



Who moves and who gains from internal migration in Egypt? Evidence from two waves of a labor market panel survey

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ABSTRACT

In recent decades, Egypt has experienced rapid internal migration movements triggered by urbanization, socioeconomic development, and environmental changes. From a literature perspective, few scholarly studies have empirically examined the drivers and welfare impacts of internal migration in Egypt, despite the increasing recognition of its inextricably links to urban sustainability. The present study utilized data from two waves of an Egyptian Labor Market Panel Survey (ELMPS) conducted in 2012 and 2018 and consisting of 63,909 observations to examine factors that determine internal migration decisions and their subsequent welfare effects. The results of the two-stage Heckman selection model indicate that both the determinants of internal migration decisions and welfare outcomes differ appreciably depending on migration stream as well as the socioeconomic characteristics of the migrants. In particular, females were found to be more likely to migrate from rural to urban areas, lending support to the growing literature on the “feminization of migration” in developing countries. The OLS regression results, after correcting for self-selection, make a strong case for the positive welfare gains from internal migration in Egypt. Specially, we found that the welfare gains for older and female migrants are much higher than other age and gender groups. A comparison of the welfare effects between different migration streams shows that all migratory movements were associated with positive and statistically significant welfare gains, except for rural-to-urban migration that was surprisingly found to be associated with significant welfare loss for the migrants. Urban-to-urban migration was found to have the strongest welfare enhancing effects on all migrant groups. The empirical findings underline a number of research and policy implications for a sustainable management of internal migration in Egypt and other countries with similar internal migration trends.

1. Introduction

Urbanization is crucially linked to migration. Processes of urbanization create inequalities in regional development and wage differentials, and subsequently generate a natural spur for migration. That is, urbanization-induced disequilibria transfer surplus labor to more-developed areas that offer higher wages and better living standards that meet individuals’ desire and expectations (Wu et al., 2020). In this regard, the Neoclassical economic theory stipulates that migration is a rational choice that maximizes the economic welfare and well-being of the migrants and their households (Harris & Todaro, 1970, pp. 126–142). In particular, internal migration tends to evolve as a country develops socioeconomically and urbanizes (Xu et al., 2022), and the strength of the interlinkages between internal migration and urbanization and vice versa depend on the nature and patterns of internal migration. However, the migration literature contends that internal

migration redistributes both population and resources within a country, and this dynamic influences industrialization, urbanization, and socioeconomic development (Yang et al., 2020). Therefore, effective urban planning and population redistribution policies must be based on an understanding of internal migration processes in terms of the size and direction of population flows, the key factors that determine mobility, and the net welfare gain or loss from migration.

Like many other developing countries, Egypt has in recent decades experienced rapid urbanization process, created mainly by internal migration and changes in agricultural land-use in rural areas (Jaad & Abdelghany, 2021). However, urbanization in Egypt has been characterized by a number of interrelated features represented by the size, rapidness and magnitude of urban expansion (Masoumi et al., 2019). First, recent statistics show that the Egyptian urban population rose significantly from 24.4 million in 1990 to 43.7 million in 2021, and it is estimated that around 44% of the population lives today in the

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metropolitan centers of the country (CAPMAS, 2021a). Actual levels could be even larger, if the massive amount of the floating and commuting population is considered. Currently, annual urban growth rate in the country is 2%, implying that Egyptian cities must accommodate around one million new dwellers annually (CAPMAS, 2017). Second, urbanization in Egypt has been associated with high rates of urban sprawl over the limited prime agricultural land, despite that around 94% of the country's area is desert with no human settlements. Some estimates indicate that Egypt loses nearly 30 thousand hectares of its prime agricultural land in the Nile Delta region annually, due to rapid and uncontrolled urban expansion, so-called urban sprawl (Badreldin et al., 2019). Third, another distinguishing feature of urbanization in Egypt is its strong association with internal migration (David et al., 2019). Although internal migration has traditionally been a key factor influencing population distribution and dynamics in Egypt, the rate and magnitude of internal migration from rural to urban areas and across urban areas have in recent years been phenomenal (David & Nilsson, 2021). Especially in the wake of the Arab Spring revolts in 2011, the country experienced unprecedented urban sprawl, as large-scale urban encroachments were reported across Egypt resulting from the state of lawlessness that enveloped the country, leading to a loss of around 1% of the country's total cultivated area between 2010 and 2011 (Badreldin et al., 2019). According to Salem et al. (2020), each 100-ha loss of agricultural land in Egypt due to urban sprawl leads to direct and indirect loss of 400 job opportunities, and thus push more people to migrate. In this respect, the latest population census in 2017 estimates that there are around 8 million internal migrants in Egypt (CAPMAS, 2021b). Furthermore, a wide range of socioeconomic and environmental challenges interacted with this urban sprawl in recent years to exacerbate spatial, economic and social heterogeneities between different regions in Egypt, making internal migration a livelihood strategy for many segments of the population to cope with poverty, limited economic resources and unemployment (IOM the International Organization for Migration, 2011).

Such patterns of urbanization and internal migration put Egypt under great sustainability pressures and may undermine efforts to eradicate poverty and malnutrition, and meet the targets of the Sustainable Development Goals (SDGs). Previous studies on internal migration in developing countries have shown that the concentration of the population in urban areas due to internal migration have serious negative externalities on urban sustainability including formation of slums within cities, poverty and inequalities, overpopulation, pressure on infrastructure, unsustainable resource management, and environmental degradation (e.g. Abu Hatab et al., 2021, pp. 1–26). However, it should also be noted that another strand of this literature however suggests that urban migration catalyzes economic growth and socioeconomic development by improving the social and economic status of the migrants through improving households' incomes, enhancing their access to social services, and empowering the traditionally marginalized groups such as women and minorities (e.g. Hong et al., 2021).

In light of the inextricable links between internal migration and sustainable development, the sustainable management of internal migratory movements has recently become a priority for Egyptian policymakers (UN HABITAT III, 2016; GOPP the General Organization for Physical Planning, 2014). In this context, Egypt's Sustainable Development Strategy 2030 and the National Urban Development Framework emphasize the need to address socioeconomic and environmental drivers and impacts of internal movements of the population which should contribute to achieving SDG#11 "make cities and human settlements inclusive, safe, resilient and sustainable" and SDG#8 "promotion of full, productive employment and decent work for all".

Based on this background, it is intriguing from a research perspective, and important from a policymaking perspective to address three important questions in relation to internal migration: (i) who moves, (ii) to where, and (iii) are there any welfare gain from these moves? To contribute to addressing these questions, the present study used data

from two waves of a nationally representative Labour Market Panel Survey (ELMPS), undertaken in 2012 and 2018 (CAPMAS & ERF, 2013, 2019), to examine the determinants and welfare impacts of internal migration in Egypt. Specifically, the study investigated a matrix of push and pull factors that may incentivize Egyptians to move within national boundaries, and then measured the welfare outcomes of such movements for different migrant groups.

The remainder of the article is structured as follows. Section 2 reviews and positions the study in the related literature. Section 3 describes ELMPS 2012 and 2018 data and provides descriptive statistics. Section 4 presents the modeling and the empirical approaches. Section 5 reports and discusses the results. Section 6 summarizes and draws policy implications from the study.

2. Prior literature and contribution

A rapid scoping review (RSR) methodology, based on Arksey and O'Malley (2005), was used to review the scholarly literature published between 2000 and 2020 on internal migration in developing countries. The Supplementary material of this study briefly describes the RSR methodology summarizes (in Table S1) the list of the reviewed literature. Upon a close look at the studies listed in Table S1 in the supplementary material, the following 4 characteristics/limitations in the previous literature can be identified. In the following paragraphs of this section, we briefly present these limitations and highlight how the present study contributes to addressing them.

