity seems to be even higher.

	(1)	**(2)**	**(3)**	**(4)**
	FE	**FE**	**FE**	**FE**
L.ln_labour_prodconstUSD	0.0711	0.118**	0.118**	0.174**
	(0.0435)	(0.0463)	(0.0463)	(0.0728)
L.ln_MigrantDest	0.343**	0.306**	0.306**	0.0748
	(0.164)	(0.150)	(0.150)	(0.0677)
L.ln_MigrantOrig	-0.0624	-0.0283	-0.0283	0.0185
	(0.299)	(0.297)	(0.297)	(0.143)
L.ln_emp		0.405**	0.405**	0.369
		(0.170)	(0.170)	(0.230)
L.shareBilTra_world				-0.439
				(0.793)
L.lnrealGDP_pc				0.413**
				(0.198)
L.GCFperGDP				0.929**
				(0.461)
L.FDI				0.0548*
				(0.0318)
Constant	-3.022	-4.704*	-4.704*	-4.920
	(2.497)	(2.567)	(2.567)	(2.970)
Observations	220	220	220	180
R-squared	0.252	0.277	0.277	0.457
r2_w	0.252	0.277	0.277	0.457
r2_a	0.231	0.253	0.253	0.421
Robust standard errors in parentheses				
Only sectors Agriculture, Manufacturing, Construction, Trade Services and Business Services are included.				
*** p<0.01, ** p<0.05, * p<0.1				

5. Summary and conclusions

This study exploits a new dataset on migrant stocks which is based on population censuses during the period 1970-2013 and tries to empirically respond to the main objective of the Economic Development in Africa Report (2018); that is to contribute to a better understanding of the relationship between migration and structural transformation in destination and sending African countries. To do so, we use a variety of econometric models and explore several specifications of the structural transformation variable. The results show that migration enhances structural transformation within both destination and sending countries. Overall, the findings of our most conservative model (dynamic panel data model), suggest that a one per cent increase in the stock of immigrants (emigrants) is associated with a 0.43 per cent (0.30 per cent) increase in manufacturing value added in destination (sending) countries. When GDP per capita is used as our dependent variable, the findings of this study are similar in sign and magnitude to those found in Bove and Elia (2016) which focus on a global context. In fact, these authors exploring the effect of immigration (through its effect on the cultural diversity proxied using fractionalization and polarization indices) on development (proxied using GDP per capita) in developing countries, find that a one per cent increase in the growth rate of fractionalization boosts GDP per capita by about 0.1 per cent. In our study, we find that a one per cent increase in the stock of immigrants (emigrants) is associated with a 0.06 per cent (0.1 per cent) increase in GDP per capita in destination (sending) countries.

Furthermore, this study aims to empirically examine the channel through which migration patterns impact structural transformation in Africa. In order to investigate whether migration impacts structural transformation in Africa through the channel of promoting human capital formation, innovation and the adoption of new technologies (Bodvarsson and Van den Berg, 2013; Nelson and Phelps, 1966), we interact the variable migration with a dummy variable that takes 1 if the weighted average of years of schooling in sending countries is higher than the average of years of schooling in the receiving country and zero otherwise. The results show that the coefficient of this interaction variable is positive which indicates that there is an additional effect of educated immigration on structural transformation. This positive effect is significant when we measure structural transformation using the variable logarithm transformation of GDP per capita.

It should be noticed that the effect of human capital on economic growth is a controversial question in the related literature. The recent cross-country growth literature assuredly shows that different economies obey different linear models when grouped together according to their

initial level of economic development (Durlaufand Johnson, 1995; Kalaitzidakis and al., 2001). Durlauf and Johnson (1995) find that the coefficient of the secondary enrollment ratio is one third higher in magnitude for the middle-income economies as compared to the high income. Krueger and Lindahl (2001) examining a sample of 110 countries, find a positive and significant impact of education on economic growth only for less-developed countries which are characterized by the lowest level of education. Likewise, Qadri and Waheed (2013) find that the benefits of human capital are larger in the low-income countries than in the whole sample. In addition, O'Neil (1999) finds that the return to education measured in terms of its contribution to GDP increases by 58 per cent in developed countries and by 64 per cent in less-developed countries. Vandenbussche et al. (2006) provide the theoretical reason underpinning the aforementioned results. The authors argue that rich countries are closer to the technological frontier which means thus the strength of the catch-up impact with the frontier erodes with the relative level of development. Thus, from this point of view, African developing countries should take most advantage from educated immigration inflows.

