

# **Assessing the impact of unexpected Instability events on Internal Migration in Egypt**

Mina Sami<sup>1</sup>

American University in Cairo  
School of Business, Department of Economics  
AUC Avenue – Postal Code 11835, New Cairo, Cairo, Egypt  
E-mail: [mina\\_sami@aucegypt.edu](mailto:mina_sami@aucegypt.edu)

Dina Abdel Fattah

American University in Cairo  
School of Business, Department of Economics  
AUC Avenue – Postal Code 11835, New Cairo, Cairo, Egypt  
E-mail: [dmoh40@aucegypt.edu](mailto:dmoh40@aucegypt.edu)

Mona Said

American University in Cairo  
School of Business, Department of Economics  
AUC Avenue – Postal Code 11835, New Cairo, Cairo, Egypt  
E-mail: [mona\\_said@aucegypt.edu](mailto:mona_said@aucegypt.edu)

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<sup>1</sup> Corresponding author

## **Abstract**

This paper aims to assess the impact that events of unexpected instability have on internal migration. Conspicuously, the study measures the impact of two main instability events: terror attacks and political attacks. Three main datasets have been compiled to reach the objective of the study: the Egyptian Labor Market Survey (ELMPS, 2012), the Global Terrorism Database (GTD), and the statistical database of the Egyptian Revolution (SDER).

Based on the properties of conditional and mixed logistic regression econometric models, the results show that (a) internal migration is an optimal choice for citizens in poor and developing countries as a response to events of unexpected instability. (b) In a given Egyptian governorate, each one person killed during an unexpected terror attack or political event is associated with higher migration to other governorates.

This study is considered as a prior research (a) shows that people of developing countries will not respond in the same manner to unexpected instability events, as the poor people of those countries might not be able to afford the costs of international migration. Therefore, internal migration will be the alternative affordable and legal solution (b) includes unexpected events as one of the determinants of internal migration.

**Keywords:** instability events, terror attacks, revolution, internal migration.

**JEL Classification:** R23, D74.

## **Introduction**

In recent years, political instability has become increasingly prevalent in the MENA region. The current decade has seen an increasing number of unexpected instability events, especially in the MENA region. Where 6% of the World's population currently reside in the MENA region, Roser et al. (2018) found that 35 percent of worldwide terror attacks occur in the region.

A number of studies exist on the impact of unexpected events on selected indicators, on the country level, such as international migration (Koslowski 2012 & Schmid 2016) and trade (De Sousa et al. 2018). The literature, however, is scarce in assessing the impact of instability on internal migration, which is considered a strategic question especially in developing countries.

Migrants originating from developing countries might not have the opportunity to meet the requirements of international migration, internal migration will be the alternative that is both affordable and legal. Therefore, they might respond to instability events by moving internally to achieve one's own safety. Given the substantial impact on the areas of origin and destination, in terms of job, education, demographic concentration, poverty, wages, traffic congestion, and pollution, internal migration deserves more empirical attention (Skeldon 2002).

The main goal of this paper is to assess the impact of unexpected instability events on internal migration, which has been overlooked by the current migration literature. The study measures the impact of two main instability events: terror attacks and political attacks, on internal migration in Egypt over the period 2000-2012.

In order to reach goal of this study, the number of unexpected incidents and killed per attack on the governorate level are used as a proxy measure for the terror attacks event. Furthermore, the number of killed on the governorate level during the unexpected revolution of 25<sup>th</sup> January 2011 is used as a proxy to measure the political instability event.

Three main datasets are compiled to serve the purpose of the empirical analysis. First, the Egyptian Labor Market Survey (ELMPS, 2012) dataset that is carried out by Economic Research Forum (ERF) in cooperation with Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS). This dataset is considered as the most comprehensive source of the Egyptian labor market on the individual level. Second, the Global Terrorism Database (GTD) that provides information on terrorist events over the period 1970-2016. Third, the statistical database of the Egyptian Revolution (SDER) that provides a comprehensive account of statistics regarding the Egyptian revolution on the governorates level: number of killed and blessed persons during the revolution, number of conflict incidents and others.

