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ON THE IMPACT OF HOUSEHOLD ASSET LEVEL AND INEQUALITY ON INTER-GOVERNORATE MIGRATION: EVIDENCE FROM EGYPT

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Abstract

We investigate whether the level and the inequality of household assets impact inter-governorate migration in Egypt using gravity models and data from the 1996 and 2006 Population and Housing Censuses of Egypt. We find that people tend to move to the governorates with higher asset level and higher asset inequality. This suggests that there is a positive association between inequality and economic growth. Areas with high economic level and inequality attract more migrants than areas with low economic level and inequality. Moreover, our findings suggest that unlike non-work migration, the low level of assets in original governorate is a push factor of work migration.

JEL Classifications: O15; R23; D63

Keywords: household asset inequality, asset index, migration, gravity model, Egypt.

ملخص

في هذه الدراسة نبحث فيما إذا كان لمستوى الأصول لدى الأسر المعيشية وعدم المساواة فيها ؟ؤثر عل؟ الهجرة ب؟ن المحافظات في مصر. وباستخدام نماذج وب؟انات الجذب من تعدادى السكان وا؟سكان في مصر لعامى 1996 و2006 تبين لنا أن الناس يميلون إلى الانتقال إلى المحافظات ذات مستوى الأصول العالي وعدم المساواة في الأصول بها. وهذا يشير إلى وجود علاقة إيجابية بين عدم المساواة والنمو الاقتصادي. فالمناطق ذات المستوى الاقتصادي العالي وعدم المساواة تجذب المزيد من المهاجرين أكثر من المناطق ذات المستوى الاقتصادي المنخفض وعدم المساواة في تلك الأصول بها. علاوة على ذلك، توحي نتائجنا أنه على عكس الهجرة لغير العمل، فإن انخفاض مستوى الأصول في المحافظة الأصلية يعتبر عامل دفع للهجرة للعمل.

1. Introduction

Although economic growth constitutes a necessary condition to reduce poverty, there is an agreement among economists that its efficiency in terms of poverty reduction largely depends on the level of inequality. High inequality means low income for a large proportion of population that will have low investment in human capital, and as a result continue to have low productivity and income. Recently, there is an increasing concern about the inequality in household assets which can cause inequality in income and consumption. Nowadays, most countries pursue a pro-poor growth policy that not only promotes economic growth but also reduces the inequality (Bhagwati, 1988; Goudie and Ladd, 1999; Kakwani and Ernesto, 2000; Perkins et al. 2001).

Migration is one of important livelihood strategies for households, especially in low-income and middle-income regions, to increase income and reduce poverty. Agriculture is a major income source for rural households, but agricultural income is volatile because of economic and natural shocks (Winters et al., 2004; Easterly and Kraay, 2000). Non-farm business income might be more stable, but starting a non-farm business is not easy because of credit constraints and lack of business knowledge. Migration is one of ways to increase income and reduce risk of income fluctuation (Stark and Bloom, 1985; Stark and Taylor, 1991; Stark, 1991; Adams and Page, 2005; McKenzie and Sasin, 2007; Nguyen, 2008; Nguyen et al., 2011).

Economists as well as policy makers have been long interested in understanding the causes of migration. In the economic literature, there are numerous theories on the migration decisions of individuals or households. In conventional theory, individuals relocate to maximize utility given spatial variation in wage and price levels (Molloy, 2011; Valencia, 2008). In the New Economics of Labor Migration, decisions to migrate depend on characteristics of both migrants and their families (Stark and Bloom, 1985; Stark and Taylor, 1991). Recently, there are a number of studies showing that community characteristics of home and destination locations are also important factors exerting 'push' and 'pull' forces on migrants (Mayda, 2007; Kim and Cohen, 2010; Ackah and Medvedev 2012). People tend to move from regions with low welfare levels to regions with high welfare levels (Stark and Bloom, 1985; Stark and Taylor, 1991; Stark, 1991). In addition, public services are also considered in migrants' decisions. Migrants not only seek better employment, but also access to improved public services in destination areas (McKenzie and Rapoport, 2006; Zaiceva and Zimmermann, 2008). Ackar et al. (2012) show that in communities with poor public services, people are likely to migrate regardless of their relatively disadvantaged education and inherent characteristics which are not favorable for them to move to other regions.

Human capital plays a key role in economic development (Schultz, 1997; 2002; Hanushek and Woesmann, 2008). Understanding whether the welfare level can attract migrants, especially highly-educated and skilled migrants, is important for economic development. The main objective of this study is to examine the push and pull effects of the level and inequality of household assets on inter-governorate migration using a gravity model and data from the Population and Housing Censuses of Egypt in 1996 and 2006. We will provide the descriptive analysis of inter-governorate migration in Egypt, and then examine whether the mean and inequality of the original and destination governorates can affect the inter-governorate migration.

For several reasons, Egypt offers an interesting case to look at. Firstly, Egypt is the largest country in the Arab world. Egypt is a low middle income country with per capita GDP of around 3,300$US in 2013 (World Bank, 2014). Secondly, Egypt has achieved annual economic growth rate of around 5 percent, but it has not been very successful in poverty reduction. Poverty in Egypt is persistent with a rate around 20 percent during the last two decades (El-Laithy, 2011). According to World Bank (2014), the poverty rate of Egypt is 25.2 percent, and 75 percent of the poor are living in

rural areas. There is a high inequality between regions and the inequality is also high within regions. Thus, it is important to investigate whether the inequality and the poverty can be pull or push factors of migration among governorates in Egypt. Thirdly, although there are several studies on migration in Egypt such as Zohry (2007; 2009), Herrera and Badr (2012) and Wahba (2015), there are no studies on the linkages between migration and household asset inequality in Egypt.

Our paper aims to contribute to the ongoing literature that promotes rural development in developing countries through the rural-urban migration. There are a large number of studies on the effect of wealth level as well as the inequality between the original and destination areas on migration. The effect of migration on inequality of the original and destination areas is also studied (e.g., Black et al., 2005; Card and Shleifer, 2009). However, there is little if anything known on the effect of inequality within the original and destination areas on migration. Our study is one of the first attempts to examine the impact of wealth inequality of original and destination areas on the migration flow between areas. Policy-makers are interested on assessing the impacts of inequalities for not only economic reasons but also social ones such as social justice and social cohesion.

The remaining sections of this paper are structured as follows. Section 2 briefly discusses theoretical framework and literature on the determinants of migration decision. The third section introduces the main data sets used in this study and presents some preliminary analyses. Section 4 introduces our empirical approach. Section 5 discusses our main empirical findings. Finally, conclusions are presented in section 6.

2. Theoretical framework and literature review

According to theoretical migration models (e.g., Harris and Todaro, 1970), migration is determined by "pull" and "push" factors. The most important pull factors are economic incentives such as job opportunities, higher real wages and better public services. Push factors at the place of origin such as poor economic activity or conflicts cause outmigration. This "disequilibrium" view of migration emphasizes persistent expected income differentials as a major motivation for migration. Recent research tries to identify factors behind migration, taking into account market failures due to information asymmetries, credit market imperfections and network effects.

In the empirical literature, logistic models are often used to understand migrants' motives for moving (McKenzie et al. 2010; Gibson et al. 2011). These models include characteristics of migrants as well as of their households and home and host regions. Microeconomic models and gravity models are also used in the literature to determine migration determinants. Microeconomic models make use of micro data such as surveys of individuals or households, while gravity models appeal to the representative agent assumption and make use of aggregate data, for example census data in which migration rates are measured at the level of the community or administrative unit (e.g., Karemera et al., 2000; Grogger and Hanson, 2011; Phan and Coxhead, 2010; Bunea, 2012; Ortega and Peri, 2013). For example, Phan and Coxhead (2010) used data from the 1989 and 1999 Censuses from Vietnam to investigate migration patterns and determinants and the role of migration on cross-province income differentials. They found that provinces with higher per capita income attract more migrants. However, the coefficient of the income in the sending province is also positive and significant, implying that the "liquidity constraint effect" outweighed the "push" effect in inhibiting migration in poorer regions.

