No one leaves home until home is a damp voice in your ear saying leave, run now, I don't know what I've become

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Abstract

This paper aims to analyze how a succession of extreme climate events affect individual climate change awareness and thus personal intentions to migrate internationally. Using a wide cross-sectional, individual-level dataset covering most countries of the Middle East and North Africa, it distinguishes between individuals wishing to migrate and individuals wishing to migrate in an irregular way. Three proxies of climate change awareness are considered in order to capture the emotional and the cognitive components of mind. Our results show that a repetition of fast-onset climate hazards raises concern about climate change, but a repetition of slow-onset climate disasters lowers the level of concern. Our findings also show that, when weather anomalies become more frequent, the emotional component of mind is the main driver of illegal migration intentions. On the contrary, people recognizing the relevance of national government in fighting climate change do not wish to migrate abroad. Lastly, the empirical analysis demonstrates that, among aware individuals, the increasing repetition of climate shocks is changing the gender dimension of international migratory flows. For countries more exposed to climate change, higher climate change awareness boosts irregular migration among women.

Keywords: Climate change awareness; Willingness to migrate; Willingness to migrate irregularly; Succession of climate shocks; Middle East; North Africa; IV probit regression model.

JEL classification: D01; O15; Q54.

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1 Introduction

Climate change is the biggest environmental problem the world is facing today. It involves long-term changes in climate, as well as significant intensity and unprecedented frequency of extreme weather events such as drought, extreme temperatures, floods and storms (Fischer et al., 2021; Naumann et al. 2021). It is one of the main causes of the loss of biodiversity and other natural resources, and the challenge of achieving a more sustainable and healthy planet by 2030 is enormous (United Nations, 2015).

Damaging series of disruptive floods and storms create breeding grounds for disease, as well as contamination of drinking water and significant shortages of freshwater. Moreover, in developing countries, high temperatures, low rainfall and droughts contribute to the loss of arable lands because of salt accumulation in the root zone, and destroy crops and soil properties (Baker et al., 2019). These factors also have negative repercussions in terms of food transport and food insecurity. Moreover, deserts become hotter and drier, sea levels rise, and coastal regions erode (IPCC, 2022).

These phenomena have serious socio-economic implications. They worsen macroeconomic instability, which in turn lowers public investments especially in education and health care. The consequent higher unemployment rates worsen living conditions, with important security implications (Scheffran et al., 2012; Salehyan and Hendrix, 2014).

The combination of all these critical issues on one hand raises the level of individual awareness of climate change awareness. This is a key driver for taking action to preserve the environment (Amel et al., 2017). On the other hand, disease and harm caused by climate change reduce the capacity to cope and adapt with urgent and appropriate environmental actions and policies (Duenwald et al., 2022). Extreme weather events thus positively affect individual climate change awareness (Konisky et al., 2016), and together with institutional incapacity to solve environmental problems, may be a push factor for migration (IDMC, 2019). In the words of the British Somali poet, Warsan Shire, '*no one leaves home until home is a damp voice in your ear saying leave, run now, I don't know what I've become*'.

Although raising climate change awareness is one of the main targets of the United Nations 2030 Agenda for Sustainable Development, and although individual climate change awareness can impact on the mode of migration, no studies have as yet been made on the linkages among a succession of climate disasters in sending countries, individual climate change awareness and migration intentions.

This paper aims to fill this gap by means of a maximization problem where the expected utility of migrating internationally depends, for the first time in the empirical literature, not only on the financial benefits of migrating and its costs, but also on the loss due to climate change. This function is principally affected by personal experience of repeated country-specific weather change as well as the socio-economic conditions of each agent.

The empirical analysis uses a wide cross-sectional, individual-level dataset from the

seventh wave of the Arab Barometer (2021-2022), which covers most countries in the Middle East and North Africa. These data are then merged with data on droughts, extreme temperatures, floods and storms in the years 2000-2020, retrieved from the International Disaster Database (EM-DAT).

This paper is thus at the crossroads between environmental and migration studies. The connections between these different research fields makes it possible to analyze environmental attitudes from a novel perspective, where adaptation and mitigation behaviors are focused on the desire to migrate rather than to stay.