In addition, this study checks whether the effect of migration on structural transformation in destination countries is affected by the level of overall stability in those countries (in the presence of armed conflict and civil war). The results show that the effect of immigration on structural transformation is more pronounced in countries that have encountered a deterioration in their overall stability compared to countries in which there has been an established peace. One potential explanation of this finding might be that there is less economic development in African countries that have encountered conflict and therefore there is more development (and reconstruction) to be gained and partially through attracting African immigrants.

A key policy recommendation of this study for policymakers in African countries would be to engage in policies that facilitate the freedom of movement of African workers within the continent, as this will contribute not only to economic development in destination countries but also in sending countries. For instance, visa restrictiveness and other immigration restrictions set by several African countries should be abandoned for African migrants. Another important related policy recommendation would be to ensure mutual recognition of academic qualifications and skills.

By taking advantage of the availability of both time-series and cross-country data, this study makes progress in explaining the socio-economic benefits of intra-African migration. However, this study has some limitations. One of them is the relatively large share of informal intra-African migrants, and that their effect on structural transformation is not accounted for in this study. In fact, Ratha et al (2011) argue that roughly half of African migratory flows are intra-continental and most of them are informal and not included in national official statistics.

Future studies on structural transformation within African countries which are characterized by low productive agriculture sector, should proxy structural transformation using the variable urbanization which reflects the migration of labour from rural to urban areas.

References

Adams, R.H. and Page, J., 2005, Do International Migration and Remittances Reduce Poverty in Developing Countries? World Development, Vol. 33, No. 10, pp. 1645-1669.

Ager, P., and Brõckner, M., 2013. Cultural diversity and economic growth: Evidence from the US during the age of mass migration. European Economic Review, 64, 76–97.

Alesina, A., Harnoss, J., and Rapoport, H., 2016. Birthplace diversity and economic prosperity. Journal of Economic Growth, 21(2), 101–138.

Arellano, M., and Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. The Review of Economic Studies, 58(2), 277–297.

Arellano, M., and Bover, O., 1995. Another look at the instrumental variables estimation of error-components models. Journal of Econometrics, 68(1), 29–51.

Bandyopadhyay, S., Coughlin, C. C., & Wall, H. J. (2008). Ethnic networks and U.S. exports. Review of International Economics, 16(1), 199–213.

Barro, R. J., and Lee, J., W., 2013. A new data set of educational attainment in the world, 1950–2010. Journal of Development Economics, 104,184–198.

Barro, R. J., and Sala-i-Martin, X., 1992. Convergence. Journal of Political Economy, 100(2), 223–251.

Barro, R., J., 1991. Economic growth in a cross section of countries. The Quarterly Journal of Economics, 106(2), 407–443.

Blundell, R., and Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, 87(1), 115–143.

Bodvarsson, O. B., and Van den Berg, H., 2013. Economic growth and immigration. In The economics of immigration (pp. 217–248). Berlin Heidelberg: Springer.

Bove, V., and Elia, L., 2017. Migration, Diversity and Economic Growth. World Development, 89, 227-239.

Brauw, A., Mueller, V., and Lee, H., L., 2014. The Role of Rural–Urban Migration in the Structural Transformation of Sub-Saharan Africa, World Development, 63, 33-42.

Chellaraj, G., Maskus, K., E., and Mattoo, A., 2008. The contribution of skilled immigration and international graduate students to U.S. innovation. Review of International Economics, 16(3), 444–462.

Collier, P., 2013. Exodus: How migration is changing our world. Oxford University Press.

De Haan, A., 1999. Livelihoods and poverty: The role of migration-acritical review of the migration literature. The Journal of Development Studies, 36(2), 1–47.

Deane, K., D., Johnston, D., and Parkhurst, J., O., 2013. Migration as a tool in development policy: Caution ahead? The Journal of Development Studies, 49(6), 759–771.

Docquier, F., Lodigiani, E., Rapoport, H., and Schiff, M., 2016. Emigration and democracy. Journal of Development Economics, 120, 209-223.

Durlauf, S., N., and Johnson, P., A., 1995. Multiple regimes and cross-country growth behaviour. Journal of Applied Econometrics, 10(4), 365–384.