It is well established in the literature that individuals move from low to high wealth areas (Stark and Bloom, 1985; Stark and Taylor, 1991). However, there are less evidences on the effect of inequality of wealth within the original and destination areas on migration. Lipton (1980) suggests

that inequalities within original areas can push migration, i.e., people living in more unequal areas are more likely to migrate.

Based on the current literature on economic growth, poverty, inequality, and migration, we argue that asset level and asset inequality might affect migration between areas through several channels. First, income inequality, which has been shown to be linked to migration, can be caused by asset inequality. McKinley (1993) suggests that unequal and highly concentrated distribution of assets, in particular productive resources such as physical capital, land and human capital in the form of better education, causes unequal distribution of income. Second, capital market imperfections and credit constraints coupled with unequal and highly concentrated patterns of asset ownership can constitute a push factor of migration. In the case of Egypt, it seems that rural poor are not able to provide collaterals to obtain sufficient loans from lenders. In the context of credit rationing, only entrepreneurs with significant levels of assets are able to finance their projects. This prevents rural poor from undertaking profitable investments and may leads to persistence of poverty and encourages rural poor to migrate to urban areas to find alternative means of livelihood (Deininger and Olinto, 2000). Third, asset inequality limits human capital accumulation and thus growth, especially in countries such as Egypt where the economic importance of agriculture activity is still quite important due to its contribution of the GDP and rural employment and livelihood for the poor (Carter, 2000). This may explain the high rate of rural-to-urban migration among low educated people. Finally, asset inequality may threaten social cohesion and cause social instability and social stratification which can be directly associated with violence and crime and may act as migration push factor (De Janvry and Sadoulet, 2000).

Our study aims to fill the research gap in measuring the effect of wealth level and inequality on migration. To measure the asset inequality, we will follow the approach of Filmer and Pritchett (2001), which computes a wealth index using a principal components approach. According to this approach, an index is constructed as the first principal component of a vector of assets of households, including durables goods, housing characteristics, and access to utilities. Filmer and Scott (2008) and Kolenikov et al. (2009) conclude that rankings of various measures of welfare, including outcomes for education, health care, fertility, child mortality, and the labor market, are very similar the ranking of asset indices. In this study, we will use this asset index and examine whether asset level and inequality affect the decision to migrate in Egypt. We hypothesize that people can migrate from areas of low asset levels to areas of high asset levels. Moreover, we study whether asset inequality in original and destination areas are push and pull factors of migration, an issue that has not been investigated in previous studied on migration.

3. Data sets and descriptive statistics

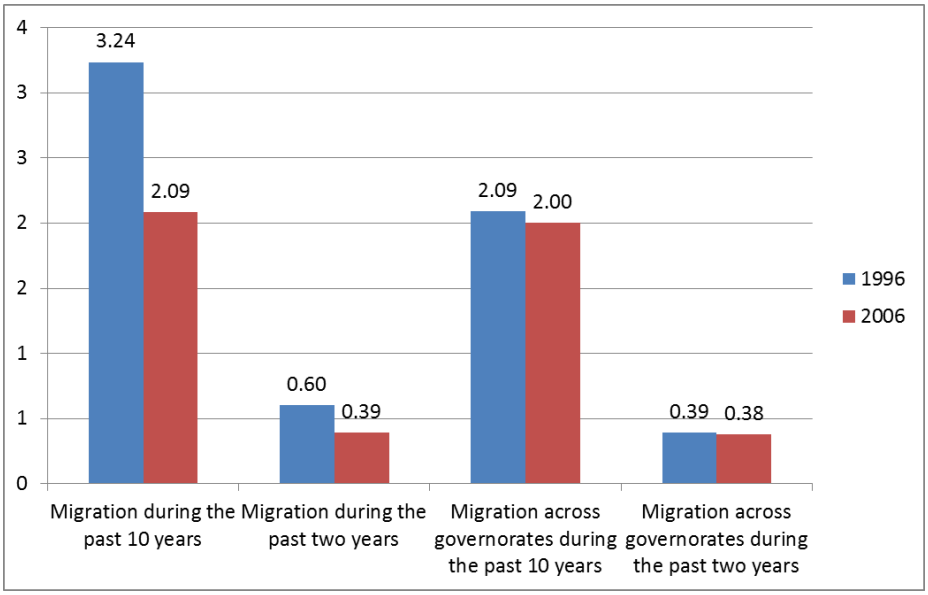
3.1. Data sets

In this paper, we make use of data from the Population and Housing Censuses of Egypt which were conducted by the Central Agency for Mobilization and Statistics (CAPMAS) in 1996 and 2006. The Population and Housing Censuses of Egypt contain individual-level and household-level data. The individual-level module contains data on demography, education, employment, disability and migration of individuals. Regarding migration, there are data on the previous governorate of individuals before living in the current governorate, and year of moving. Using the data set, we compute the rate of inter-governorate migration. The household-level module contains data on housing condition facilities, and durables. These data are used to construct the asset indexes.

3.2. Inter-governorate migration

International migration in Egypt has been examined in different studies such as Zohry (2007, 2009) and Wahba (2014). Our paper uses the Egypt Population and Housing Censuses to compute the inter-governorate migration and estimate the migration flows between governorates. Figure 1 shows that the percentage of individuals who changed the residence place during the past 10 year was 3.2 percent in 1996 and 2.1 percent in 2006. The percentage of people moving across governorates was lower, at 2.1 percent in 1996 and 2.0 percent in 2006. In this study, we will measure the effect of current wealth index and inequality on migration flow. Thus we use the short-run migration that happened recently. We measure the inter-governorate during the past two years. The percentage of migrants during the past two years was lower than the percentage of migrants during the past 10 years. The percentage of inter-governorate migration during the past two years in 1996 and 2006 was 0.39 percent and 0.38 percent, respectively.

Figure 1: Migration rate in Egypt

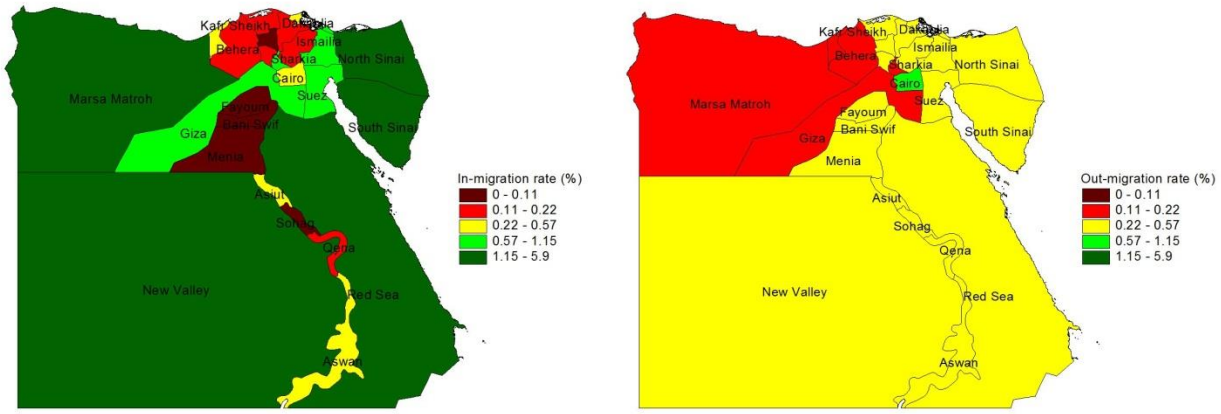


Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses

Figures 2 and 3 present maps of the percentage of out-migration and in-migration population during the past two years across governorates. Detailed estimates of the migration rate and the number of migrants are presented in Tables A.1 and A.2 in Appendix. The pattern of migration is very similar in 1996 and 2006. South Sinai had the highest in-migration rate, at 5.6%, while Kaliobia had the lowest in-migration rate, at 0.16%. Governorates that had the highest in-migration rates are Red Sea and New Valley.