From a migration point of view, the Middle East and North Africa are of particular interest, because they are on the front line in terms of human, physical, and economic ramifications. In fact, they are important points on the Central Mediterranean and Balkan immigration routes, making migration a hot topic in these areas as well as for the international community. The empirical framework used here distinguishes between individuals wishing to migrate and individuals wishing to migrate illegally. This is new compared to previous literature, where illegal migration is generally not analyzed because of lack of exhaustive and robust data (Manchin and Orazbayev, 2018).

The Middle East and North Africa are also a hotspot for climate change because of their geographical location, which makes climate disasters more frequent and persistent than in other areas of the world (Waha et al., 2017; Schilling et al., 2020). In the last two decades, these regions have recorded an increase in the frequency of disruptive years, i.e., years where weather anomalies have caused severe damage to humans, and have thus received increasing attention from natural and social scientists (Duenwald et al., 2022).

Furthermore, given that not only personal experience with severe climate events but also emotions, personal values and worldviews are very important for perceptions of climate change (Libarkin et al., 2018), climate change awareness has been explored in two main dimensions.

The first dimension is the emotional component of mind, in other words, to what extent an individual perceives climate change as serious and severe compared to other global problems. The second dimension is the cognitive component of mind, which corresponds to rational insight into climate change problems. Note that climate change is a global negative externality whose impact differs from place to place. This requires an unprecedented level of cross-country policy coordination and cooperation (Jänicke, 2017). Consequently, policy integration needs to be mainstream in all national adaptation and mitigation policies (Biesbroek, 2021). Environmental concern is essential for supporting these costly actions (Baiardi, 2022), but climate behaviour research should also consider how people interact with the various climate policies (Behaviour as leverage, 2022). Thus, climate change awareness is also proxied in terms of policy attitudes for fighting climate change on a international and local scale, i.e., individual perceptions about the priorities of the United Nations and the perceived efforts by national governments.

Climate behaviour research needs to move beyond only focusing on choices of individuals and should consider how people interact with the broader environment as well as

with the various climate policies

Lastly, it is worth noting that women and girls are disproportionately affected by climate change compared to men (Alston, 2013). During climate emergencies, female access to education and other essential services is limited (Cattaneo et al., 2019). Women are also less likely to migrate than men because their financial and psychological constraints are greater (Eastin, 2018; Rao et al., 2019). The persistence of climate emergencies can significantly weaken a society's ability to protect women and girls from violence and sexual abuse. This is especially the case in countries more exposed to climate hazards, and could have implications in terms of the gender composition of irregular migration. The empirical framework here thus also aims to assess whether irregular migrant women from economies more negatively impacted by climate change exhibit higher environmental concern. To the best of our knowledge, there is to date no research studying the role of climate change awareness in terms of migration and adaptation decisions across gender.

The remainder of the paper is structured as follows. Section 2 reviews the literature, introduces the main research questions and the hypotheses. Section 3 analyzes the empirical framework and methodology. Section 4 describes the data. Section 5 presents the main empirical results. Section 6 concludes and discusses policy implications.

2 Related literature and research hypotheses

Our main research objectives are to asses to what extent exposure to a succession of climate shocks affects climate change awareness, to what extent climate change awareness influences migration intentions, and whether the gender dimension matters in this framework. The following subsections review main findings in the literature on these topics. The main research questions and the related hypotheses are also introduced.

2.1 Does a series of extreme weather events affect climate change awareness in developing countries?

Adverse weather conditions, like large significant deviations from historical weather patterns, have strong negative effects in developing countries (Scheffran et al., 2012; Salehyan and Hendrix, 2014). Repetitions of weather anomalies negatively affect the access to basic services and resources, with consequent losses in terms of productivity and economic growth thus fostering income inequality (Ahmed et al., 2009; Burke et al., 2015; Shah et al., 2022).

These factors are particularly disruptive to agrarian societies. In fact, the agricultural sector, the source of income for most of the world's poor, is probably the most affected by climate change (Falco et al., 2019). According to IPCC (2022), approximately 3.3 to 3.6 billion people live in areas where human mortality from floods, droughts and storms was 15 times higher than in less vulnerable areas in the decade 2010-2020.