First, our review of the literature showed that few empirical country-level studies have been carried out in the context of developing countries to investigate determinants of internal migration decisions and their subsequent welfare outcomes. In addition, the geographic distribution of these few studies is skewed towards Asian countries (e.g. China and India), whereas African countries have comparatively received meagre attention in the literature. Especially, the North African region— to which our case study belongs—has been widely ignored in this literature and was the focus of only 2 empirical country-level analysis during the review period. Generally, studies on internal migration in North Africa, and particularly Egypt, are either descriptive in nature (e.g. Wahba, 2007; Zohry, 2012) or do examine internal migration briefly in the context of questions regarding cross-border migration (e.g. David & Jarreau, 2016). This tendency in the extant migration research on developing countries neglects that the magnitude of internal migration is usually greater than that of international migration and is the primary demographic process that shapes patterns of human settlement in these countries (Rodríguez-Vignoli & Rowe, 2018). Furthermore, internal migration in developing countries has major long-term impacts on economic growth and sustainable development in relation to poverty reduction potential and wellbeing outcomes (David et al., 2019; IOM, 2018). This calls for more empirical studies on internal migration in developing countries to examine its determinants, welfare impact, and effects on the population composition of different areas in order to implement more sustainable urban planning policies that effectively respond to population needs (e.g. housing, healthcare, educational, and transportation) and understand the spatial distribution of skills, knowledge, and labor.

Second, the surveyed literature in Table S1 reveals that it is not only that the dearth of studies that characterizes the internal migration literature on developing countries, but also the level of analysis. That is, investigations on causes and impacts of internal migration have been sought by analyzing data on continental and regional levels (e.g. Bell et al., 2015; Rodríguez-Vignoli & Rowe, 2018; Østby, 2016). While internal migration is often assigned to sociodemographic and structural factors (e.g. levels of employment, wages and urbanization in the areas of origin and destination), the importance of these motives in the context of specific countries are often overlooked. Thus, lower-aggregated and country-levels analyses are more likely to preserve heterogeneity in the drivers, motives and effects of internal migration more effectively than

Table 1
Characteristics of the sample of internal migrants in Egypt; ELMPS 2012–2018.

Variables	General ¹		Rural-to-urban		Rural-to-rural		Urban-to-rural		Urban-to-urban	
	(n = 63,909)		(n = 35,423)		(n = 36,557)		(n = 22,646)		(n = 24,598)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Migrant	0.139	0.346	0.055	0.229	0.085	0.278	0.047	0.212	0.123	0.328
Age	37.345	16.921	36.047	16.83	36.193	16.616	37.071	16.720	38.377	17.140
Experience	1,681	1,515	1,583	1,502	1,586	1,476	1,654	1,485	1,767	1,539
Age group										
>36 years	0.445	0.497	0.407	0.491	0.415	0.493	0.440	0.496	0.474	0.499
<36 years	0.555	0.497	0.593	0.491	0.585	0.493	0.560	0.496	0.526	0.499
Educational attainment										
Reads & writes	0.048	0.214	0.048	0.213	0.050	0.217	0.043	0.204	0.045	0.206
Illiterate	0.262	0.440	0.332	0.471	0.328	0.470	0.166	0.372	0.162	0.368
Lower intermediate	0.206	0.405	0.216	0.412	0.214	0.410	0.207	0.405	0.202	0.402
Intermediate	0.326	0.469	0.303	0.460	0.311	0.463	0.356	0.479	0.351	0.477
Above intermediate	0.025	0.156	0.016	0.126	0.016	0.125	0.035	0.183	0.036	0.187
University	0.132	0.339	0.085	0.278	0.082	0.275	0.193	0.395	0.204	0.403
House size	4.535	2.044	4.737	2.191	4.769	2.198	4.279	1.762	4.230	1.760
Gender										
Male	0.454	0.498	0.427	0.495	0.460	0.498	0.450	0.497	0.465	0.499
Female	0.546	0.498	0.573	0.495	0.540	0.498	0.550	0.497	0.535	0.499
Employment status										
Permanent	0.252	0.434	0.225	0.418	0.236	0.425	0.268	0.443	0.278	0.448
Temporary	0.062	0.242	0.049	0.216	0.058	0.234	0.064	0.245	0.069	0.254
Seasonal	0.068	0.251	0.075	0.263	0.084	0.277	0.046	0.209	0.047	0.213
Casual	0.009	0.094	0.012	0.108	0.012	0.110	0.005	0.069	0.005	0.068
Unemployed	0.609	0.488	0.639	0.480	0.609	0.488	0.617	0.486	0.600	0.490
Marital status										
Never married	0.255	0.436	0.254	0.435	0.247	0.432	0.307	0.461	0.290	0.454
Divorced	0.014	0.118	0.011	0.106	0.011	0.105	0.017	0.130	0.019	0.137
Widowed	0.078	0.267	0.078	0.268	0.071	0.257	0.075	0.264	0.082	0.274
Married	0.653	0.476	0.657	0.475	0.671	0.470	0.601	0.490	0.610	0.488
Origin of birth										
Rural	0.600	0.490	1.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
Urban	0.400	0.490	0.000	0.000	0.000	0.000	1.000	0.000	1.000	0.000
Survey wave	0.605	0.489	0.632	0.482	0.640	0.480	0.576	0.494	0.562	0.496

¹ The sample size for the general model does not necessarily equal the sum of the samples for other models. This is because the sample of each sub-model includes non-migrants who are the same irrespective of the type of migrant.

regional and continental levels of analysis.

Third, a more critical look at the studies listed in [Table S1](#) demonstrates that most of the interest has centered on population movements from rural areas to urban areas (e.g. [Agbonlahor & Phillip, 2015](#), pp. 267–284; [Hirvonen, 2016](#)). Specifically, the literature has concentrated on causes and processes of the initial move to urban areas and/or the analysis of overall migration streams without any breakdown of different types of movement. This largely neglects the fact that internal migration may refer to a multitude of movements across space including also “rural-to-rural”, “urban-to-rural” and “urban-to-urban” flows. While the characteristics of migrants vary substantially between various migration streams, it is crucial to understand the determinants and welfare impacts of each of these spatial patterns of migration in order to capture the full picture of human mobility within the country and identify relevant interventions for each migration stream.

In conclusion, existing literature on internal migration in developing countries, particularly North Africa, is insufficient to fully document and quantitatively examine the determinants and welfare gains from various internal migration movements for different population groups. The present study contributes to filling these gaps and answers growing calls for attention to internal migration in developing countries. The empirical analysis focuses on Egypt, which has been under-searched in the extant literature, despite the increasing rates of urbanization that have been observed since 2011/2012, and accelerated further since 2014. These trends in urbanization, resulting from a range of interrelated economic, social and political changes, have stimulated large-scale internal migratory movements both from rural to urban areas and between urban areas. Furthermore, internal migration in Egypt has in recent years also been strongly associated with increased international “irregular” migration from the country to the EU. That is, internal migration

may facilitate international irregular migration when internal migrants move within the country to obtain information and establish contacts that make further migration across the border less costly ([Zohry, 2005](#)). In this context, the World Migration Report of 2018 indicates that Egypt has recently become one of the largest “migration corridors” from African countries to the EU ([IOM, 2018](#)). Thus, the study of internal migration in Egypt could provide useful insight for a comprehensive analysis of international irregular immigration.

Another added value of the current study is represented by our empirical analysis, which covers the four main streams of internal migration: the urban turnover (urban-urban), the rural turnover (rural-rural), the rural-to-urban, and the reverse migration (urban-to-rural). As illustrated in the introduction, migration decisions from and to each of these spatial areas can differ substantially, and so are the welfare effects. For instance, rural to rural migration in Egypt has historically been dominated by agricultural laborers and movement of people to the newly reclaimed areas in the Egyptian deserts for farming activities. In contrast, urban-to-urban migration is dominated by the middle-class households who move from small towns with fewer facilities and inefficient social services to larger cities with more efficient services and higher living standards ([World Bank, 2008](#)). To capture these heterogeneities, this paper estimated a pooled model for the determinants and welfare impact of internal migration, and then it estimated age- and gender-differentiated models for each migration stream. This way, our analysis provides a comprehensive picture of internal migration that should contribute to the design of urban planning and population policies conducive to managing internal migration more effectively and addressing its impact on urban sustainability.

3. Data on internal migration in Egypt

The empirical analysis in the current study relied on data from two waves of a longitudinal labor market panel survey (ELMPS) carried out in the years 2012 and 2018 (ERF & CAPMAS, 2013 & 2019). ELMPS 2012 and 2018 represent, respectively, the third and fourth waves of a longitudinal survey of the Egyptian labor force, which is carried out by the Central Agency for Public Mobilization and Statistics (CAPMAS) in collaboration with the Economic Research Forum (ERF) in Egypt. The first and second waves of the survey were carried out in 1998 and 2006, respectively.