Figure 2: The percentage of inter-governorate in-migration and out-migration during the past two years in 1996

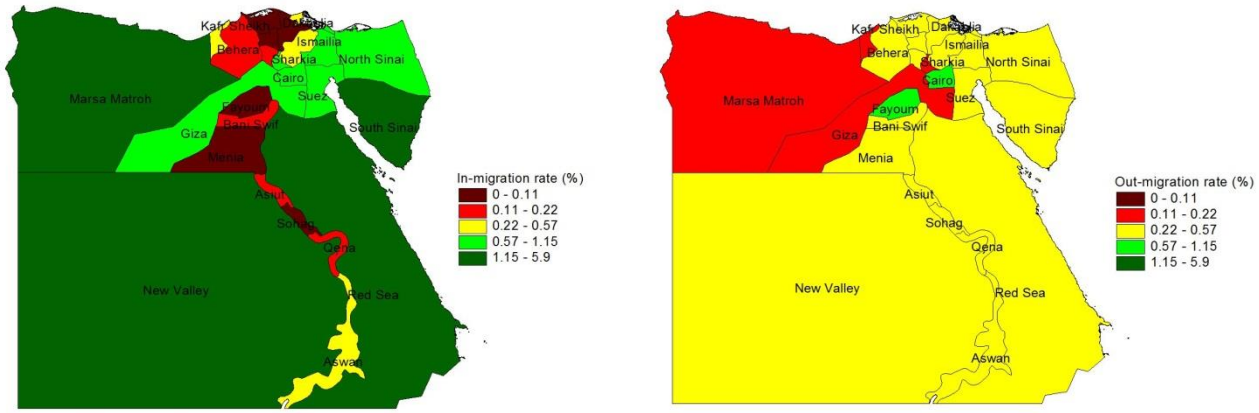
In-migration population **Out-migration population**



Source: Authors' estimation from the 1996 Egypt Population and Housing Censuses

Figure 3: The percentage of inter-governorate in-migration and out-migration during the past two years in 2006

In-migration population **Out-migration population**



Source: Authors' estimation from the 2006 Egypt Population and Housing Census

Table 1 presents the distribution of migrants by the reasons for migrations. It shows that two third of migration across governorates in Egypt is due to family move and marriage. Work migrants accounted for 18.2 percent and 21.0 percent of the total migrants in 1996 and 2006, respectively. Since migrant mainly happen for family reasons, migrants are mainly children and young peopled

(aged 15-30). Older people are less likely to move. In addition, migration is also a human capital investment, and older workers have a shorter period to collect migration investment returns and a lower incentive to migrate (Borjas 2012).

Table 1. The distribution of migrants by the reasons for migrations and migrants' age

In percent	1996	2006
Reason for migration		
Work	18.22	21.01
Family move	31.68	31.81
Marriage or union	36.22	36.17
Divorce or widowhood	0.52	0.59
Study	1.43	1.95
Other reasons	11.92	8.46
Total	100	100
By age		
Children (aged 0-14)	21.80	27.17
Young people (aged 15-30)	51.90	49.95
Adults (aged 31-60)	24.15	20.99
Elderly (aged 61+)	2.15	1.89
Total	100	100

Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses

3.3. Wealth indexes

We follow the principal components approach of Filmer and Pritchett (2001) to compute a wealth index. According to this approach, an index is constructed as the first principal component of a vector of assets of households, including durables goods, housing characteristics, and access to utilities.[1] The principal component approach defines a wealth index in terms of the first principal component of the variables used. The wealth index, denoted by A_j, for household *j* is computed as follows:

$$A_j = \sum_p a_p \left(\frac{x_{pj} - \bar{x}_p}{s_p} \right) \quad (1)$$

where x_p denotes the asset *p*, and $\bar{x}$ denote a mean of households in the sample. *s* is a standard deviation of asset x_p, and the *p*-dimensional vector of weight *a* is chosen to maximize the sample

[1] Filmer and Scott (2008) and Kolenikov et al. (2009) conclude that rankings of various measures of welfare, including outcomes for education, health care, fertility, child mortality, and the labor market, are very similar the ranking of asset indices.

variance of *A*, subject to $\sum_p a_p^2 = 1$. The weight *a* is also called the vector of scores of asset variables, which can be estimated using principal component analysis.

The asset index has zero means, but it includes both negative and positive values. Inequality measures such as Gini and Generalize entropy indexes are widely used for income and consumption. However, these measures are used for positive values and cannot be applied for the case of household asset index. Instead, in this study, we will use the asset inequality measure proposed by McKenzie (2005) to measure the household asset inequality of governorates in Egypt.

Household asset inequality of a local area such as a governorate can be measured by the standard deviation of the asset index across households in the local area. McKenzie (2005) proposes a relative asset inequality measure of an area which is the ratio of the standard deviation of the asset index in the area to the standard deviation in the sample as a whole. More specifically, the relative measure of household asset inequality of a governorate is given by:

$$I_j = \frac{SD_{governate}(A)}{SD_{all}(A)}, \tag{2}$$

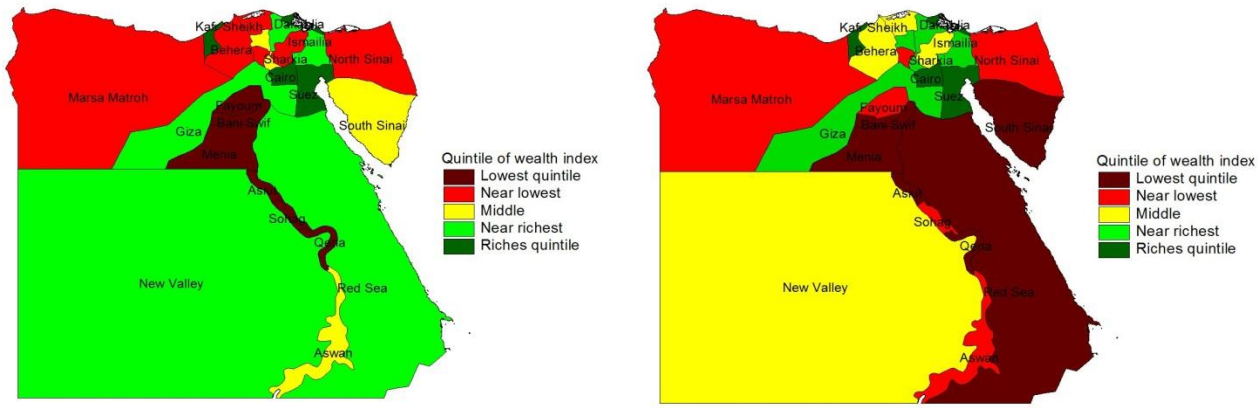
where $SD_{governate}(A)$ is the standard deviation of the household asset index *A* in the governorate, and $SD_{all}(A)$ is the standard deviation of the household asset index *A* in the whole country. This asset inequality measure is positive and can be larger than one. Higher value of the asset inequality measure of an area means higher inequality in assets among households within the area. McKenzie (2005) proves this asset inequality measure satisfies the common properties of an inequality measure. It should be noted that since we will standardize the wealth index according to standard normal distribution, the inequality index is equal to the standard deviation of the wealth index.