Furthermore, disease caused by climate change exacerbates food insecurity and wage differentials between developing and developed countries, which implies greater pressure to migrate (Drabo and Mbaye, 2015). In this light, migration in geographical areas heavily reliant on climate-sensitive livelihoods is a risk management strategy, enabling access to additional resources and consumption smoothing (IPCC, 2022).

From one hand, despite the growing academic and real-world interest in this topic, there is currently little evidence on the channels through which climate affects migration patterns (Mueller et al., 2020).[1] On the other hand, many studies show that personal experience of extreme climate events, as well as related changes in the accessibility and effective utilization of natural resources, play a role in shaping climate change awareness (Ogunbode et al, 2022). Hence, climate change awareness is the key player of an individual's capacity to adapt in socially desirable ways (Baiardi, 2022).

However, it is worth noting that the impact of a series of extreme weather events on individual intentions could differ from the impact of a single event. To date, no studies have made in-depth empirical analysis of this (Catteneo et al., 2019). We therefore test the following hypothesis:

Hypothesis 1: *A succession of extreme weather events increases climate change awareness*

2.2 Does climate change awareness drive the desire to migrate?

Migration intentions are generally defined in terms of aspiration, willingness, likelihood or interest, thus including planning or preparations to migrate (Cirillo et al., 2022). There is in fact a close association between migration intentions and actual future migration (Bankole and Westoff, 1998; Creighton, 2013). In fact, intentions are a good predictor of 'true plans' (van Dalen and Henkens, 2013) and indicate how hard people are willing to try in order to reach their goals (Ajzen, 2011). This implies that intentions are the first step in the migration decision-making process, without which actual migration would not take place (Tjaden et al., 2019).

Climate shocks go hand in hand with large-scale movements of people (Reuveny and Moore, 2009; IDMC, 2019). Migration represents an important margin of adjustment to global warming, potentially contributing to structural change and even increasing income per worker in middle income countries (Cattaneo and Peri, 2016). It can be a vital adaptation response to climate change. By considering weather variations in 103 source countries, Coniglio and Pesce (2015) and Missirian and Schlenker (2017) demonstrate that rising temperatures increase asylum applications to OECD countries. Similarly, Cai et al. (2016) find that higher temperatures positively affect international out-migration only in the most agriculture-dependent countries. There is also some country-specific evidence

[1] In fact, the literature mainly considers losses in agricultural productivity caused by climate change as drivers of international migration (Cottier and Salehyan, 2021).

on this link (Gray and Wise, 2016). However, in the case of Asian countries, some studies find either no effects (Mueller et al., 2014) or reverse effects, i.e., natural disasters reduce emigration flows (Gray and Mueller, 2012).

On the other hand, as noted above, the literature suggests that climate change awareness is stronger for people who have direct experience of extreme weather events. To the best of our knowledge, previous literature has only investigated either the relationship between climate hazards and migration, or the relationship between climate hazards and environmental concern. It has not explicitly investigated jointly how a succession of climate disasters in sending countries may affect climate change awareness, which may positively influence migration intentions. Given these premises, we test the following hypothesis:

Hypothesis 2: *Climate change awareness strengthens migration intentions when the frequency of severe climate events increases*

However, migration decisions can be costly. Adam (2016) describes how resource barriers affect intentions to migrate. These barriers can be lack of income, lack of education opportunities and life-cycle stage. Such factors are a severe impediment to emigration and constitute the monetary and financial costs of migration particularly to developed countries.

Financial constraints increase prohibitively during climate shocks, and official papers required for leaving a country (e.g., visa applications) are also time-expensive. Financial constraints can thus become stronger during periods of climatic variability (Cottier and Salehyan, 2021). Moreover, irregular mass migration is more responsive to the economic cycle than legal immigration (Hanson and Spilimbergo, 1999; Hanson, 2006; Nawrotzki et al., 2015). This counter-factual evidence suggests that climate change may be responsible for irregular mass migration towards advanced economies (The Guardian, 2015).