Studying the impact of instability events on internal migration in Egypt is interesting for a number of reasons. First, although internal migration in Egypt is low relative to other neighboring countries, there is evidence of revival of internal migration in recent years (Wahba 2007), especially with the upward trend in number of instability events. Second, during the current decade, GTD (2018) and SDER (2012) show the recurring frequency of unexpected events in Egypt. Finally, the most recent studies on Egyptian internal migrants are concerned with the demographic and the socio-economic profiles of migrants (McCormick & Wahba 2005; Herrera & Badr 2012) overlooking the characteristics of origin and destination governorates, where unexpected events have occurred. Existent literature identifies a significant impact of migrants' own characteristics (age, gender, marital status, income), social networks, job opportunities, demographic pressures, institutions, and schooling on governorates of origin and destination (Zohry 2009; Herrera and Badr 2011; Bhattacharyya 2009; Tirtosudarmo 2009).

By implementing conditional and mixed logistic regressions as main strategies for empirical estimation, unexpected events as one of main determinants of internal migration in Egypt, along with the socio-economic and demographic profiles already discussed in the previous studies. Empirical findings show that unexpected instability events are considered as the first determinants for internal migration in Egypt. Each incident of terrorism in a given governorate decreases the probability of migration to this destination. The increasing magnitude of an event of unexpected instability in a given governorate is associated with an important linear decrease in the number of new migrants.

Providing security measures and devoting efforts in controlling unexpected instability events on the governorate level might have a substantial impact on the internal migration in Egypt. In fact, the odd distribution of the population, urban areas challenges and demographic concentrations can be well explained by the unexpected instability events.

The rest of the study is organized as follows: the next section provides information on the dataset implemented in this study, the second section discusses the main drivers for internal migration in Egypt according to existing econometric methodology, empirical results and analysis are presented in the third section, finally, discussion and conclusion are provided in the last section.

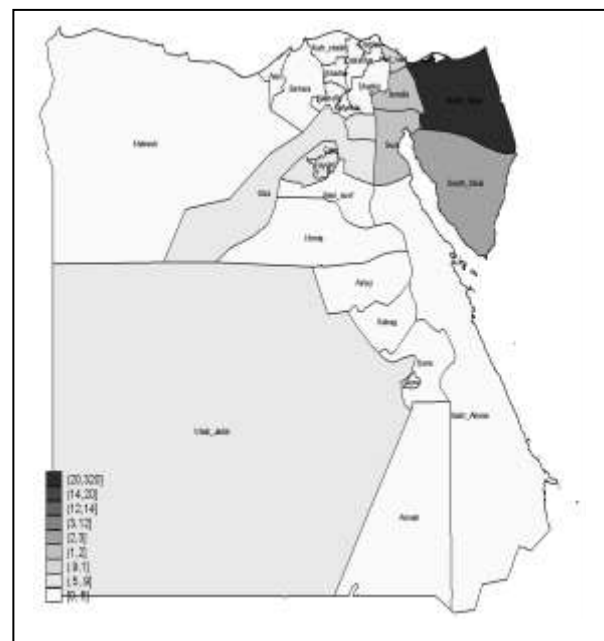
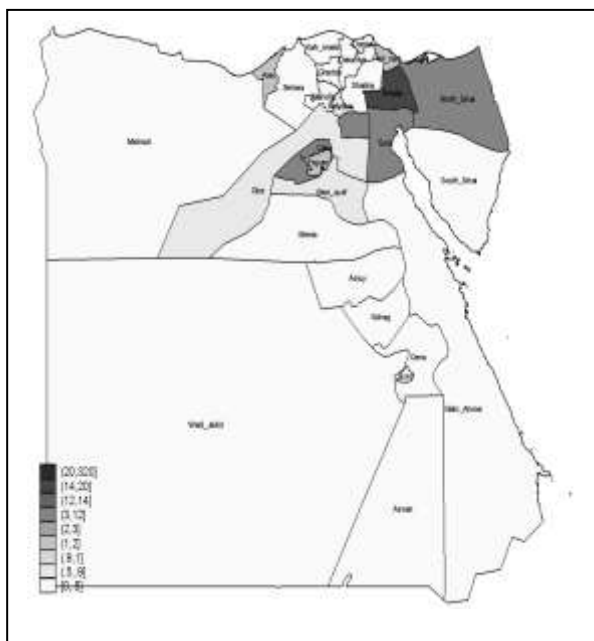
## **Background**

The MENA region has experienced two main instability events over the period (2000-2012): Terror Attacks (Roser et al. 2018) and Arab Spring/ Revolutions (2011) with consequential political instability and high levels of violence. We note an important heterogeneity across countries that characterizes these instability events ranging from more stable countries (United Arab Emirates) to less stable ones (Syria). Heterogeneity is further detected within the same country across different cities (Egyptian case).