The field work for ELMPS 2012 survey was conducted between March and June 2012. The final sample consisted of 12,060 households and. ELMPS 2018 survey was conducted between April and July 2018, and consisted of 15,746 households and 61,231 individuals. The households consisted of a sub-sample of 13,793 households whose members were surveyed in 2012, whilst 1,953 were refresher households. Among the individuals, 53,040 of them belonged to households that included at least a member who was interviewed in 2012, whereas 8,191 were in refresher households. The ELMPS 2012 and 2018 questionnaires contained a module on migration That covered a wide range of topics including place of birth and subsequent residence, parental background, education, housing, employment, job dynamics, and past and current migration experiences. The survey sample covered households and all household members aged six and above. Moreover, the survey covered various Egyptian regions, namely “Greater Cairo”, “Alexandria”, “Suez Canal region”, “urban Upper Egypt”, “urban Lower Egypt”, “rural Lower Egypt” and “rural Upper Egypt”.

The descriptive statistics in Table 1 show that the ELMPS 2012 and 2018 datasets comprised 5,233 internal migrants. Approximately, 24% of the individuals were rural-to-rural migrants, while 37% migrated from one urban area to another within Egypt. The remaining 39% were involved in cross-migration from rural areas to urban areas (26%) and vice versa (13%). The greater share of migration to urban areas (63% of total migrants) is unsurprising as it goes in line with previous studies on internal migration in developing countries suggesting the attractiveness of urban centers as destinations for internal migrants.

4. Analysis

4.1. Modeling approach

While migration is an adaptive response to socioeconomic and environmental transformations, the migration literature suggests that decisions to migrate are based on a comparison of expected lifetime earnings, net of migration costs, in the current place of residence and in an alternative place to which the migrant has the possibility of emigrating (Bell et al., 2015). Although this truism suggests that economic and other opportunity differentials play a key role in migration decisions, other factors beyond the “economic” models of migration can be significant “push” and “pull” factors for migration, such as environmental and political variables (Amuakwa-Mensah et al., 2019; Zhu et al., 2021).

Following Nakosteen and Zimmer (1980), an individual “i” decides to migrate when the expected gains from migration are greater than the corresponding cost of migration:

$$\left[\frac{W_{mi} - W_{ni}}{W_{ni}} \right] > C_i \tag{1}$$

where W_{mi} and W_{ni} denote the welfare of individual i 's as a migrant and a non-migrant, respectively. C_i is the cost incurred directly and indirectly by individual i in moving, and it can be expressed as a function of one or more of the migrant's personal characteristics (e.g. sex, age, education level, marital status), the community characteristics (e.g. cost of living and regional factors), and a random disturbance term. Thus:

$$C_i = g(X_i, Z) + \varepsilon_i \tag{2}$$

Equation (3) suggests that migration decisions could be expressed as a function of personal, household, and community characteristics, that is:

$$M_i = f(X_i, Z) \tag{3}$$

While individuals undertake migration to maximize their benefits while minimizing their costs, some areas where the benefits are anticipated to exceed the costs “pull” or attract migrants, while other areas “push” migrants since the costs are perceived to be greater than the gains from migration. The attractiveness of a given location depends on a combination of a wide range of its characteristics and spatial arrangement. The literature identifies a range of push and pull factors in relation to internal migration, including sociodemographic, economic, geographic, climatic and environmental factors (Amuakwa-Mensah et al., 2019; Garcia et al., 2015; Van der Geest et al., 2010). Based on this theoretical background, the anticipated welfare gain from internal migration is one of the motivations behind the migration decision and also influences the decision regarding the spatial movements of migrants to either a rural or an urban destination in Egypt. This raises two important questions. Does migration improve welfare? And if so, do welfare gains vary between different streams of internal migration? These questions were answered by the empirical analyses undertaken in this study.

4.2. Empirical approach

An analysis was undertaken of factors that explain internal migration decisions and how migration affects individuals' welfare status in a two-stage process: the first stage is the likelihood of migrating and the second stage is the probability of welfare gain or loss. Since the second stage is a sub-sample of the first stage, this could create a sample-selection bias. Moreover, migrants and non-migrants may have particular individual and household attributes that are likely to be unobservable and may correlate with the error term or unobserved factors that could affect welfare. This means that estimating the welfare model using the ordinary least square technique may yield biased estimates. Accordingly, the maximum likelihood Heckman's two-step procedure was used to correct for such potential selectivity bias. Heckman's two-step procedure consists of the estimation of two equations: the selection equation (equation (4)) and the outcome equation (equation (5)) (Heckman, 1976). Adopting this approach, the welfare equation was modified using the inverse Mills ratio in order to make the conditional means of the welfare disturbance terms normally distributed with zero mean and constant variance (see Nakosteen & Zimmer, 1980). More specifically, the first stage of this procedure is the specification of a selection equation that estimate the probability of an individual migrating internally. In equation (4), the dependent variable (M_{ij}) is a binary variable that takes the value of 1 if the individual migrates and 0 otherwise, and the model is estimated by maximum likelihood probit regression as follows:

$$M'_{ij} = \alpha_0 + \alpha_1 X_{ij} + \alpha_2 Z_j + \varepsilon_{ij} \tag{4}$$

where (M'_{ij}) is the migration decision variable which is unobserved, but instead $M_{ij} = 1$ is observed if $M'_{ij} > 0$, and $M_{ij} = 0$ if $M'_{ij} \leq 0$, α_1 represents a vector of coefficients of the individual and household characteristics in X_{ij} , α_2 is a vector of coefficients of community/regional characteristics in Z_j , α_0 represents a constant term, whereas ε_i is the error term.

The second stage of the Heckman procedure goes on to analyze the factors that explain household welfare and the effect on it of migration. Fitted values (ψ_{ij}) which resulted from the first stage were then used to construct a selectivity bias variable (that is, the inverse Mills ratio), which entered into the welfare model as an explanatory variable in equation (5):

$$W_{ij} = \theta_0 + \theta_1 M_{ij} + \theta_2 X_{ij} + \theta_3 Z_j + \sigma \text{Inversemillsratio} + \eta_{ij} \quad (5)$$

where, *inverse Mills ratio* $\begin{cases} \frac{-f(\varphi_{ij})}{F(\varphi_{ij})} & \text{if } M_{ij} = 1 \\ \frac{f(\varphi_{ij})}{1 - F(\varphi_{ij})} & \text{if } M_{ij} = 0 \end{cases}$

From equation (5), $F(\bullet)$ and $f(\bullet)$ denote the cumulative distribution functions and the standard normal density respectively, W_{ij} is the welfare index of the household, and M_{ij} , X_{ij} and Z_j have the same meaning as defined earlier. The same X_{ij} and Z_j variables that were included in the selection equation entered the outcome equation to reduce the possibility of misspecification. Equation (5) was estimated by the OLS method in order to allow the remaining unexplained component ϵ_{ij} to have the usual independently identically distributed properties. It should also be noted that in order to make the estimation of equations (4) and (5) identified, parents' occupational status was included only in the welfare model. Thus, parents' occupational status was more likely to affect household welfare than an individual's migration decision. Moreover, equations (4) and (5) were estimated for the pooled sample and subsamples (*i.e.* gender, age group and different spatial patterns of internal migrations).

In relation to the econometric estimations of the determinants of internal migration (equation (4)) and the welfare impacts of internal migration (equation (5)), Table 2 lists and provides operational descriptions of the dependent and explanatory variables used in these analyses. Specifically, the status of being a migrant is attached to individual aged 15 years or over whose current place of residence is different from their place of birth. In the welfare impacts model, the dependent variable is a composite asset-based index of household wealth (welfare index), which was calculated by the two agencies that conducted ELMPS (CAPMAS and ERF). This welfare index represents the first component of a vector of assets and non-durable goods using factor analysis, including the number of rooms, room size, materials used in construction of walls, floor and roof of building, ownership of phone, fridge, freezer dishwasher, washing machine, TV, AC, microwave, cooker, gas oven, fan, water-heater, heater, sewing machine, iron, radio, camera, bicycle, scooter, car, computer (laptop or desktop), cellphone, router, truck, water pump, hair dryer, vacuum, electricity generator, mixer, water cooler, water filler and other kitchen appliances. Recently, David and Jarreau (2017) used the same index as a measure of wealth and a proxy for permanent income in their analysis of the role of labor market

Table 2
Definition of variables in the analysis of internal migration in Egypt.