Using data from the 1996 and 2006 Egypt Population and Housing Censuses, we can compute the asset index. Based on the availability of data, we use dummy variables indicating whether individuals live in a household with the following assets or housing conditions: piped water, septic tank latrine, own a house, house with a least a bathroom, house with a least a kitchen, electric cooker, computer, car, washing machine, fridge or refrigerator, television, video player. Tables A.3 and A.4 in Appendix report the percentage of individuals living in a household with different assets. It shows that the percentage of households with assets increased between 1996 and 2006. Using this variable, we can compute the level and inequality of asset index of governorates (Table A.5 in Appendix).

Figure 4 depicts the geographic maps of the average wealth index by quintiles. Governorates are grouped in quintiles from the lowest to highest level of wealth index. The green governorates have the highest value of wealth index, while the brown and red governorates have the lowest value of wealth index. It shows that some governorate such as Red Sea and south Sinai have improved the wealth during the period 1996 and 2006. Figure 5 presents the inequality pattern. The green color means the low inequality level, while brown color mean the high inequality level.

Figure 4: Average wealth index

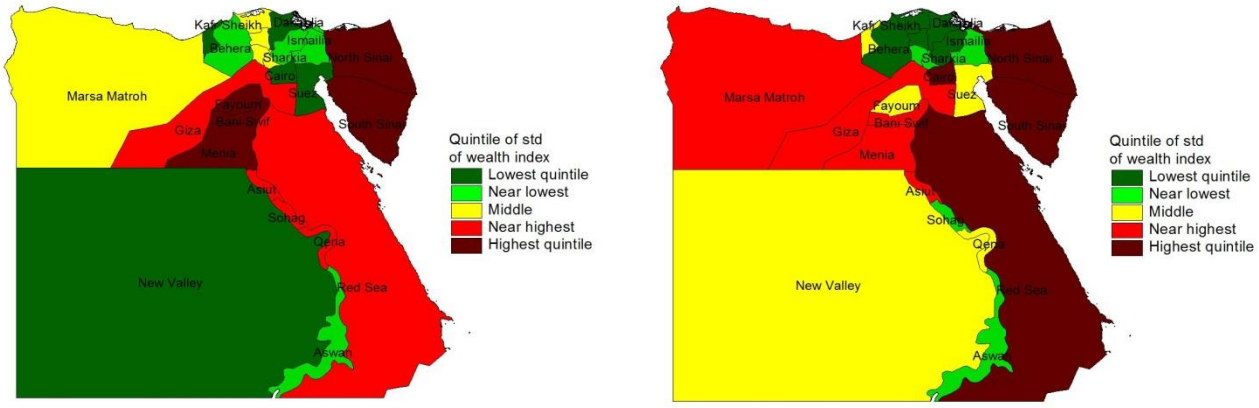
1996 **2006**



Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses

Figure 5: Inequality of wealth index

1996 **2006**



Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses

4. Estimation method

In the literature of migration, gravity models of migration are often used to estimate the flow of migration between geographic areas (e.g., Karemera et al., 2000; Grogger and Hanson, 2011; Bunea, 2012; Ortega and Peri, 2013). In this study, we also make use of a gravity model to estimate the push- and pull-impact of the level and inequality of household assets on migration among governorates in Egypt. Firstly, we write the basic gravity model as follows:

$$M_{i,j,t} = \mathrm{g}\left(\frac{P_{i,t}^{\alpha} P_{j,t}^{\beta}}{D_{ij}^{\gamma}}\right), \quad (3)$$

where $M_{i,j,t}$ is the migration flow from governorate *i* and governorate *j* in year *t* (*i* and *j* can be any two geographic areas, but in our study they are governorates); $P_{i,t}$ and $P_{j,t}$ are the sizes of the populations of governorates *i* and *j* in year *t*, respectively; D_{ij} is the distance between the two governorates. Taking the log of both sides of equation (1), we get:

$$\log(M_{ijt}) = \log(g) + \alpha \log\left(P_{i,t}\right) + \beta \log\left(P_{j,t}\right) - \gamma \log\left(D_{i,j}\right). \quad (4)$$

To model the effect of asset level and inequality, we include variables of level and inequality of household assets in governorates *i* and *j*. as follows:

$$\log(M_{ij,t}) = \beta_0 + \beta_1 A_{i,t} + \beta_2 A_{j,t} + \beta_3 I_{i,t} + \beta_4 I_{j,t} + \beta_5 \log\left(P_{i,t}\right) + \beta_6 \log\left(P_{j,t}\right)$$

$$+\beta_7 \log\left(D_{i,j}\right) + \beta_8 T_t + \varepsilon_{i,j,t}, \quad (5)$$

where $A_{i,t}$ and $A_{i,t}$ are the variables of the average level of household asset index of governorates *i* and *j* in year *t*, respectively. $I_{i,t}$ and $I_{j,t}$ are the variables of the inequality of household asset index of governorates *i* and *j* in year *t*, respectively. T_t is a dummy of year, which is equal to one for 2006 and zero for 1996. ε_{ijt} are conventional random error terms.

The push and pull effects of the level of the household assets on migration are measured by the coefficients β_1 and β_2, respectively, while the push and pull effects of the household asset inequality are measured by the coefficients β_3 and β_4, respectively. If people move from governorates with low levels of household assets to governorates with high levels of household assets, $\beta_1<0$ and $\beta_2>0$. Similarly, if people move from governorates with high inequality of household assets to governorates with low inequality of household assets, $\beta_3>0$ and $\beta_4<0$.

In non-experimental analysis, selection bias or endogeneity bias is always a great challenge. Although we cannot fully address this bias, we try to mitigate it by several ways. First, we include governorate dummies in regression, which can eliminate endogeneity bias caused by time-invariant unobserved variables. Second, we use the lagged variables of assets to measure the current migration to avoid reverse causality. More specifically, the migration between governorates are measured using the 2006 Population and Housing Censuses of Egypt, and the level and inequality of household assets are measured using 1996 Population and Housing Censuses of Egypt. Thirdly, although we do not have data on assets of households before migration, we exclude migrants when computing the asset index of governorates to avoid reverse causality, In addition, we only measure the effect of asset level and inequality on migration during the past two years.

A potential problem in estimating model (5) is that the dependent variable can be zero because of no migration between governorate pairs. As a result, we cannot take the logarithm. In this study, we use two-part models (Duan et al., 1983; Manning et al., 1987). In the first part, we model the dummy variables of migration happening between governorates, and in the second part we apply the model (5) to only governorates which have migration flow between them.

For sensitivity analysis, we use an additional estimator. We transform equation (5) into exponential function, and apply a Poisson pseudo-maximum likelihood estimator (Gourieroux et al., 1984;

Santos and Tenreyro, 2006). The results from the Poisson pseudo-maximum likelihood model are very similar to the two-part model. In this paper, we will use the results from the two-part model for interpretation. The results from the Poisson pseudo-maximum likelihood model are presented in Appendix.

5. Empirical findings

In this section, we discuss the push- and pull-effects of asset level and inequality on inter-governorate migration in Egypt. The dependent variables are log of the number of migrants across governorates. In addition to the overall migration, we also measure the effect on different types of migration including high-education migration, migration with different purpose and different ages. As mentioned in the previous section, we focus on the inter-governorate migration flow during the last two years.

Table 2 presents two-part regressions on the migration flows. There are nearly 40 percent of pair governorates in which there are no migration between them. Geographic distance increases the cost of migration and people are more likely to move to a closer governorate. If the distance between two governorates increases by one percent, the probability of migration between the two governorates decreases by 0.12 percent. For governorate with inter-governorate migration, a one-percent increase in the distance between governorates reduces the number of migrants by 0.45 percent. As expected, migration flows are higher between governorates with higher population.

Regarding asset level and inequality, people tend to move to the governorates with higher asset level and higher asset inequality. Areas with high economic level and inequality attract more migrants than areas with low economic level and inequality. If the asset level and inequality of destination governorates increase by 0.1 standard deviation, the probability of migration to these governorates increases by 0.022 and 0.056 percent, respectively. The effect on the migration flow is high. A 0.1 standard deviation increase in the asset level and inequality index of destination governorates is associated with 10.5 percent and 25.3 increases in the number of immigrants, respectively.