Dustmann, C., and Frattini, T., 2014. The fiscal effects of immigration to the UK. The Economic Journal, 124(580), F593–F643.

Easterly, W., and Levine, R., 1997. Africa's growth tragedy: Policies and ethnic divisions. The Quarterly Journal of Economics, 1203–1250.

Egger, P., Ehrlich M., Nelson, D., 2011, Migration and trade, CESifo Working Paper No. 3467 Ehrhart, H., Le Foff, M., Rocher, E. and Singh, R. J., 2012, Does migration foster exports? – An African perspective, CEPII 2012-38.

Ethier, W.J. (1996) "Theories about trade liberalisation and migration: substitutes or complements?" In P. J. Lloyd and L. Williams (eds), International Trade and Migration in the APEC Region (pp. 50–68).Melbourne: Oxford University Press.

Fessehae, J., Rustomjee, Z. and Kaziboni, L., 2016, Can mining promote industrialization? A comparative analysis of policy frameworks in three Southern African countries.

Figueiredo, E., Lima, L. R, Orefice, G., 2013, Migration and regional trade agreement: A (new) gravity estimation, CEPII Working paper 2014-13.

Frankel, J., and Romer, D., 1999. Does trade cause growth? The American Economic Review, 89(3), 379–399.

Gagnon, J., 2014. Chapter ''Demographic change and the future of the labour force in the EU27, other OECD countries and selected large emerging economies". In OECD, & European Union (Eds.), Matching economic migration with labour market needs. Paris: OECD Publishing.

Gallego, J., and Mendola, M., 2011. Labour migration and social networks participation: Evidence from Southern Mozambique. INSIDE Paper No. 28. Institute for Economic Analysis.

Head, K., & Ries, J. (1998). Immigration and trade creation: econometric evidence from Canada. Canadian Journal of Economics, 31(1), 47–62.

Hijzen, A. and P.W. Wright, (2010) "Migration, Trade and Wages". Journal of Population Economics, 23(4),1189–1211.

Horwitz, S. K., and Horwitz, I. B., 2007. The effects of team diversity on team outcomes: A meta-analytic review of team demography. Journalof Management, 33(6), 987–1015.

Junankar, P. N., 2013, Is there a trade-off between employment and productivity, IZA DP No. 7717.

Kalaitzidakis, P., Mamuneas, T., P., Savvides, A., and Stengos, T.,2001. Measures of human capital and nonlinearities in economic growth. Journal of Economic Growth, 6(3), 229–254.

Krueger, A., B., and Lindahl, M., 2001. Education for Growth: Why and for Whom? Journal of Economic Literature, 39(4), 1101–1136.

Lazear, E., P., 1999. Globalisation and the market for team-mates. The Economic Journal, 109(454), 15–40.

Markusen, J.R. (1983) Factor movements and commodity trade as complements. Journal of International Economics 14: 341–356

Nelson, R., R., and Phelps, E., S., 1966. Investment in humans, technological diffusion, and economic growth. The American Economic Review, 69–75.

Ocampo, J., A, 2005. The Quest for Dynamic Efficiency: Structural Dynamics and Economic Growth in Developing Countries. In Beyond Reforms: Structural Dynamics and Macroeconomic Vulnerability, ed. Ocampo, J.A. Santiago: Economic Commission for Latin America and the Caribbean and Stanford University Press.

Ocampo, J., A., and Vos, R., 2008. Structural Change and Economic Growth. In Uneven Economic Development, eds. Ocampo, J.A., and Vos, R. London: Zed Books.

O'Neill, D., 1995. Education and Income Growth: Implications for Cross-Country Inequality. Journal of Political Economy, 103, pp. 1289-1301.

Orefice, G., 2012, International migration and trade agreements: The new role of PTAs, CEPII 2012-15.

Ottaviano, G. I., and Peri, G., 2006. The economic value of cultural diversity: Evidence from US cities. Journal of Economic Geography, 6(1), 9–44.

Özden, C. Parsons, C., R., Schiff, M., and Walmsley, T., L., 2011. Where on earth is everybody? The evolution of global bilateral migration 1960–2000. The World Bank Economic Review, 25(1), 12–56.

Papademetriou, D. G., 1991. The unsettled relationship: Labour migration and economic development (No. 33). Greenwood Publishing Group.