Variables	Operational description
Outcome variables	
<i>Migration status</i>	Dummy variable (the dependent variable in the migration equation): 1 = migrate and 0 otherwise
<i>Welfare status</i>	Composite asset-based index (the dependent variable in Eq. (5)), calculated by the two agencies that conducted ELMPS (CAPMAS and ERF), derived from principal component analysis based on household assets/resources.
Individual-level variables	
<i>Age</i>	Continuous variable: age of the individual
<i>Experience</i>	Continuous variable: experience of the individual, defined as age squared
<i>Gender</i>	Dummy variable: male = 1 and 0 otherwise.
<i>Household size</i>	Continuous variable: number of household members
<i>Educational attainment</i>	Categorical variable: illiterate (reference category), reads and writes, less intermediate, intermediate, above intermediate, and university education
<i>Marital status</i>	Categorical variable: married (reference category), never married, divorced and widowed
<i>Employment status</i>	Categorical variable: permanent (reference category), temporary, seasonal, casual, and unemployed and unavailable for work
Community-level variables	
<i>Origin of birth</i>	Dummy variable: 1 = rural and 0 = urban
<i>Survey wave</i>	Dummy variable: 1 = 2018 and 0 = 2012

outcomes in migration decisions in Egypt during the period 1998–2012. Previous studies have used principal component analysis to derive household wealth in several countries, and demonstrate that an asset-derived index is a reliable and more stable measure of a household's long-term standard of living (*e.g.* Singh et al., 2012).

Regressors in the two equations comprised a vector of individual and household attributes (X_{ij}), and a vector of community characteristics (Z_j). The selection of these variables was based on our review of relevant empirical studies (*e.g.* Lewin et al., 2012; Amuakwa-Mensah et al., 2016; de Brauw et al., 2018). It should also be noted that a drawback was identified in relation to the independent variables in the vectors (X_{ij} and Z_j) due to data limitation. For instance, ELMPS 2012 and 2018 do not include data that explicitly capture the cost of migration and the cost of living in the areas of origin and destination. Also missing are variables such as the presence of networks, relatives and contacts in the destination community, which are perceived to provide access to information about jobs and different kinds of support to new arrivals, and can therefore facilitate migration (Liu et al., 2012). Despite this caveat, the selected variables serve as reasonably sound predictors of the magnitudes of internal migration decisions and their welfare outcomes.

In the case of individual and household attributes, we considered gender, experience (captured by age-squared), marital and employment status, education level, and the household size. To investigate how migration decisions vary between different age groups, UNESCO's age classification¹ was adopted and the sample subdivided into two age categories: "younger" migrants who are individuals between the ages of 15 and 36, and "older" migrants who are 36 years old or above.

In relation to community-level variables, the study included the administrative classification/division of the area (rural or urban) to which individuals migrated in order to capture the role of push factors in motivating migration. This classification was based on the administrative division data reported in the 2019 Statistical Yearbook of CAPMAS. To capture the role of social networks and ties to the destination community in migration decisions, this study followed the work of Bohra-Mishra, Oppenheimer, and Hsiang (2014) and controlled for regional fixed effects as this could help capture migration due to networks or social capital at the destination region. Therefore "regional" dummies were included to capture regional fixed effects and control for the general level of migration due to the level of social capital in each region provided they were time invariant.

5. Results and discussion

5.1. Determinants of internal migration

Table 3 reports the econometric results of the five models that were estimated to investigate the determinants of internal migration: a pooled model (column 1), gender-based models (columns 2 and 3) and age-based models (columns 4 and 5). At the whole sample level, the results reported in column 1 of Table 3 reveal that all individual and household attributes and community characteristics included in our model are important determinants of internal migration in Egypt. Concerning individual attributes, the age profile of internal migrants shows a non-linear relationship with the probability of migration, implying that the likelihood of migration increases with age and subsequently falls beyond a certain age threshold. The effect of experience on migration decisions was found to significantly reduce the probability of migration. These findings are in concert with previous studies in migration and labor economics (*e.g.* Lewin et al., 2012;

¹ UNESCO suggests that the definition of "youth" should be based on a particular member state. Thus, "youth" is defined on the basis of the African Youth Charter as "every person between the ages of 15 and 35 years" <http://www.unesco.org/new/en/social-and-human-sciences/themes/youth/youth-definition/>.

Table 3
Determinants of internal migration.

Variables	Estimated models				
	(1) All	(2) Male	(3) Female	(4) Age<36	(5) Age≥36
Age	0.0081*** (0.0005)	0.0139*** (0.0008)	0.0047*** (0.0006)		
Experience	-0.0001*** (<0.001)	-0.0001*** (<0.001)	-0.0000*** (<0.001)		
Educational attainment (Reference category = Illiterate)					
<i>Reads and writes</i>	0.0594*** (0.0075)	0.0486*** (0.0100)	0.0528*** (0.0106)	0.0179** (0.0090)	0.0826*** (0.0118)
<i>Lower intermediate</i>	0.0511*** (0.0051)	0.0537*** (0.0079)	0.0366*** (0.0063)	0.0002 (0.0048)	0.0714*** (0.0093)
<i>Intermediate</i>	0.0631*** (0.0043)	0.0717*** (0.0065)	0.0409*** (0.0053)	0.0193*** (0.0044)	0.0812*** (0.0077)
<i>Above intermediate</i>	0.0995*** (0.0116)	0.0908*** (0.0164)	0.0855*** (0.0151)	0.0466*** (0.0122)	0.1212*** (0.0191)
<i>University</i>	0.0761*** (0.0060)	0.0646*** (0.0084)	0.0695*** (0.0081)	0.0342*** (0.0064)	0.0916*** (0.0103)
Household size	-0.0018*** (0.0006)	-0.0002 (0.0010)	-0.0036*** (0.0008)	-0.0003 (0.0007)	-0.0067*** (0.0013)
Male (Reference category = females)	0.0208*** (0.0034)			0.0058 (0.0037)	0.0703*** (0.0063)
Employment status (Reference category = permanent)					
<i>Temporary</i>	0.0745*** (0.0066)	0.1122*** (0.0080)	-0.0166* (0.0095)	0.0393*** (0.0069)	0.1423*** (0.0135)
<i>Seasonal</i>	0.0471*** (0.0063)	0.0494*** (0.0069)	0.0153 (0.0178)	0.0329*** (0.0069)	0.0583*** (0.0117)
<i>Casual</i>	-0.0247** (0.0126)	-0.0304** (0.0148)	-0.0262 (0.0232)	-0.0075 (0.0138)	-0.0581** (0.0243)
<i>Unemployed/Unavailable</i>	0.0002 (0.0037)	-0.0112** (0.0057)	-0.0074 (0.0052)	-0.0041 (0.0044)	0.0042 (0.0066)
Marital status (Reference category = married)					
<i>Never married</i>	-0.0923*** (0.0032)	-0.0510*** (0.0064)	-0.0980*** (0.0032)	-0.0936*** (0.0032)	-0.1257*** (0.0087)
<i>Divorced</i>	-0.0143* (0.0084)	0.0029 (0.0188)	-0.0127 (0.0090)	-0.0229** (0.0090)	-0.0009 (0.0166)
<i>Widowed</i>	-0.0162*** (0.0044)	-0.0244** (0.0105)	0.0048 (0.0054)	-0.0233 (0.0172)	0.0152** (0.0073)
Origin of birth (Reference category = urban locality)	0.0092*** (0.0030)	0.0391*** (0.0044)	-0.0166*** (0.0039)	0.0124*** (0.0033)	-0.0375*** (0.0058)
Observations	63,909	29,037	34,872	35,450	28,459
Governorate FE	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES
Pseudo R-squared	0.126	0.158	0.123	0.0903	0.0981
LR chi2(23)	5059	2811	2565	1694	2468
Log likelihood	-22499	-10712	-11328	-9331	-13069

Standard errors are in parentheses. Symbols *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively. The results in Table 3 correspond to Equation (4), which was estimated using Maximum Likelihood-Probit. The dependent variable is binary 1 = internal migrant and 0 otherwise. Estimation coefficients are presented as average marginal effects.

Amuakwa-Mensah et al., 2016; Amuakwa-Mensah et al., 2019), which suggest that migration is largely a “youth phenomenon” and that individuals are much more likely to migrate during their period of youth.