As previously mentioned, the main goal of this paper is to study the impact of these events on internal migration in Egypt. Therefore, two main indices have been constructed to measure the extent of terror attacks and political instability (revolution) across the Egyptian governorates. The index takes into account the share of killed in any unexpected event in the population of the same governorate  $j$  weighted by the share of all killed people in the Egyptian population.

**Figure 1** Killed per Revolution

**Figure 2** Killed per terror attack



Source: Authors' construction using GTD & SDER databases

The maps above show the governorates with the high number of instability events given their weight in Egypt. It is noticeable that unexpected instability events in general have not been exclusive to certain governorates in Egypt. Although, these events have a high probability to occur in North East of Egypt, especially in North Sinai, Ismailia and Suez.

Considering the implications of these events on the governorate indicators such as international trade and foreign and local investments, this paper assumes these events might

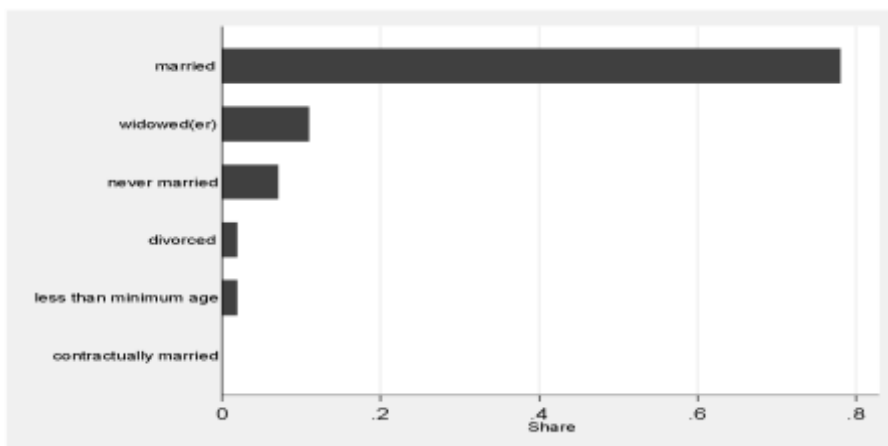
have important implications on internal migration of Egyptian citizens. This has significant implications on the urban concentration and re-distribution of population in Egypt.

## Methodology and Data

### Characteristics of internal migrants in ELMPS

According to ELMPS (2012), the average age of internal migrants is 41.4 years old. Approximately 78% of those migrants are married (Figure 3). From the married ones, 98% confirmed that they moved with their family.

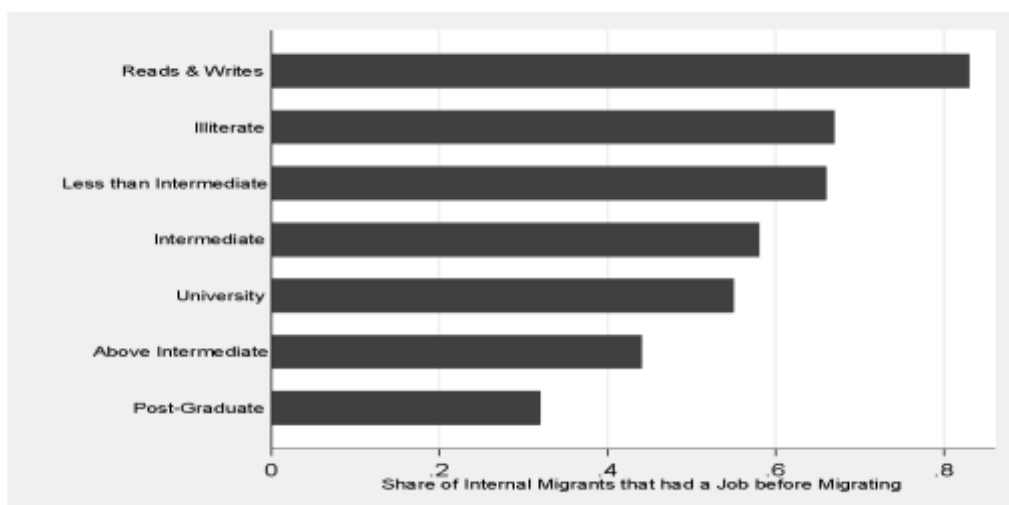
**Figure 3** Marital Status of Internal Migrants.