There are no data on poverty status from the census. However, there is information on the education level of people. Table 2 also reports the effect of asset level and inequality on migration of high-education people (people completed college or university). The effect of distance on high-education migration is smaller than the effect of distance on overall migration. It implies that the distance is less challenging for highly-educated migrants than overall migrants. Interestingly, highly-educated people tend to move more from to governorates with high asset level and inequality than other people. In other words, high asset level and inequality are not only pull but also push factors of highly-educated migrants.

Table 2. Regression of migration flows

Explanatory variables	Having migration	Log of migration flow	Having high education migration	Log of high education migration flow
Log of distance	-0.1225***	-0.4499***	-0.1218***	-0.1776***
	(0.0113)	(0.0419)	(0.0125)	(0.0451)
Log of population of origin governorates	0.1631***	0.5230***	0.1285***	0.4498***
	(0.0069)	(0.0289)	(0.0068)	(0.0353)
Log of population of destination governorates	0.0526***	0.3630***	0.0524***	0.2870***
	(0.0068)	(0.0274)	(0.0071)	(0.0290)
Level of wealth index of origin governorates	0.0204	-0.0549	0.0913***	0.3067***
	(0.0160)	(0.0641)	(0.0181)	(0.0687)
Level of wealth index of destination governorates	0.2239***	1.0560***	0.3101***	0.7364***
	(0.0160)	(0.0655)	(0.0171)	(0.0702)
Inequality of wealth index of origin governorates	0.0352	0.1720	0.1999***	0.4154*
	(0.0435)	(0.2162)	(0.0433)	(0.2459)
Inequality of wealth index of destination governorates	0.5636***	2.5303***	0.7774***	2.1536***
	(0.0438)	(0.1781)	(0.0478)	(0.1846)
Year 2006	-0.1525***	-0.3090***	-0.1177***	0.0564
	(0.0176)	(0.0692)	(0.0173)	(0.0723)
Constant	-2.1920***	-8.3135***	-2.3229***	-8.6434***
	(0.1978)	(0.8421)	(0.2121)	(0.9534)
Observations	2,808	1,733	2,808	956
R-squared	0.308	0.336	0.278	0.327

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses.

Table 3 presents the effects of asset level and inequality on migration of different purposes. There are some differences in incentive to migrate between different migration purposes. Firstly, people tend to move to a richer and high-inequality governorate regardless of the purpose of migration. However, for marriage and family migration, high inequality within the original areas is also a push factor of migration. For work migration low level of assets is a push factor. In other words, working people tend to move from one governorate of low economic level to another governorate of high economic level. The economic incentive is more important for work migrants than other migrants.

In Table 4, we investigate the effects of asset level and inequality on the inter-governorate migration flow by different age groups. The effect is very similar between groups. People tend to move to a governorate with higher wealth level and higher inequality. Young people tend to move from a lower wealth level to a higher wealth level governorate, since the young people migrate mainly for work purpose.

Table 3. Regression of flows of migration by purposes

Explanatory variables	Having work migration	Log of work migration flow	Having family migration	Log of family migration flow	Having marriage migration	Log of marriage migration flow	Having other-type migration	Log of other-type migration flow
Log of distance	-0.0980***	-0.1557***	-0.1201***	-0.2679***	-0.1457***	-0.3458***	-0.1340***	-0.2980***
	(0.0128)	(0.0462)	(0.0126)	(0.0489)	(0.0123)	(0.0418)	(0.0125)	(0.0437)
Log of population of origin governorates	0.1532***	0.5034***	0.1422***	0.4389***	0.1221***	0.3854***	0.1179***	0.2838***
	(0.0071)	(0.0325)	(0.0070)	(0.0366)	(0.0070)	(0.0328)	(0.0071)	(0.0316)
Log of population of destination governorates	0.0459***	0.2444***	0.0536***	0.3003***	0.0925***	0.3639***	0.1027***	0.4138***
	(0.0072)	(0.0279)	(0.0072)	(0.0292)	(0.0069)	(0.0281)	(0.0068)	(0.0286)
Level of wealth index of origin governorates	-0.0230	-0.2015***	0.0676***	-0.1606**	0.0857***	0.0190	0.0557***	-0.0380
	(0.0185)	(0.0679)	(0.0184)	(0.0746)	(0.0184)	(0.0687)	(0.0182)	(0.0698)
Level of wealth index of destination governorates	0.3180***	0.7512***	0.3192***	0.8003***	0.2663***	0.7737***	0.2461***	0.4866***
	(0.0172)	(0.0722)	(0.0172)	(0.0725)	(0.0172)	(0.0662)	(0.0174)	(0.0667)
Inequality of wealth index of origin governorates	0.0375	-0.1826	0.1263***	0.2194	0.1131**	0.1223	0.0896*	0.3258
	(0.0447)	(0.2482)	(0.0451)	(0.2486)	(0.0442)	(0.2446)	(0.0459)	(0.2175)
Inequality of wealth index of destination governorates	0.6721***	2.0541***	0.7192***	1.6743***	0.5836***	1.6194***	0.6059***	1.5703***
	(0.0483)	(0.1796)	(0.0478)	(0.1865)	(0.0475)	(0.1792)	(0.0465)	(0.1757)
Year 2006	-0.1373***	-0.2212***	-0.1219***	-0.1694**	-0.1235***	-0.3032***	-0.0608***	-0.2889***
	(0.0180)	(0.0727)	(0.0180)	(0.0799)	(0.0174)	(0.0709)	(0.0180)	(0.0733)
Constant	-2.3853***	-8.0769***	-2.3455***	-6.9915***	-2.4064***	-7.2032***	-2.5699***	-6.6326***
	(0.2157)	(0.8971)	(0.2122)	(0.9716)	(0.2171)	(0.8954)	(0.2168)	(0.8835)
Observations	2,808	1,205	2,808	1,181	2,808	992	2,808	1,051
R-squared	0.290	0.249	0.285	0.256	0.297	0.336	0.271	0.264

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses.

Table 4. Regression of flows of migration by age

Explanatory variables	Having child migration	Log of child migration flow	Having young migration	Log of young migration flow	Having middle-age migration	Log of middle-age migration flow	Having elderly migration	Log of elderly migration flow
Log of distance	-0.1077***	-0.2582***	-0.1221***	-0.4224***	-0.1295***	-0.1912***	-0.0592***	-0.0996*
	(0.0128)	(0.0464)	(0.0120)	(0.0398)	(0.0125)	(0.0447)	(0.0104)	(0.0514)
Log of population of origin governorates	0.1423***	0.3860***	0.1579***	0.4681***	0.1380***	0.4426***	0.0613***	0.2778***
	(0.0069)	(0.0353)	(0.0072)	(0.0276)	(0.0070)	(0.0325)	(0.0055)	(0.0423)
Log of population of destination governorates	0.0542***	0.2740***	0.0671***	0.3427***	0.0550***	0.3138***	0.0656***	0.1558***
	(0.0073)	(0.0276)	(0.0071)	(0.0264)	(0.0073)	(0.0270)	(0.0061)	(0.0291)
Level of wealth index of origin governorates	0.0663***	-0.1178*	0.0211	-0.1950***	0.0415**	0.1022	0.0424***	0.1609**
	(0.0184)	(0.0708)	(0.0175)	(0.0611)	(0.0184)	(0.0664)	(0.0152)	(0.0799)
Level of wealth index of destination governorates	0.2810***	0.7766***	0.2353***	0.8326***	0.3152***	0.7544***	0.2098***	0.1676**
	(0.0174)	(0.0697)	(0.0168)	(0.0630)	(0.0172)	(0.0680)	(0.0155)	(0.0744)
Inequality of wealth index of origin governorates	0.1448***	0.2024	0.0784*	-0.1348	0.0991**	0.3162	0.0658*	0.4217
	(0.0452)	(0.2382)	(0.0460)	(0.2042)	(0.0450)	(0.2310)	(0.0354)	(0.3080)
Inequality of wealth index of destination governorates	0.6990***	1.8078***	0.5910***	2.2736***	0.5870***	1.7336***	0.3936***	0.4049*
	(0.0483)	(0.1732)	(0.0465)	(0.1722)	(0.0499)	(0.1727)	(0.0392)	(0.2101)
Year 2006	-0.0949***	-0.1908**	-0.1715***	-0.2453***	-0.1060***	-0.2914***	-0.0409***	-0.2549***
	(0.0179)	(0.0753)	(0.0182)	(0.0666)	(0.0179)	(0.0703)	(0.0134)	(0.0840)
Constant	-2.4836***	-6.2499***	-2.4469***	-7.3201***	-2.1438***	-8.1347***	-1.7052***	-3.6800***
	(0.2147)	(0.9319)	(0.2103)	(0.8126)	(0.2161)	(0.9009)	(0.1921)	(1.0815)
Observations	2,808	1,058	2,808	1,541	2,808	1,122	2,808	375
R-squared	0.265	0.264	0.290	0.331	0.285	0.285	0.191	0.181