The results reveal that educational attainment increases the likelihood of migration, while an individual with university degree is about 7% more likely to migrate than those who are illiterate. Interestingly, the association between formal educational attainment and internal migration in Egypt is highly significant in that the odds of internal migration rise as the level of education increases from “intermediate” to “above intermediate” and “university” levels. According to CAPMAS (2017), illiteracy rates among the Egyptian population have been declining in recent years, decreasing from 39.4% in 1996 to around 25% in 2017, and illiteracy is lowest (8.6%) among those in the 15–24 year age group. This implies that internal migration is likely to increase in future with the steady fall in illiteracy rates and the significant share of young people in the working-age population in Egypt.

The results show also that females are less likely to migrate than their male counterparts. In this regard, Sika (2011) points out that Egyptian women customarily do not attempt to find jobs outside their areas of origin given the social and cultural context. Traditionally, labor markets

in Egypt used to segregate females and males into different jobs, and private-sector employers tend to consider women to be more costly to hire, less attached to work, reluctant to work long hours and have high absenteeism and turnover rates (Nassar, 2011). However, the share of women among internal migrants in developing countries with similar sociocultural and economic circumstances is constantly growing (Camlin et al., 2014).

With regard to employment status, temporary and seasonal workers were found to be more likely to migrate than those with permanent employment. This finding is consistent with the findings of David and Jarreau (2017) showing that internal migration in Egypt positively correlates with individuals being non-permanently employed because the benefits of formal employment seem to act as a deterrent to migrating. Marital status was found to be an important determinant of migration decisions, where married Egyptians were significantly more likely to migrate compared to those who have other marital statuses (e.g. never married, divorced and widowed). According to Choi and Lim (2015), most studies in the migration literature suggest that married individuals are more likely to migrate than unmarried individuals because of the greater incentive to earn a better income.

The results of Model 1 demonstrate a strong association between the characteristics of place or origin (rural *versus* urban) and the likelihood of migration, where individuals who originally belong to “rural” localities are more likely to migrate to other areas. In this respect, Lewin et al. (2012) note that rural areas in developing countries represent a “push” factor for migration, whereas “urban” centers are believed to offer greater opportunities for individuals to excel and also sufficient infrastructure and better social services.

By and large, the results of the gendered models (Models 2 and 3 in Table 3) indicate that age and educational attainment, followed to a lesser extent by marital and employment statuses are significant determinants of both males’ and females’ migration decisions. In particular, the results relating to marital status confirm the results of the pooled model and indicate that migration decisions in developing countries are made in concert with decisions about other life-course events such as marriage.

In analogy with the results of previous studies on internal migration in developing countries (e.g. Sagarika, 2015), our results show that rural males are significantly more likely to out-migrate compared to their counterparts in urban areas. In contrast, rural females are significantly less likely to migrate compared to their counterparts in urban areas. This finding may be attributable to the fact that rural out-migration among

Egyptian females is chiefly motivated by marriage, whereas that for rural males is primarily induced by factors related to employment and seeking their livelihoods.

As shown in columns 4 and 5 of Table 3, migration decisions for both age groups are significantly influenced by gender, employment, marital status, household size and educational attainment. In general, the sign and magnitude of the effect of these factors are qualitatively similar to those of the pooled model. However, gender only affects the migration decision of older migrants, as males over the age of 36 are 7% more likely to migrate than females in the same age group, compared to merely 2% in the pooled model. In addition, older individuals with larger-sized households are significantly less likely to migrate, which might be explained by the economic and non-economic cost of moving.

Finally, a comparison of the marginal effects of the origin of birth variable for younger and older individuals suggests that younger and more mobile individuals from rural areas are more likely to out-migrate for better opportunities elsewhere. In this regard, Zaiceva (2014, p. 99) points out that the desire to migrate declines later in the life cycle because the indirect labor demand effects that may reduce migration, though the return migration to rural areas at older ages and following retirement may increase.

Table 4
Determinants of rural-to-urban migration.

Variables	Estimated models				
	(1)	(2)	(3)	(4)	(5)
	All	Male	Female	Age<36	Age≥36
Age	0.0004** (0.0002)	0.0003 (0.0002)	0.0008*** (0.0003)		
Experience	-0.0000 (<0.001)	0.0000 (<0.001)	-0.0000** (<0.001)		
Educational attainment					
<i>Reads and writes</i>	0.0104*** (0.0032)	0.0087** (0.0034)	0.0104* (0.0054)	0.0058 (0.0063)	0.0673*** (0.0150)
<i>Lower intermediate</i>	-0.0003 (0.0019)	0.0014 (0.0022)	-0.0023 (0.0028)	0.0012 (0.0031)	0.0599*** (0.0112)
<i>Intermediate</i>	-0.0002 (0.0016)	0.0029 (0.0020)	-0.0042* (0.0024)	0.0055* (0.0029)	0.0629*** (0.0096)
<i>Above intermediate</i>	0.0027 (0.0038)	0.0029 (0.0043)	0.0010 (0.0058)	0.0286** (0.0118)	0.1229*** (0.0342)
<i>University</i>	0.0013 (0.0021)	0.0063** (0.0027)	0.0062** (0.0029)	0.0286*** (0.0064)	0.1311*** (0.0190)
Household size	-0.0007** (0.0003)	-0.0002 (0.0003)	-0.0012*** (0.0004)	-0.0005 (0.0005)	0.0084*** (0.0012)
Male	-0.0085*** (0.0028)			-0.0127*** (0.0035)	-0.0194*** (0.0045)
Employment status					
<i>Temporary</i>	0.0245*** (0.0082)	0.0299*** (0.0096)	-0.0018 (0.0161)	0.0114 (0.0074)	0.0318** (0.0154)
<i>Seasonal</i>	-0.0036 (0.0025)	-0.0014 (0.0019)	0.0062 (0.0098)	-0.0079** (0.0033)	-0.0070 (0.0097)
<i>Casual</i>	-0.0066 (0.0056)	-0.0042 (0.0045)	-0.0098 (0.0113)	-0.0102* (0.0060)	-0.0150 (0.0226)
<i>Unemployed/Unavailable</i>	0.0007 (0.0017)	-0.0015 (0.0016)	-0.0039 (0.0031)	-0.0032 (0.0032)	0.0123* (0.0064)
Marital status					
<i>Never married</i>	-0.0253*** (0.0014)	-0.0108*** (0.0020)	-0.0337*** (0.0018)	-0.0223*** (0.0022)	-0.0431*** (0.0087)
<i>Divorced</i>	-0.0064** (0.0030)	-0.0012 (0.0052)	-0.0085* (0.0045)	-0.0141*** (0.0036)	0.0426** (0.0196)
<i>Widowed</i>	-0.0011 (0.0019)	-0.0038* (0.0022)	0.0062* (0.0033)	0.0085 (0.0170)	0.0162** (0.0064)
Observations	57,066	25,073	31,993	21,008	14,269
Governorate FE	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES
Pseudo R-squared	0.128	0.171	0.110	0.273	0.329
LR chi2(23)	1707	787	988.8	8339	12399
Log likelihood	-7618	-2513	-5027	-2244	-2617

Standard errors are in parentheses. Symbols *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively. The results in Table 4 correspond to Equation (4), which was estimated using Maximum Likelihood-Probit. The dependent variable is binary 1 = rural-to-urban migrant and 0 otherwise. Estimation coefficients are presented as average marginal effects.

5.2. Determinants of different spatial migration patterns

5.2.1. Rural-to-urban migration

Table 4 reveals that rural-to-urban migration decisions are determined mainly by gender, age, employment status and household size, followed by educational attainment and marital. In contrary to the vast majority of earlier studies on internal migration in developing countries, particularly Egypt, the results provide a strong evidence that females are more likely to migrate from rural to urban areas. Generally, previous studies suggest that rural males, who form the surplus of the rural and agricultural sectors in Egypt, are more likely than rural females to migrate to urban areas in search of employment opportunities and securing livelihoods (Zohry, 2012). However, our findings lend support to the growing literature on the “feminization of migration”, which indicate that the share of women among internal migrants in most developing countries is rising, and that more women in these countries are migrating to urban areas for employment purposes and not just as accompanying spouses (e.g. Camlin et al., 2014; Yang et al., 2020). This is attributable to the greater demand for female labor in several industries and services, as well as the increasing social acceptance of women’s economic independence and mobility.