Source: Authors' construction using ELMPS database

Job opportunity is not the only reason for such a movement. Figure (4) shows the percentage of migrants that have already a job before migrating per education level. We note that, on average, 60% of Internal Migrants already have a job before migrating.

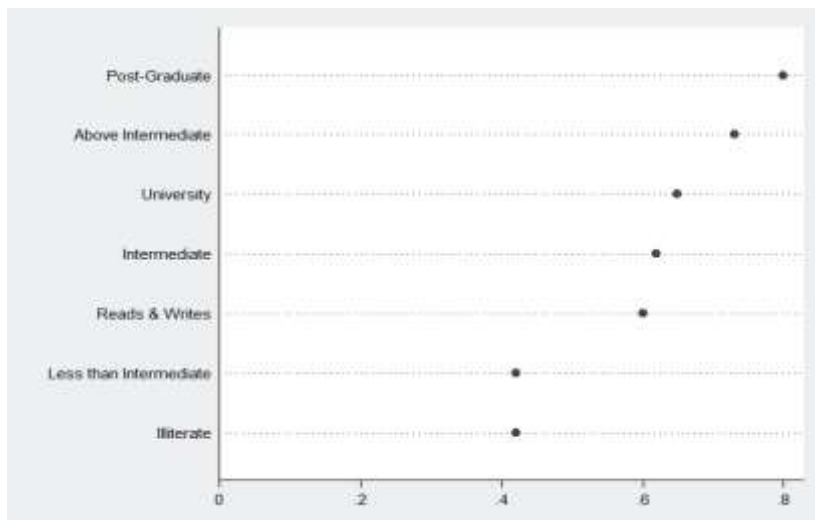
**Figure 4** Distribution of Jobs across migrants before migrating by education level



Source: Authors' construction using ELMPS database

If we look at the job stability, Figure (5) shows that on average, 56% of Internal Migrants who already had a job have a **permanent contract** with a significant variance across educational levels.

**Figure 5** Share of permanent contract per education level

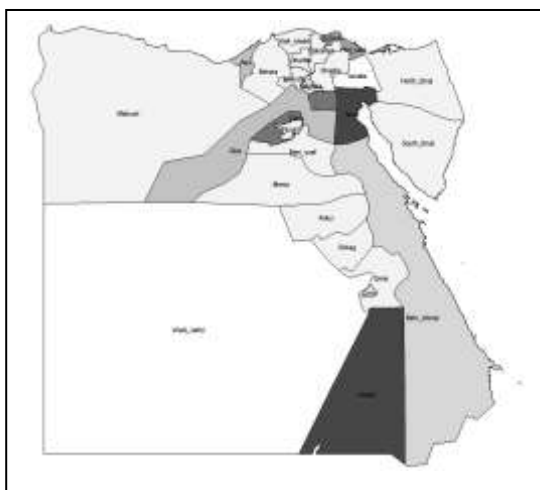


Source: Authors' construction using ELMPS database

**a. Internal Migrants Geographical Movements**

The following maps represent top governorates receivers and senders respectively of internal Egyptian migrants given their weight. It is important to note that the number of governorates that regularly experience instability events (terror attacks or political violence) have received a very low number of new migrants (North Sinai, Ismailia) as opposed to high number of emigrants.

**Figure 6** Top governorates receivers



**Figure 7** Top governorates senders



In order to get a better grasp on the possible motives for internal migration in Egypt, we turn to use a gravity model in the empirical econometric specification.

The migration decision is by nature a discrete choice among several alternatives made by the migrant. Accordingly, models with qualitative endogenous variables such as conditional logit and mixed logit models are appropriate for empirical estimation.

#### I. Limitation of Conditional Logit Model (CLM)

(CLM) assumes that migrants maximize a utility function while choosing a given governorate within Egypt. The deterministic component of the utility function consists of various characteristics that can impact the migrants' utility. The random component consists of unobserved attributes of the alternatives or measurement errors.

From J possible alternatives (governorates), the migrant decision problem can be written as:

$$V(x, \varphi) = \max_j (v(x, j) + \varphi_j) \quad (1)$$

The utility function of a migrant that locates in an alternative j is specified as  $u(x, j) + \varphi_j$  where  $\varphi_j$  is assumed to be identically independently distributed across alternatives and over time. Let  $x$  be the governorate vector which include potential observed characteristics. Once the migration decision is undertaken to the location j, the transition probability from the migrants' state  $x$  to the state  $x'$  can be defined as:  $P(x'|x, j)$ . Accordingly, the utility can be defined as:

$$v(x, j) = \delta u(x, j) + \beta P(x'|x, j) \bar{v}(x') \quad (2)$$

$$\bar{v}(x) = E_\varphi V(x, \varphi) \quad (2)$$

Let  $E_\varphi$  denotes the expectation of the J-vector  $\varphi$  with components  $\varphi_j$ .