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Children are aged less than 15, the young people aged 15-30; middle age people aged 31-60, and elderly aged above 60.
Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses.

6. Conclusions

In this study, we look at the effect of the level and the inequality of asset index on inter-governorate migration in Egypt using gravity models and data from the 1996 and 2006 Population and Housing Censuses of Egypt. To do this, we follow Filmer and Pritchett (2001) and construct an asset index as the first principal component of a vector of assets of households, including durables goods, housing characteristics, and access to utilities.

Our main findings show that people are more likely to move to a closer governorate. As expected, migration flows are higher between governorates with higher population. Regarding asset level and inequality, people tend to move to the governorates with higher asset level and higher asset inequality. Areas with high economic level and inequality attract more migrants than areas with low economic level and inequality. If the asset level and inequality of destination governorates increase by 0.1 standard deviation, the probability of migration to these governorates increases by 0.022 and 0.056 percent, respectively. The effect on the migration flow is high. A 0.1 standard deviation increase in the asset level and inequality index of destination governorates is associated with 10.5 percent and 25.3 increases in the number of immigrants, respectively. For work migration, low level of assets is a push factor. In other words, working people tend to move from a governorate of low economic level to another governorate of high economic level.

All in all, our empirical findings suggest that asset inequalities act in some cases as push factors for internal migration. So, a reduction in poverty does not seem to be sufficient to decrease internal migration. Indeed, our findings suggest that migration will be still the choice of rural poor as long as asset inequalities remain. Internal migration in Egypt is like to continue in the following years due to the strong asset inequalities that exist. Thus, Egyptian policy-makers have to continue to aim rural poverty reduction but also to concentrate on the reduction of asset inequalities. As assets become more equally distributed and increase in level, internal migration and rural poverty will tend to decrease. Future research works should explore the best approaches in the case of Egypt towards reducing asset inequality and ultimately the reduction of rural poverty.

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Appendices

Table A.1. All migration during the past two years

	1996		2006		1996		2006	
Governorate	**Out-migration during rate (in percent)**	**In-migration during rate (in percent)**	**Out-migration during rate (in percent)**	**In-migration during rate (in percent)**	**The number of out-migrants**	**The number of in-migrants**	**The number of out-migrants**	**The number of in-migrants**
Cairo	1.10	0.57	0.85	0.76	74,737	38,532	64,980	58,760
Alexandria	0.21	0.36	0.17	0.39	6,755	12,040	6,620	16,020
Port Said	0.32	0.72	0.31	0.73	885	3,409	1,180	4,030
Suez	0.51	0.73	0.51	1.12	1,318	3,023	1,740	5,650
Damietta	0.72	0.85	0.28	0.28	6,941	7,720	3,180	3,030
Dakahlia	0.47	0.36	0.41	0.06	21,273	15,350	21,800	2,990
Sharkia	0.53	0.49	0.31	0.43	23,913	21,131	17,250	22,960
Kaliobia	0.63	1.50	0.17	1.08	18,832	49,385	6,620	45,640
Kafr Sheikh	0.43	0.32	0.29	0.04	9,748	7,087	7,730	1,160
Gharbia	0.56	0.43	0.26	0.05	19,910	14,719	11,010	1,940
Menoufia	0.58	0.41	0.36	0.12	17,195	11,277	12,570	3,850
Behera	0.41	0.39	0.27	0.15	16,697	15,653	13,100	6,920
Ismailia	0.79	1.11	0.56	1.22	4,110	7,869	3,970	11,470
Giza	0.86	1.72	0.22	0.94	35,200	81,854	12,160	58,780
Bani Swif	0.50	0.29	0.45	0.14	9,662	5,303	10,700	3,080
Fayoum	0.65	0.23	0.60	0.03	13,435	4,651	15,890	640
Menia	0.52	0.22	0.45	0.03	17,676	7,287	19,340	1,450
Asiut	0.60	0.51	0.40	0.12	17,983	14,157	14,570	4,180
Sohag	0.53	0.26	0.41	0.03	17,710	8,117	16,470	1,080
Qena	0.45	0.21	0.37	0.13	11,524	5,215	11,710	4,010
Aswan	0.60	0.48	0.45	0.32	5,872	4,709	5,340	3,730
Luxor	0.38	0.07	0.36	0.16	1,429	252	1,640	720
Red Sea	0.80	2.99	0.58	3.25	929	4,681	910	7,540
New Valley	0.98	2.09	0.38	1.15	1,315	2,959	620	2,090
Marsa Matroh	0.34	1.64	0.17	1.17	631	3,483	480	3,730
North Sinai	0.41	1.67	0.47	0.78	912	4,195	1,430	2,660
South Sinai	0.73	5.12	0.56	6.02	254	2,791	260	5,160
Total	0.60	0.60	0.39	0.39	356,848	356,848	283,270	283,270

Note: This table presents the percentage and the number of migrants during the past two years. The migrants include migrants within governorates and migrants between governorates.
Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses.

Table A.2. Inter-governorate migration during the past two years

Governorate	1996		2006		1996		2006	
	Out-migration during rate (in percent)	In-migration during rate (in percent)	Out-migration during rate (in percent)	In-migration during rate (in percent)	The number of out-migrants	The number of in-migrants	The number of out-migrants	The number of in-migrants
Cairo	1.10	0.57	0.79	0.64	74,727	38,522	61,030	54,810
Alexandria	0.21	0.36	0.17	0.38	6,755	12,040	6,540	15,940
Port Said	0.32	0.72	0.31	0.72	885	3,409	1,170	4,020
Suez	0.51	0.73	0.50	0.94	1,318	3,023	1,700	5,610
Damietta	0.24	0.34	0.27	0.30	2,339	3,118	3,010	2,860
Dakahlia	0.27	0.14	0.41	0.10	12,041	6,117	21,530	2,720
Sharkia	0.27	0.22	0.30	0.33	12,070	9,288	16,590	22,300
Kaliobia	0.21	1.12	0.16	1.09	6,359	36,913	5,970	44,990
Kafr Sheikh	0.23	0.12	0.29	0.08	5,254	2,592	7,640	1,070
Gharbia	0.24	0.10	0.26	0.07	8,637	3,446	10,810	1,740
Menoufia	0.37	0.18	0.36	0.15	10,973	5,054	12,460	3,740
Behera	0.18	0.16	0.26	0.15	7,387	6,343	12,640	6,460
Ismailia	0.38	0.81	0.53	1.03	2,002	5,761	3,790	11,290
Giza	0.20	1.15	0.17	1.01	8,200	54,854	9,550	56,170
Bani Swif	0.33	0.11	0.44	0.12	6,449	2,089	10,510	2,890
Fayoum	0.49	0.07	0.60	0.04	10,198	1,415	15,760	510
Menia	0.35	0.05	0.45	0.04	11,921	1,532	19,250	1,360
Asiut	0.42	0.31	0.39	0.20	12,625	8,798	14,240	3,850
Sohag	0.39	0.11	0.41	0.06	13,109	3,516	16,300	910
Qena	0.38	0.14	0.37	0.13	9,803	3,494	11,500	3,800
Aswan	0.42	0.31	0.42	0.30	4,147	2,984	5,020	3,410
Luxor	0.36	0.06	0.33	0.10	1,379	201	1,520	600
Red Sea	0.47	2.74	0.53	3.02	544	4,296	820	7,450
New Valley	0.39	1.53	0.37	1.31	521	2,165	610	2,080
Marsa Matroh	0.15	1.48	0.17	1.29	283	3,135	480	3,730
North Sinai	0.30	1.57	0.47	1.12	674	3,958	1,410	2,640
South Sinai	0.48	4.96	0.52	5.59	167	2,704	240	5,140
Total	0.39	0.39	0.38	0.38	230,768	230,768	272,090	272,090