Furthermore, the results of the gender-differentiated models reveal that females’ decisions (Model 3) in relation to rural-to-urban migration

are positively influenced by age and educational attainment, and negatively influenced by household size. In addition, divorced and widowed women are more likely to migrate than those who are married, which might be explained by the fact that migration can be a way for divorced and widowed women in developing countries to escape social stigma (Afsar, 2011). Migration decisions among rural males (Model 2) were mainly influenced by education and employment status. Although “marital status” explains the decisions of both males and females to migrate from rural to urban areas, “household size” significantly affects females’ decisions negatively while the temporary status of employment affects males’ migration decisions positively (columns 2 and 3 of Table 4). The results also revealed that married individuals are more likely to migrate from rural to urban areas than those who have never married (columns 4 and 5 of Table 4). With few exceptions, the sign and magnitude of the estimated coefficients in the age disaggregated models (Model 4 and 5) are qualitatively similar to those of the pooled model. The results indicate that a larger household size is associated with increased probability for migration among older rural individuals, as larger household sizes in this case may facilitate the replacement of additional labor’s loss in farming activities (Wouterse & Van den Berg, 2011).

Table 5
Determinants of rural-to-rural migration.

Variables	Estimated models				
	(1) All	(2) Male	(3) Female	(4) Age<36	(5) Age≥36
Age	0.0022*** (0.0002)	0.0038*** (0.0003)	0.0008*** (0.0002)		
Experience	-0.0000*** (<0.001)	-0.0001*** (<0.001)	-0.0000** (<0.001)		
Educational attainment					
<i>Reads and writes</i>	0.0114*** (0.0029)	0.0090*** (0.0033)	0.0122*** (0.0046)	0.0137* (0.0078)	0.0477*** (0.0118)
<i>Lower intermediate</i>	0.0060*** (0.0019)	0.0058** (0.0025)	0.0035 (0.0024)	-0.0004 (0.0040)	0.0335*** (0.0098)
<i>Intermediate</i>	0.0077*** (0.0015)	0.0099*** (0.0020)	0.0007 (0.0018)	0.0125*** (0.0037)	0.0456*** (0.0079)
<i>Above intermediate</i>	-0.0001 (0.0034)	0.0018 (0.0046)	-0.0055 (0.0036)	0.0171 (0.0114)	0.0372 (0.0228)
<i>University</i>	-0.0033* (0.0017)	-0.0058*** (0.0020)	-0.0015 (0.0024)	0.0038 (0.0050)	0.0205* (0.0118)
Household size	0.0008*** (0.0002)	0.0011*** (0.0003)	-0.0000 (0.0003)	0.0007 (0.0005)	-0.0020* (0.0011)
Male	0.0266*** (0.0020)			0.0320*** (0.0038)	0.1252*** (0.0073)
Employment type					
<i>Temporary</i>	0.0382*** (0.0040)	0.0498*** (0.0044)	-0.0005 (0.0043)	0.0397*** (0.0072)	0.1646*** (0.0168)
<i>Seasonal</i>	0.0172*** (0.0027)	0.0188*** (0.0027)	0.0007 (0.0060)	0.0193*** (0.0052)	0.0436*** (0.0105)
<i>Casual</i>	-0.0021 (0.0042)	-0.0029 (0.0048)	0.0007 (0.0085)	-0.0091 (0.0082)	-0.0232 (0.0181)
<i>Unemployed/Unavailable</i>	-0.0030* (0.0016)	-0.0055*** (0.0020)	-0.0035 (0.0023)	-0.0091** (0.0042)	-0.0122* (0.0072)
Marital status					
<i>Never married</i>	-0.0246*** (0.0018)	-0.0204*** (0.0023)	-0.0193*** (0.0016)	-0.0524*** (0.0034)	-0.0792*** (0.0085)
<i>Divorced</i>	-0.0017 (0.0039)	-0.0058 (0.0060)	0.0044 (0.0047)	-0.0102 (0.0083)	0.0482* (0.0266)
<i>Widowed</i>	-0.0090*** (0.0016)	-0.0119*** (0.0028)	-0.0009 (0.0022)	-0.0222** (0.0107)	-0.0096 (0.0081)
Observations	58,142	26,722	29,988	21,379	15,175
Governorate FE	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES
Pseudo R-squared	0.183	0.193	0.103	0.128	0.149
LR chi2(23)	2613		530.6	1982	1471
Log likelihood	-9881	-6330	-3291	-3721	-5061

Standard errors are in parentheses. Symbols *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively. The results in Table 5 correspond to Equation (4), which was estimated using Maximum Likelihood-Probit. The dependent variable is binary 1 = rural-to-rural migrant and 0 otherwise. Estimation coefficients are presented as average marginal effects.

5.2.2. Rural-to-rural migration

Table 5 shows that migration across rural areas is mainly driven by age, gender, and educational attainment (Model 1). To a lesser extent, both employment and marital status were found to significantly influence rural-to-rural migration decisions. An increase in household size was found to be significantly associated with increased probability of rural-to-rural migration for the pooled sample (column 1) and males (column 3). The results also reveal that migration across rural areas in Egypt tends to decrease among those who have higher levels of educational attainment, especially university degrees. This finding dovetails with those of Carr (2009) who shows that rural-to-rural migrants in many developing countries are generally less educated than both non-migrants and migrants to other urban destinations, as they perceive themselves as having limited capabilities of competing on labor markets in urban areas.

In relation to the determinants of rural-to-rural migration across age groups, the estimates of models 4 and 5 in Table 5 indicate that the drivers of rural-to-rural migration among older people conform with the estimates of the pooled model for rural-to-rural migration, whereas migration decisions among younger people are particularly influenced by gender, employment type and to some extent by marital status.

5.2.3. Urban-to-rural migration

Table 6 shows that the counter-flow of people from urban to rural areas is driven more or less by the factors explaining overall internal migration presented in column 1 in Table 3. Interestingly, the results reveal that the likelihood of migration from urban to rural areas increases with age (Model 1), especially for males (Model 2 and Model 5). This finding is consistent with the findings of Kim and Han (2014) and Zhu et al. (2021), which point out that the likelihood of urban-to-rural migration increases around mid-life and retirement. In the same context, Cattaneo and Robinson (2020) find that on average, 51% of males and 32% of females in their sample of 31 countries in sub-Saharan Africa migrated from urban to rural areas, with the majority of them being return migrants who lived in rural areas as children. Return migration can generally be attributed to multiple reasons including retirement, family ties, or the existence of social safety nets that migrants may not have access to in urban areas.

In particular, the strong association between return migration and the gender (the male category), educational attainment (all categories) and employment status (the temporary category) could be explained by the concept of “circular migration”, where the female and children members of household stay in the rural area and the male members migrate between rural and urban areas. While the likelihood for males to

Table 6
Determinants of urban-to-rural migration.