Qadri, F., S., and Waheed, A., 2013. Human capital and economic growth: Cross-country evidence from low-, middle-and high-income countries. Progress in Development Studies, 13(2), 89–104.

Ratha, D., and Shaw, W., 2007. South-South migration and remittances (No. 102). World Bank Publications.

Ratha, D., Eigen-Zucchi, C., and Plaza, S., 2016. Migration and remittances Factbook 2016. World Bank Publications.

Ratha, D., S., Mohapatra, C., Ozden, S., Plaza, W., Shaw and A., Shimeles, 2011. Leveraging Migration for Africa: Remittances, Skills, and Investments. World Bank.

Rauch, J., & Trindade, V. (2002). Ethnic Chinese networks in international trade. Review of Economics and Statistics, 84(1), 116–130.

Rogerson, C. M., Building skills: Cross-border migrants and the South African Construction Industry, The South African Migration Projects.

Santos Silva, J., and Tenreyro, S., 2006. The log of gravity. The Review of Economics and Statistics, 88(4), 641–658.

Skeldon, R., 2008. International migration as a tool in development policy: A passing phase? Population and Development Review, 34(1), 1–18.

Taylor, J., E., and Martin, P., 2001. Human capital: Migration and rural population change. In

G. Rausser, & B. Gardner (Eds.), Handbook of agricultural economics (pp. 458– 511). New York: Elsevier.

Timmer MP, de Vries G and de Vries K (2014). Patterns of structural change in developing countries. Research Memorandum No. 149, Groningen Growth and Development Centre (GGDC), Groningen.

UNDESA (United Nations Department of Economic and Social Affairs), 2006a. World Economic and Social Survey 2006: Diverging Growth and Development. New York: United Nations.

UNDP (2009). Overcoming barriers: Human mobility and development, Human development report. New York: UNDP.

UNIDO (United Nation Industrial Development Organization), 2013. Industrial Development Report: Sustaining Employment Growth: The Role of manufacturing and Structural Change. Vienna.

Van Der Mensbrugghe, D., and Roland-Holst, D., 2009. Global economic prospects for increasing developing country migration into developed countries. United Nations Development Programme, human development reports, Research Paper 2009/50.

Vandenbussche, J., Aghion, P., and Meghir, C., 2006. Growth, distance to frontier and composition of human capital. Journal of Economic Growth, 11(2), 97–127.

Wagner, D., Head, K., & Ries, J. (2002). Immigration and the trade of provinces. Scottish Journal of Political Economy, 49 (5), 507–525.

Windmeijer, F., 2005. A finite sample correction for the variance of linear efficient two-step GMM estimators. Journal of Econometrics, 126 (1), 25–51.

World Bank (2008). World development report 2008. Washington, DC: World Bank.

World Bank (2009). Reshaping economic geography – World development report 2009. Washington, DC: World Bank.

Appendices

Appendix 1 : List of the countries included in this study			
Algeria	Dem. Rep. of the Congo	Libya	Senegal
Angola	Djibouti	Madagascar	Seychelles
Benin	Egypt	Malawi	Sierra Leone
Botswana	Equatorial Guinea	Mali	South Africa
Burkina Faso	Gabon	Mauritania	Swaziland
Burundi	Gambia	Mauritius	Togo
Cabo Verde	Ghana	Morocco	Tunisia
Cameroon	Guinea	Mozambique	Uganda
Central African Republic	Guinea-Bissau	Namibia	United Republic of Tanzania
Chad	Kenya	Niger	Zambia
Comoros	Lesotho	Nigeria	Zimbabwe
Congo	Liberia	Rwanda	
Côte d'Ivoire	Liberia	Sao Tome and Principe	