The individual will choose the best alternative that maximizes his utility. It is assumed that individuals will deviate from locating in the governorates characterized by rough life conditions including high levels of instability.

In order to better grasp the impact of the location attributes on the migrants' decision, a standard conditional logit model has been implementing at a first stage. Following McFadden (1974) and Rust (1987), the probability to choose the location j with attributes x at time t can be defined as:

$$P(x, j) = \frac{e^{(v_t(x, j))}}{\sum_{k=1}^J e^{(v_t(x, k))}}$$



However, according to the ELMPS (2012) data, the descriptive statistics show the variance between migrants is substantial due to their age, gender, education, income and others. This suggests that they could not respond in the same matter for the attributes of the potential locations. This could lead to biased results and the independence of irrelevant alternative (IIA) condition can be violated (Train, 2002). Across migrants, some governorate can be closer substitutes than others.

## II. Mixed logit model

Accordingly, we opt for a mixed logistic regression model that takes into account that IIA assumption might not be valid. This model introduces random individual fixed effects in the estimation. More precisely

$$v(x, j) = u(x, j) + \beta_i P(x' | x, j) \bar{v}(x')$$

A mixed logistic regression has been implemented to model the location decision of migration across governorates and over time. The probability to choose a given alternative is as follows:

$$L_{ijt}(B_i) = \frac{e^{\beta'_i X_{ij}}}{\sum_{i=1}^J e^{\beta'_i X_{ij}}}$$

$X_{ij}$  are observed variables for the alternatives. It includes all the observable characteristics of the governorates  $j$ ,  $\beta'_i$  will vary across individuals as it takes into account that they have different preferences,  $\epsilon_{ij}$  is a random term that is assumed to be independently and identically distributed extreme value.

The main equation to be estimated can be identified as follows:

$$P(y_{ijt}|x) = \alpha + \beta_1 \text{Market Potential}_{jt} + \beta_2 \text{Corruption}_{jt} + \beta_3 \text{Job Seekers}_{jt} \\ + \beta_4 \text{Migration networks}_{jt} + \beta_5 \text{unexpected event}_{jt} + \epsilon_{it}$$

In fact, the variable unexpected events, which represents terror unexpected attacks and political unexpected events will be assessed by three main proxies. The first two proxies will serve to measure the impact of terror attacks, while the third one will serve to measure the impact of political events. Regarding terror attacks proxies, the number of incidents on the governorate level and the number of killed people per incident attack on the governorate level have been implemented. However, number of killed people during January 2011, the Egyptian revolution has been implemented to assess the political attack.

The following table shows that definition of observed variables for the possible governorate alternatives:

**Table 2:** Definition and source of independent variables

Variable	Definition	Source
Market Potential	This indicator is constructed according to Harris index (1954) which takes into account the economic size of the governorate and the bilateral distance between governorates. Due to unavailable information for the governorates' GDP, the population has been served as the main proxy:  $Pop_i + \sum_{i \neq j}^i \frac{Pop_j}{d(i,j)}$	Authors' construction using CAPMAS database
Corruption	Number of corruption incidents detected per governorate across years	CAPMAS database
Job seekers	Number of job seekers per governorate across years	CAPMAS database
Migration networks	Number of migrations in the host governorate originating from the same governorate in the year preceding the migration decision.	Authors' construction using ELMPS database.
Incidents	Number of terror attacks per governorate across years	GTD database.
Killed Terror	Number of killed people per terror attack per governorate across years	GTD database.
Killed Political	Number of killed people during the revolution of 25th January 2011 per governorate.	SDER database

### Empirical results

The magnitude of the variables remains unchanged between the conditional logistic and the mixed logistics regressions. For simplification, all results are interpreted from the mixed logistic regression output. Findings show that governorates' push factors; along with pull factors play a significant role in shaping the internal migration in Egypt. The market potential variable suggests that at a given level of population, when the distance between the origin governorate and the destination one increases, the probability of choosing the destination governorate substantially decreases. This finding has been attributed to the fact that costs of migration substantially impact the migrants especially in developing countries such as Egypt.