Variables	Estimated models				
	(1) All	(2) Male	(3) Female	(4) Age<36	(5) Age≥36
Age	0.0008*** (0.0001)	0.0007*** (0.0002)	0.0011*** (0.0002)		
Experience	-0.0000*** (<0.001)	-0.0000*** (<0.001)	-0.0000*** (<0.001)		
Educational attainment					
<i>Reads and writes</i>	0.0054** (0.0027)	0.0015 (0.0022)	0.0080* (0.0047)	-0.0023 (0.0053)	-0.0021 (0.0052)
<i>Lower intermediate</i>	0.0101*** (0.0019)	0.0051** (0.0020)	0.0139*** (0.0031)	-0.0024 (0.0033)	0.0135** (0.0054)
<i>Intermediate</i>	0.0108*** (0.0015)	0.0045*** (0.0015)	0.0159*** (0.0025)	-0.0027 (0.0031)	0.0053 (0.0036)
<i>Above intermediate</i>	0.0324*** (0.0065)	0.0121** (0.0054)	0.0471*** (0.0109)	0.0057 (0.0062)	0.0142 (0.0096)
<i>University</i>	0.0163*** (0.0027)	0.0034* (0.0020)	0.0284*** (0.0049)	-0.0027 (0.0032)	-0.0004 (0.0043)
Household size	-0.0003 (0.0002)	0.0001 (0.0002)	-0.0006** (0.0003)	0.0001 (0.0006)	0.0029*** (0.0007)
Male	0.0083*** (0.0010)			-0.0116*** (0.0029)	0.0223*** (0.0035)
Employment type					
<i>Temporary</i>	0.0041** (0.0020)	0.0054*** (0.0019)	-0.0042 (0.0029)	0.0072 (0.0054)	0.0190** (0.0090)
<i>Seasonal</i>	-0.0011 (0.0017)	0.0001 (0.0012)	-0.0022 (0.0055)	-0.0030 (0.0045)	0.0066 (0.0078)
<i>Casual</i>	-0.0054* (0.0030)	-0.0007 (0.0032)		0.0108 (0.0226)	
Unemployed/Unavailable	0.0013 (0.0011)	0.0017 (0.0012)	-0.0016 (0.0019)	0.0057* (0.0030)	-0.0018 (0.0034)
Marital status					
<i>Never married</i>	-0.0111*** (0.0009)	-0.0026** (0.0012)	-0.0189*** (0.0013)	-0.0395*** (0.0051)	-0.0207*** (0.0028)
<i>Divorced</i>	-0.0031 (0.0020)	-0.0026 (0.0025)	-0.0038 (0.0032)	-0.0080* (0.0043)	-0.0090 (0.0058)
<i>Widowed</i>	-0.0017 (0.0012)	-0.0036*** (0.0012)	-0.0005 (0.0021)	-0.0103 (0.0063)	-0.0058* (0.0030)
Observations	56,109	24,686	31,296	11,022	9,931
Governorate FE	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES
Pseudo R-squared	0.122	0.145	0.109	0.184	0.198
LR chi2(23)	849.9	309.2	602.2	395.1	565.7
Log likelihood	-4634	-1261	-3310	-1699	-1702

Standard errors are in parentheses. Symbols *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively. The results in Table 6 correspond to Equation (4), which was estimated using Maximum Likelihood-Probit. The dependent variable is binary 1 = urban-to-rural migrant and 0 otherwise. Estimation coefficients are presented as average marginal effects.

migrate to urban areas is much higher, as suggested by the results of our rural-to-urban models, it could be that rural migrants return to rural areas, when they fail to find employment opportunities in urban areas.

5.2.4. Urban-to-urban migration

Table 7 shows that urban-to-urban migrants in Egypt are generally highly educated and have smaller household sizes. These findings comport with the previous literature on internal migration in developing countries showing that this pattern of internal migration is more pronounced among well-educated and experienced workers and is influenced by the imbalanced regional economic development that subsequently motivates people to move from less developed cities to the more developed to look for a better employment and living opportunities (Ye et al., 2016). The negative but statistically significant relationship between household size and urban-to-urban migration could be attributed to the higher economic and non-economic costs of moving within urban areas. The estimated gender- and age-differentiated models indicate that migration decisions are more or less motivated by similar factors to those of the full sample model.

5.3. Welfare outcomes from internal migration

Table 8 summarizes the estimated effect on welfare in relation to the

Table 7
Determinants of urban-urban migration.

Variables	(1)	(2)	(3)	(4)	(5)
	All	Male	Female	Age<36	Age≥36
Age	0.0037*** (0.0002)	0.0050*** (0.0004)	0.0026*** (0.0002)		
Experience	-0.0000*** (<0.001)	-0.0000*** (<0.001)	-0.0000*** (<0.001)		
Educational attainment					
<i>Reads and writes</i>	0.0331*** (0.0055)	0.0310*** (0.0078)	0.0323*** (0.0075)	0.0278 (0.0184)	0.0472** (0.0185)
<i>Lower intermediate</i>	0.0412*** (0.0039)	0.0474*** (0.0064)	0.0313*** (0.0045)	0.0130 (0.0097)	0.0672*** (0.0143)
<i>Intermediate</i>	0.0446*** (0.0031)	0.0482*** (0.0049)	0.0376*** (0.0038)	0.0212** (0.0086)	0.0690*** (0.0119)
<i>Above intermediate</i>	0.0956*** (0.0111)	0.0986*** (0.0163)	0.0871*** (0.0148)	0.0317* (0.0177)	0.1302*** (0.0257)
<i>University</i>	0.0839*** (0.0058)	0.0798*** (0.0084)	0.0833*** (0.0082)	0.0477*** (0.0125)	0.1227*** (0.0146)
Household size	-0.0019*** (0.0003)	-0.0019*** (0.0005)	-0.0017*** (0.0004)	-0.0029** (0.0012)	-0.0049** (0.0022)
Male	0.0028* (0.0015)			0.0020 (0.0048)	0.0575*** (0.0089)
Employment type					
<i>Temporary</i>	0.0183*** (0.0033)	0.0307*** (0.0043)	-0.0041 (0.0036)	0.0250*** (0.0087)	0.1011*** (0.0195)
<i>Seasonal</i>	0.0123*** (0.0035)	0.0139*** (0.0038)	0.0134 (0.0115)	0.0295** (0.0121)	0.0695*** (0.0215)
<i>Casual</i>	-0.0149*** (0.0046)	-0.0169*** (0.0051)	-0.0105 (0.0104)	-0.0087 (0.0283)	-0.0999** (0.0406)
<i>Unemployed/Unavailable</i>	0.0021 (0.0016)	-0.0016 (0.0026)	0.0011 (0.0020)	-0.0017 (0.0057)	0.0231** (0.0093)
Marital status					
<i>Never married</i>	-0.0107*** (0.0018)	0.0020 (0.0032)	-0.0158*** (0.0018)	-0.0589*** (0.0047)	-0.0986*** (0.0121)
<i>Divorced</i>	0.0109** (0.0050)	0.0084 (0.0089)	0.0111** (0.0055)	0.0024 (0.0158)	0.0322 (0.0234)
<i>Widowed</i>	-0.0002 (0.0020)	-0.0009 (0.0048)	0.0021 (0.0023)	-0.0286 (0.0201)	0.0385*** (0.0117)
Observations	58,061	25,942	32,119	12,941	11,657
Governorate FE	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES
Pseudo R-squared	0.216	0.221	0.230	0.0874	0.146
LR chi2(23)	3676	1678	2063	505.4	1400
Log likelihood	-9298	-4517	-4655	-2702	-4859

Standard errors are in parentheses. Symbols *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively. The results in Table 7 correspond to Equation (4), which was estimated using Maximum Likelihood-Probit. The dependent variable is binary 1 = urban-to-urban migrant and 0 otherwise. Estimation coefficients are presented as average marginal effects.

Table 8
Welfare impacts of internal migration in Egypt.

Variables	(1)	(2)	(3)	(4)	(5)
	All	Male	Female	Age<36	Age≥36
Full sample	0.0247*** (0.0033)	0.0225*** (0.0036)	0.0325*** (0.0052)	0.0241*** (0.0080)	0.0263*** (0.0036)
Rural-to-urban	-0.0241** (0.0108)	-0.0172 (0.0158)	-0.0149 (0.0133)	0.0289 (0.0218)	0.0725*** (0.0138)
Rural-to-rural	0.0022 (0.0052)	0.0163*** (0.0054)	0.0306* (0.0184)	-0.0094 (0.0098)	0.0246*** (0.0048)
Urban-to-rural	0.0294* (0.0162)	0.0297 (0.0292)	0.0399** (0.0194)	0.0336** (0.0165)	0.0585*** (0.0178)
Urban-to-urban	0.0373*** (0.0062)	0.0330*** (0.0083)	0.0419*** (0.0086)	0.0533*** (0.0194)	0.0372*** (0.0058)

Robust standard errors are in parentheses. Symbols *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively. **p < 0.01, ***p < 0.05, *p < 0.1. The results correspond to Equation (5), which was estimated using OLS method after correcting for self-selection. The dependent variable is a composite asset-based index of household wealth calculated by the two agencies that conducted ELMPS (CAPMAS and ERF). Control variables include age, literacy, educational attainment, household size, gender, level of urbanization, employment status, marital status and parents' employment status. Selection bias is accounted for in all estimations.

various forms of internal migration in Egypt. The econometric results of the determinants of welfare for the full sample and for each internal migration stream are given in the Supplementary Material (Tables S2–S6). The results underscore five main findings. First, there is a strong case for the positive welfare gains from internal migration in Egypt for all migrant groups, regardless the origin and the destination (Row 1 in Table 8). More specifically, the results revealed that the net welfare of internal migrants is roughly 2.5% greater than that of non-migrants. This finding echoes the findings of several previous studies in this literature, which suggest that internal movements of the population in developing countries can significantly improve migrant's economic welfare and their overall well-being (e.g.: Amuakwa-Mensah et al., 2016; de Brauw et al., 2018).