Appendix 2: Results of static Panel data models

Dependent variable	**LnGDP**				**Share of Labour in Manufacturing and Services**			
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
LnImmigration	0.102**	-0.012	0.091**	0.090**	-2.368	-6.138	-2.161	-3.581
	(0.042)	(0.048)	(0.044)	(0.043)	(2.879)	(4.372)	(2.923)	(3.481)
LnEmigration	-0.021	-0.049	-0.020	-0.026	-0.430	-1.385	-0.273	-0.428
	(0.058)	(0.068)	(0.059)	(0.051)	(0.946)	(1.543)	(1.098)	(0.970)
LnImmigration × DummyEducImmigrants		0.112**				4.195		
		(0.050)				(3.337)		
LnImmigration × DummyManufImmigrants			0.011				0.386	
			(0.028)				(1.008)	
LnImmigration × DummyInstability				0.102**				3.442
				(0.041)				(2.429)
LnPopulation	0.017	0.025	-0.027	0.035	0.659	-2.966	-6.215	0.565
	(0.088)	(0.093)	(0.095)	(0.087)	(8.100)	(10.87)	(12.267)	(8.134)
Investment	-0.149	-0.070	-0.136	-0.187	6.972	10.198	7.512	6.577
	(0.204)	(0.211)	(0.204)	(0.201)	(8.865)	(9.362)	(9.051)	(8.718)
Consumption	-0.336***	-0.390**	-0.380***	-0.330***	-0.934	-4.101	-5.009	-1.459
	(0.123)	(0.146)	(0.130)	(0.117)	(4.202)	(5.354)	(6.106)	(4.235)
Trade openness	0.147	0.084	0.156	0.087	3.571	1.090	5.975	3.551
	(0.191)	(0.202)	(0.190)	(0.193)	(3.653)	(5.060)	(4.731)	(4.032)
Inflation	-0.102*	-0.191***	-0.099*	-0.077	-0.011	-1.291	-0.042	0.006
	(0.052)	(0.029)	(0.052)	(0.058)	(1.088)	(1.051)	(1.066)	(1.331)
Constant	5.780***	7.326***	6.645***	5.759***	56.170	175.939	163.581	71.804
Observations	187	141	187	187	124	94	124	124
R-squared	0.265	0.327	0.276	0.316	0.091	0.155	0.125	0.110
Number of code	44	31	44	44	43	33	43	43
Model	FE	FE	FE	FE	FE	FE	FE	FE
Hausman test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F statistic	7.72***	28.44***	7.34***	9.17***	2.60***	3.39***	2.13***	3.43***

Asterisks indicate significance at 10per cent (*), 5per cent (**) and 1per cent (***). Robust standard errors are reported in parentheses and corrected for potential heteroskedasticity and autocorrelation within each country.

Appendix 3: Results of dynamic Panel data models

Dependent variable	LnGDP					
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged dependent variable	1.007***	0.429***	1.065***	0.975***	1.04***	0.963***
	(0.049)	(0.062)	(0.07)	(0.155)	(0.08)	(0.08)
LnImmigration	0.059**		0.003	-0.042	-0.009	-0.049
	(0.028)		(0.06)	(0.118)	(0.080)	(0.057)
LnEmigration		-0.105***	0.09**	0.068	0.102*	0.108**
		(0.030)	(0.04)	-0.042	(0.054)	(0.045)
LnImmigration × DummyEducImmigrants				0.087		
				(0.133)		
LnImmigration × DummyManufImmigrants					-0.012	
					(0.043)	
LnImmigration × DummyInstability						(0.102)
						-0.070
LnPopulation	-0.133***	0.119**	-0.102	-0.008	-0.122**	-0.070
	(0.029)	(0.054)	(0.120)	(0.126)	(0.060)	(0.082)
Investment	0.153**	-0.043	0.125	0.122	0.066	0.095
	(0.068)	(0.038)	(0.159)	(0.182)	(0.179)	(0.158)
Consumption	-0.038	-0.236***	-0.073	-0.024	-0.175*	-0.126
	(0.043)	(0.039)	(0.114)	(0.111)	(0.103)	(0.077)
Trade openness	0.574***	0.051	0.396	0.481*	0.415**	0.052
	(0.076)	(0.077)	(0.301)	(0.270)	(0.201)	(0.226)
Inflation	0.196***	0.108***	0.106	-0.186*	0.033	0.092
	(0.037)	(0.024)	(0.102)	(0.111)	(0.065)	(0.090)
Constant	0.948**	3.017***	-0.206	-0.061	0.362	0.397
Observations	157	162	157	116	157	157
Wald Chi-squared statistic	798.42***	289.33***	673.01***	974.7***	452.08***	506.06 ***
AR 2 (p-value)	0.741	0.118	0.593	0.695	0.640	0.629
Hansen-J test of over-identification (p-value)	0.158	0.248	0.247	0.989	0.381	0.760

Note: Asterisks indicate significance at 10per cent (*), 5per cent (**) and 1per cent (***). Z-Statistics of system GMM model are reported in parentheses and based on Windmeijer-corrected standard errors.