Note: This table presents the percentage and the number of inter-governorate migrants during the past two years. Unlike Table A.1, within-governorate migration is not included in this table.
Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses

Table A.3. Proportion of individuals living in households with different assets in 1996

Governorate	Proportion of individuals with piped water	Proportion of individuals with septic tank	Proportion of individuals with bathroom	Proportion of individuals with electric cooker	Proportion of individuals with computer	Proportion of individuals with a car	Proportion of individuals with washing machine	Proportion of individuals with fridge	Proportion of individuals with television	Proportion of individuals with an own house	Proportion of individuals with video player	Proportion of individuals with kitchen
Cairo	0.875	0.916	0.897	0.688	0.018	0.123	0.903	0.872	0.911	0.267	0.163	0.874
Alexandria	0.931	0.867	0.897	0.833	0.006	0.074	0.918	0.815	0.929	0.288	0.140	0.870
Port Said	0.931	0.896	0.940	0.907	0.011	0.109	0.889	0.889	0.930	0.164	0.145	0.931
Suez	0.958	0.900	0.965	0.934	0.005	0.061	0.946	0.909	0.932	0.268	0.112	0.933
Damietta	0.942	0.512	0.961	0.897	0.002	0.039	0.918	0.693	0.874	0.646	0.038	0.938
Dakahlia	0.797	0.613	0.894	0.458	0.002	0.028	0.853	0.583	0.842	0.796	0.026	0.872
Sharkia	0.567	0.389	0.803	0.698	0.004	0.028	0.854	0.530	0.832	0.850	0.020	0.768
Kaliobia	0.608	0.403	0.803	0.731	0.004	0.027	0.889	0.637	0.861	0.639	0.032	0.760
Kafr Sheikh	0.633	0.262	0.843	0.389	0.003	0.017	0.681	0.320	0.756	0.887	0.013	0.740
Gharbia	0.676	0.292	0.828	0.671	0.004	0.026	0.883	0.501	0.894	0.778	0.037	0.750
Menoufia	0.478	0.142	0.627	0.520	0.004	0.024	0.839	0.456	0.828	0.846	0.014	0.586
Behera	0.526	0.218	0.810	0.632	0.004	0.016	0.733	0.335	0.799	0.869	0.011	0.717
Ismailia	0.676	0.425	0.897	0.880	0.005	0.068	0.870	0.744	0.874	0.633	0.059	0.915
Giza	0.696	0.564	0.833	0.780	0.011	0.073	0.880	0.722	0.904	0.541	0.097	0.761
Bani Swif	0.328	0.140	0.420	0.555	0.003	0.018	0.514	0.327	0.698	0.872	0.011	0.356
Fayoum	0.336	0.162	0.358	0.446	0.001	0.017	0.384	0.305	0.539	0.822	0.013	0.267
Menia	0.271	0.071	0.305	0.556	0.002	0.016	0.411	0.287	0.660	0.869	0.012	0.250
Asiut	0.450	0.254	0.599	0.317	0.003	0.020	0.509	0.363	0.626	0.836	0.013	0.510
Sohag	0.335	0.095	0.526	0.284	0.002	0.017	0.655	0.427	0.736	0.844	0.010	0.455
Qena	0.446	0.273	0.576	0.398	0.003	0.018	0.571	0.579	0.737	0.849	0.008	0.565
Aswan	0.651	0.216	0.702	0.867	0.002	0.018	0.778	0.827	0.880	0.790	0.032	0.757
Luxor	0.484	0.201	0.785	0.835	0.001	0.020	0.760	0.814	0.880	0.807	0.025	0.838
Red Sea	0.592	0.115	0.880	0.778	0.004	0.078	0.812	0.810	0.827	0.531	0.048	0.877
New Valley	0.858	0.487	0.767	0.788	0.000	0.049	0.887	0.891	0.903	0.748	0.021	0.954
Marsa Matroh	0.347	0.026	0.866	0.553	0.001	0.072	0.533	0.459	0.597	0.854	0.027	0.938
North Sinai	0.539	0.045	0.756	0.649	0.001	0.073	0.587	0.568	0.688	0.761	0.026	0.752
South Sinai	0.554	0.408	0.756	0.659	0.000	0.176	0.639	0.627	0.712	0.533	0.046	0.808
Total	0.612	0.417	0.739	0.608	0.006	0.043	0.761	0.564	0.813	0.691	0.051	0.691

Source: Authors' estimation from the 1996 Egypt Population and Housing Censuses

Table A.4. Proportion of individuals living in a household with different assets in 2006