Second, with regard to the full-sample model, all migration streams were associated with positive and statistically significant welfare gains, except for rural-to-urban migration that was surprisingly found to be associated with significant welfare loss for the migrants (column 1 in Table 8). Third, older migrants (≥ 36 years) are the ones who achieve positive and statistically significant welfare gains from all streams of internal migration (column 5 in Table 8). In contrast, young people only improve their welfare when they embark on an urban-to-urban or urban-to-rural migration by around 5–6% relative to non-migrant youth, and their welfare gains are also around 1.5–2% greater than those of older urban-to-urban migrants.

Fourth, urban-to-urban migration is the only form of internal migration in Egypt that is associated with significant positive welfare gains for all migrant groups (last first row in Table 8). Fifth, the results interestingly highlight that the welfare gains for Egyptian females from internal migration are much higher than the welfare gains that their male counterparts may achieve from migration. In particular, females who migrate from urban areas to other urban areas or to rural areas benefit more than their male counterparts do. These findings are in line with those of Salih (2011) who argues that Egyptian migrant women are twice as likely to work than non-migrant women, and that they attain more power with regard to household's decision-making processes, especially those related to children's education, welfare and household maintenance.

6. Conclusions and implications for policy and research

Using data from two waves of a nationally-representative Labor Market Panel Survey (ELMPS) conducted in 2012 and 2018, this study examined the determinants and welfare gains from different streams of internal migration in Egypt. The following subsections discuss the implications of our main findings and provide recommendations for urban policy making in developing countries:

An overall look at the empirical findings indicate that the determinants of internal migration decisions and their welfare outcomes in Egypt differ depending on migration streams, and gender and age groups. For instance, higher educational attainment was found to significantly increase the likelihood of migration from rural to urban areas, as well as between urban areas. In contrast, higher educational attainment tends to decrease the likelihood of migration between rural areas. Another example is that the probability for older males to embark on an urban-to-rural migration is much higher than that for older females, whilst younger females are more likely to migrate from urban to rural areas compared to their males counterparts. In spite of these heterogeneities, urban planning policies in most of developing countries, including Egypt, are implemented without regard to their implications and consequences for migration (Selod, Shilpi, & Washnigton, 2021). While these policies influence both the benefits and costs of internal migration, policies related to population mobility and regional development must characterize migrant groups and identify motives for various spatial movements. Accounting for heterogeneities is crucial for understanding the patterns and welfare impacts of each migration stream, which can help developing evidence-based interventions for

improved resource allocation and more effective regional planning.

The empirical results make a strong case for the overall welfare gains from internal migration, while the net welfare of internal migrants was estimated to be 2.5% greater than that of the non-migrants. These findings comport with the growing consensus among policy makers and scholars regarding the integral role that migration can play in the process of human development as well as in achieving the SDGs in developing countries. In spite of that, a deeper look at Egyptian population and urban development strategies reveals that they, like in many other developing countries, are often aimed at preventing or reducing migration. Especially, they are generally salient on issues relating to the integration of internal migrants and the protection of their rights and welfare. When appropriate development strategies are put in place, internal migrants shall be viewed as potential contributors to economic growth and drivers of development, rather than a mere burden for the receiving communities. Studies on internal migration in similar developing countries point out that migration should not be unduly prohibited nor discouraged because migration-preventing policies could even be counterproductive (e.g. World Bank, 2009; Bhagat & Keshri, 2020). Therefore, Egyptian policymakers should concern themselves with strategies that can maximize the potential welfare gains of migrants and society at large. Urban planning should incorporate an area-based understanding of potential migrants and include them in development plans, such as the provision of affordable housing and education and healthcare services. Local authorities in receiving communities and other stakeholders must also harness and optimize the skills, experience and productivity of migrants. Such policies will contribute to achieving SDG #11 aiming to “make cities inclusive, safe, resilient and sustainable”.

In connection with the previous conclusion, our findings indicated that rural-to-urban migration is generally associated with a net welfare loss or insignificant welfare gains for all migrant groups, except for older migrants. This calls for more effort for promoting income-generating activities in areas of high rates of outmigration, especially rural areas, to enhance employment opportunities and reduce the push factors for outmigration. In particular, it is essential to work towards the development of entrepreneurial skills of rural dwellers, supporting agribusinesses and family farming, removing obstacles preventing access to markets, investing in rural infrastructure, and promoting public and private investments in favor of agricultural and rural economic development.

The results revealed that the counter-flow of people from urban to rural areas is determined mainly by age, especially for males. From a policy making perspective, the return of this category of migrants to rural areas could likely bring back a diverse blend of skills that may benefit rural communities. The implications for the rural areas will depend on what is driving the decision to return, and thus more efforts should be made to provide favorable conditions for those returnees.

The findings pointed out to a clear indication of gender difference in relation to the determinants and welfare gains from different streams of internal migration. For instance, it appears that economic development and urbanization translate into a shift from the traditional rural-to-rural migration of women to rural-to-urban migration. Moreover, the welfare gains for Egyptian females from internal migration are much higher than the welfare gains that their male counterparts may achieve. This is especially the case of urban-to-urban and urban-to-rural migration. These findings underscore a principal recent change in population movements in Egypt, where internal migration that has historically been dominated by men is increasingly feminized with women increasingly outnumbering men among internal migrants. While motivations, decisions and expectations from internal migration often differ among women and men (Camlin, 2014), greater gender awareness within labor and social policies is crucial to fully realize the positive effects of internal migration on women through empowering their autonomy and improving their socioeconomic status.

The results tended to support the argument that migration is a “youth

phenomenon”, while a non-linear relationship was found between age and the probability of migrating. This implies that the probability of migration rises with age and subsequently falls beyond a certain age threshold. However, the results showed that older migrants are the ones who achieve positive and statistically significant welfare gains from all streams of internal migration. In addition, for most of migration streams, the welfare gains of younger migrants were lower and statistically less insignificant compared to the welfare gains of older migrants. This implies that internal migration may provide an immediate temporary solution to the youth “bulge” and unemployment, but does not improve young people’s welfare and wellbeing. Therefore, labor policies should pay greater attention to deficiencies in domestic labor markets and youth-specific and targeted reforms need to be implemented so as to improve young people’s welfare gain from internal migration.

The finding that urban-to-urban migration is the only stream of internal migration in Egypt that was associated with significant positive welfare gains for all migrant groups strongly suggests that welfare gains from internal migration is a function of the level of development and urbanization. Uneven development is one of the major reasons for migration and urbanization is the sole consistent factor to attract migrants. In this regard, it is crucial for regional planning strategies to aim for reducing regional inequalities, and more spatial integrated policies should be implemented to take into consideration the interlinkages that exist between economic growth, urbanization, and migration, to achieve more sustainable regional development.

Finally, the results pointed out to an association between rural-to-rural migration and welfare gains for males and older migrants. This is largely attributable to agrarian expansion in recent decades to Egyptian deserts, especially the formation of new agrarian systems driven by global commodity markets, which encouraged labor migration from traditional agricultural production systems in rural areas to high-tech and export-oriented production systems in newly reclaimed lands in the deserts, making rural labor market a fast developing market in Egypt. Given that development challenges are increasingly concentrated in urban areas in developing countries, urban areas in Egypt are unlikely to maintain their capacity to generate employment opportunities that could absorb the migrating workforce from rural areas. Researchers and policymakers concerned about reducing poverty and increasing livelihood opportunities in Egypt’s rural areas should develop better understanding of the increasing labor movements between rural areas in order to facilitate such circular rural migration, make rural areas more economically integrated, and decrease income differences between Egyptian regions.

Credit author statement

Assem Abu Hatab: Conceptualization, Methodology, Software, Validation, Data Curation, Writing - Original Draft, Writing - Review & Editing, Project administration, Funding acquisition. Franklin Amuakwa-Mensah: Conceptualization, Methodology, Software, Validation, Data Curation, Writing - Review & Editing. Carl-Johan Lagerkvist: Conceptualization, Validation, Writing - Review & Editing, Supervision, Funding acquisition.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.habitatint.2022.102573>.

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