These costs serve as a proxy for physical costs, transportation costs, as well as information costs (Greenwood, 1975).

Moreover, it seems that Egyptian internal migrants are not able to cope with corruption. Governorates with high levels of corruption provide unpredictable economic conditions, as well as low levels of security for the migrants (Poprawe, 2015) therefore have a low propensity to accommodate migrants. We note that migrants respond adversely to the destinations that suffer from deteriorate levels of socio-economic and politico-institutional conditions (Iryna, 2014).

Conspicuously, the number of job seekers has a negative impact on the decision of internal migrants. In fact, a significant number of job seekers might show the demand for labor is lower than the supply of labor. This might result in the lack of guarantee in the access to the job market.

Internal migrants' location decision is substantially impacted by the migration networks. The existence of a previous network from the same origin governorate in the destination one plays an important role in the location in the new governorate (Pedersen & al., 2008).

The results of the second model show that unexpected instability events have a substantial significant impact on the internal migration decision. The governorates that suffer from high levels of unexpected events have the least likelihood to be chosen by the Egyptian migrants. In a given governorate, each one unexpected event is associated with a decrease in the probability of migrating by 3 percent. Furthermore, each hundred killed people during an unexpected terror attack decrease the probability of migration by 7 percent. Results show that the impact of unexpected terror event has a greater impact than the terror attacks. Each hundred killed during an unexpected political event decreases the probability of migrating by 3 percent.

Table 2. Mixed Logistic regression results

	(1)	(2)	(3)
Market Potential	0.745*** (0.201)	0.773*** (0.157)	0.835*** (0.173)
corruption	-0.0337*** (0.00890)	-0.0224*** (0.00615)	-0.0276*** (0.00734)
Job seekers	0.000900 (0.0636)	-0.167*** (0.0455)	-0.169*** (0.0545)
Migration networks	0.0104*** (0.00218)	0.00969*** (0.00210)	0.0115*** (0.00199)
<u>Terror attacks</u>			

Incidents -3.014\*\*\*  
(1.094)

Instability events

Killed Terror -0.0703\*  
(0.0367)

Killed Political -0.0306\*\*\*  
(0.00887)

Observations	11,605	11,605	11,605
Individual FE	YES	YES	YES
Gov FE	YES	YES	YES
year FE	YES	YES	YES

Dependent variable is Clustered standard errors across governorates in parentheses

(\*\*\* p<0.01, \*\* p<0.05, \* p<0.1)

### Conclusion and Discussion

This study assesses the impact of unexpected instability events on the internal migration in Egypt over the period 2000-2012. Unlike previous studies, this paper assumes that unexpected instability events should have a substantial impact on the internal migration, especially in developing and poor countries. Migrants originating from those countries might not have the opportunity to meet the requirements of international migration, especially in terms of costs.

According to CAPMAS statistics (2016), internal migration in Egypt has been increasing in the recent decades. Important gaps and heterogeneity across governorates can be highlighted. The results of this study show that unexpected events matters for the re-distribution of population across governorates. Conspicuously, each hundred killed people during an unexpected terror attack decrease the probability of migration by 3 percent. Moreover, each hundred killed during an unexpected political event decreases the probability of migrating by 7 percent. These results might have important implications on urban areas in terms of demographic concentration, poverty, wages, traffic congestion, and pollution (Skeldon, 2002).

Important extensions for this study will be implemented especially in terms of descriptive statistics on the distribution of population and unexpected instability events background.

## Appendix

Table A.1. Conditional logistic regression results

VARIABLES	(1)	(2)	(4)
Governorate access	0.543*** (0.108)	0.561*** (0.105)	0.540*** (0.107)
corruption	-0.00665*** (0.00235)	-0.00428* (0.00252)	-0.00692*** (0.00246)
Job seekers	-0.0878* (0.0471)	-0.144*** (0.0418)	-0.0895** (0.0434)
Migration networks	0.0105*** (0.00161)	0.0105*** (0.00161)	0.0112*** (0.00160)
<u>Terror attacks</u>			
Incidents	-0.233** (0.119)		
<u>Instability events</u>			
Killed Terror		-0.0444* (0.0244)	
Killed Political			-0.00465** ((0.00887))
Observations	11,605	11,605	11,605
Individual FE	YES	YES	YES
Gov FE	YES	YES	YES
year FE	YES	YES	YES

Dependent Variable: Internal Migration decision. Clustered standard errors across governorates in parentheses (\*\*\*)  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ )

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