Governorate	Proportion of individuals with piped water	Proportion of individuals with septic tank	Proportion of individuals with bathroom	Proportion of individuals with electric cooker	Proportion of individuals with computer	Proportion of individuals with a car	Proportion of individuals with washing machine	Proportion of individuals with fridge	Proportion of individuals with television	Proportion of individuals with an own house	Proportion of individuals with video player	Proportion of individuals with kitchen
Cairo	0.938	0.961	0.915	0.648	0.235	0.155	0.448	0.941	0.956	0.433	0.213	0.919
Alexandria	0.961	0.857	0.946	0.790	0.141	0.092	0.274	0.948	0.972	0.550	0.147	0.951
Port Said	0.882	0.869	0.922	0.410	0.142	0.150	0.301	0.913	0.941	0.601	0.138	0.938
Suez	0.978	0.894	0.979	0.630	0.153	0.114	0.373	0.977	0.976	0.522	0.124	0.965
Damietta	0.990	0.770	0.951	0.846	0.051	0.052	0.215	0.984	0.990	0.824	0.059	0.979
Dakahlia	0.920	0.849	0.949	0.904	0.062	0.043	0.144	0.995	0.996	0.791	0.072	0.963
Sharkia	0.873	0.546	0.907	0.901	0.050	0.041	0.097	0.986	0.987	0.750	0.057	0.929
Kaliobia	0.924	0.556	0.940	0.871	0.080	0.039	0.167	0.941	0.968	0.622	0.084	0.945
Kafr Sheikh	0.905	0.550	0.964	0.948	0.036	0.021	0.072	0.883	0.966	0.849	0.040	0.965
Gharbia	0.925	0.640	0.949	0.872	0.064	0.040	0.127	0.924	0.976	0.810	0.071	0.957
Menoufia	0.870	0.240	0.880	0.897	0.054	0.036	0.077	0.927	0.967	0.787	0.057	0.892
Behera	0.832	0.477	0.948	0.882	0.026	0.020	0.053	0.885	0.967	0.855	0.038	0.954
Ismailia	0.962	0.488	0.961	0.785	0.082	0.083	0.205	0.974	0.984	0.718	0.086	0.970
Giza	0.922	0.622	0.930	0.816	0.130	0.082	0.229	0.920	0.959	0.579	0.132	0.937
Bani Swif	0.675	0.129	0.703	0.871	0.030	0.025	0.058	0.756	0.942	0.804	0.033	0.732
Fayoum	0.854	0.299	0.801	0.911	0.024	0.024	0.047	0.832	0.913	0.799	0.036	0.829
Menia	0.601	0.131	0.745	0.943	0.023	0.019	0.051	0.728	0.948	0.822	0.039	0.752
Asiut	0.739	0.111	0.814	0.870	0.029	0.030	0.071	0.791	0.940	0.779	0.055	0.831
Sohag	0.767	0.150	0.838	0.749	0.025	0.025	0.066	0.854	0.951	0.842	0.050	0.851
Qena	0.676	0.108	0.800	0.941	0.024	0.018	0.066	0.900	0.952	0.822	0.043	0.833
Aswan	0.887	0.360	0.891	0.943	0.045	0.025	0.097	0.952	0.958	0.827	0.072	0.904
Luxor	0.908	0.391	0.915	0.918	0.057	0.031	0.175	0.946	0.955	0.847	0.087	0.931
Red Sea	0.690	0.279	0.734	0.652	0.093	0.078	0.223	0.718	0.746	0.481	0.085	0.736
New Valley	0.930	0.608	0.909	0.713	0.060	0.064	0.138	0.899	0.906	0.764	0.026	0.922
Marsa Matroh	0.667	0.218	0.869	0.835	0.037	0.062	0.055	0.732	0.812	0.821	0.049	0.955
North Sinai	0.686	0.383	0.838	0.808	0.054	0.063	0.097	0.710	0.780	0.749	0.044	0.848
South Sinai	0.432	0.353	0.522	0.502	0.047	0.102	0.085	0.517	0.531	0.338	0.034	0.531
Total	0.855	0.519	0.891	0.841	0.079	0.055	0.159	0.902	0.960	0.715	0.085	0.903

Source: Authors' estimation from the 2006 Egypt Population and Housing Censuses

Table A.5. Mean and Inequality of wealth index

Governorates	1996		2006	
	Mean of wealth index	Inequality of wealth index	Mean of wealth index	Inequality of wealth index
Cairo	0.843	0.686	0.752	1.163
Alexandria	0.829	0.659	0.492	0.927
Port Said	0.966	0.712	0.503	1.126
Suez	0.965	0.520	0.665	0.863
Damietta	0.561	0.606	0.315	0.653
Dakahlia	0.261	0.694	0.261	0.677
Sharkia	0.023	0.783	0.014	0.774
Kaliobia	0.173	0.825	0.140	0.798
Kafr Sheikh	-0.252	0.805	-0.032	0.632
Gharbia	0.078	0.808	0.125	0.744
Menoufia	-0.325	0.801	-0.208	0.827
Behera	-0.234	0.793	-0.128	0.655
Ismailia	0.412	0.800	0.259	0.840
Giza	0.405	0.901	0.281	1.008
Bani Swif	-0.804	0.952	-0.754	1.042
Fayoum	-0.988	1.038	-0.443	0.896
Menia	-1.016	0.932	-0.783	0.966
Asiut	-0.631	0.927	-0.530	0.930
Sohag	-0.671	0.874	-0.427	0.855
Qena	-0.452	0.864	-0.549	0.867
Aswan	0.101	0.798	-0.133	0.822
Luxor	0.074	0.764	-0.005	0.851
Red Sea	0.236	0.892	-0.520	1.602
New Valley	0.464	0.680	0.031	0.902
Marsa Matroh	-0.350	0.832	-0.483	0.947
North Sinai	-0.252	1.074	-0.497	1.208
South Sinai	0.065	1.195	-1.260	1.732
All the country	0	1	0	1

Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses

Table A.6. Poisson pseudo maximum likelihood regression of migration

Explanatory variables	Total migration flow	High-education flow	Work migration flow	Family migration flow	Marriage migration flow	Other-type migration flow	Child migration flow	Young migration flow	Middle-age migration flow	Elderly migration flow
Log of distance	-0.5993***	-0.4015*	-0.4091***	-0.6707***	-0.7110***	-0.5982***	-0.6483***	-0.6275***	-0.4927***	-0.4677***
	(0.1607)	(0.2120)	(0.1051)	(0.1847)	(0.2378)	(0.1424)	(0.1655)	(0.1506)	(0.1832)	(0.1678)
Log of population of origin governorates	1.2061***	1.3401***	1.2101***	1.2419***	1.3705***	0.9941***	1.2396***	1.1430***	1.3236***	1.2727***
	(0.1060)	(0.1199)	(0.0951)	(0.1252)	(0.1640)	(0.0949)	(0.1159)	(0.1002)	(0.1294)	(0.1303)
Log of population of destination governorates	0.6412***	0.6897***	0.4727***	0.6156***	0.8911***	0.8255***	0.6190***	0.6336***	0.6802***	0.7274***
	(0.0666)	(0.1090)	(0.0517)	(0.0759)	(0.0969)	(0.0682)	(0.0715)	(0.0618)	(0.0783)	(0.0736)
Level of wealth index of origin governorates	0.2315	0.9859***	-0.2650*	0.2600	0.7583***	0.2738	0.1659	0.0837	0.5921***	0.6933***
	(0.1943)	(0.2172)	(0.1517)	(0.2168)	(0.2559)	(0.1982)	(0.2024)	(0.1934)	(0.2066)	(0.1853)
Level of wealth index of destination governorates	1.1768***	1.2972***	1.2237***	1.2747***	1.3534***	0.7529***	1.2497***	1.0968***	1.2937***	1.1678***
	(0.0837)	(0.1033)	(0.0995)	(0.0966)	(0.0997)	(0.1105)	(0.0931)	(0.0812)	(0.0982)	(0.1338)
Inequality of wealth index of origin governorates	1.5918*	1.9215**	0.4229	1.8315*	2.0484*	1.8691**	1.9751**	1.4976*	1.3179	0.8704
	(0.8614)	(0.9089)	(0.6468)	(0.9401)	(1.0594)	(0.7668)	(0.8415)	(0.8560)	(0.9440)	(0.8693)
Inequality of wealth index of destination governorates	3.0696***	4.0005***	3.2977***	2.8181***	3.1637***	3.1716***	3.1686***	3.1248***	2.8491***	2.2681***
	(0.3569)	(0.3594)	(0.3060)	(0.4134)	(0.5524)	(0.3133)	(0.3738)	(0.3373)	(0.4174)	(0.4149)
Year 2006	-0.7719***	-0.6724***	-0.6370***	-0.6195***	-1.2918***	-0.8260***	-0.6018***	-0.7896***	-0.8846***	-0.7023***
	(0.1919)	(0.1942)	(0.1440)	(0.2331)	(0.2814)	(0.1703)	(0.2136)	(0.1804)	(0.2113)	(0.1979)
Constant	-22.625***	-29.425***	-21.877***	-23.416***	-30.396***	-24.158***	-24.491***	-22.026***	-26.608***	-28.271***
	(2.8429)	(4.1877)	(2.2514)	(3.2206)	(4.2658)	(2.7615)	(3.0302)	(2.6083)	(3.4618)	(3.0888)
Observations	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808
R-squared	0.194	0.232	0.211	0.170	0.210	0.209	0.195	0.191	0.205	0.222

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Children are aged less than 15, the young people aged 15-30; middle age people aged 31-60, and elderly aged above 60.
Source: Authors' estimation from the 1996 and 2006 Egypt Population and Housing Censuses.