Nevertheless, illegal migration intentions are omitted from most migration statistics (Manchin and Orazbayev, 2018). To the best of our knowledge, only Cottier and Salehyan (2021) analyze the impact of droughts on irregular migration flows by using data on the number of illegal border crossings recorded in the European Union and Schengen Associated Countries (i.e. Iceland, Liechtenstein, Norway and Switzerland). They find that climate shocks reinforce financial barriers to migration and that no clear conclusions can be drawn on their effects on irregular migration. Therefore, we also test the following hypothesis:

Hypothesis 3: *Climate change awareness fosters illegal migration intentions when the frequency of severe climate events increases*

2.3 Which migrants are most aware of climate conditions?

Adaptation to climate change is also gendered (Chindarkar, 2012; Alston, 2013). To the best of our knowledge, the existing literature on the linkages between climate change,

migration and gender is limited and methods and results of these studies differ (Denton, 2002; Rao et al., 2019; Babacan, 2021).

In many parts of the world, women have limited access to labor opportunities and are largely excluded from political, community and household decision-making processes (Penning-Rowsell et al., 2013; Adam, 2016). Women also tend to be primary carers with responsibility for the elderly, children and the household. The availability of natural resources such as clean water and foodstuffs is negatively impacted by climate change, which can also lead to school closure. This in turn often disproportionately affects girls' education (Fry and Lei, 2021).

These factors may increase the burden on women, exacerbating marginalization and unequal ownership of vital resources (Alstor, 2013; Cattaneo et al., 2019). So, they all restrict economic independence of women, who thus tend to have higher liquidity constraints. Moreover, women perceive migration as a risky decision because of the high probability of sexual abuse along the major migration routes. The combination of these factors makes female intention to migrate lower than male intention (Eastin, 2018; Rao et al., 2019).

It is men on the other hand who generally make decisions about evacuation and timing, and are more likely to migrate to look for work, energy sources, clean water and safe sanitation during climate emergencies (Dankelman, 2012; Ampaire et al., 2020). Given that climate change awareness could be a driving force in such decisions, independently of the mode of migration, the following hypothesis is tested:

Hypothesis 4: *Among migrants, men are more aware of climate change than women*

In countries more susceptible to the negative impact of climate change, losses in agricultural productivity significantly lowers the income of rural populations (Duenwald et al., 2022). In these circumstances, women are more exposed to risk than men (Yadav and Lal, 2018). Their condition dramatically degenerates, making them even poorer and more vulnerable (Cannon, 2002; Andrijevic et al., 2020).

The literature also highlights that climate change is causally associated with increasing socio-political conflict, as in the case of the long drought in Syria in 2007-2010, which pushed people into neighboring countries and Europe (Kelley et al., 2015). These phenomena often go hand in hand with an increasing trend in sexual violence and aggression against women and girls (Desai and Mandal, 2021). For instance, extreme drought conditions in Ethiopia in 2010-2011 made it more likely for girls to be sold into marriage in exchange for livestock (OCHA, 2021).

The implications of the relationship between gender and climate change-induced migration are not clear. On one hand, worsening socioeconomic conditions may remove female presence from migratory flows. On the other hand, despair, hardship and increasing episodes of sexual violence in the home country may lead women to take risks they normally would not, and thus boost especially *illegal* migration intentions.

Under these circumstances, the trade-off between staying in the home country in extreme poverty during protracted crises and facing the risk of migrating may no longer hold. This could have significant implications in terms of the gender composition of climate change-induced irregular migration. The following hypothesis is thus tested:

Hypothesis 5: *Among irregular migrants, women are more aware of climate change than men in economies more susceptible to climate change*

3 The empirical framework

To formalize the framework, a utility maximization problem is adopted, where, for each agent i in country j, the expected utility of migrating internationally can be expressed as follows:

$$E(u_{ij}) = E[B(X_{ij}) - C(X_{ij}) - L(W_j, X_{ij})] \tag{1}$$

where all terms in the right-hand side of Equation (1) depend on personal and household attributes (X_{ij}). According to Grogger and Hanson (2011) and Cirillo et al. (2022), the expected utility of migrating internationally ($E(u_{ij})$) is a linear function of the difference between the financial benefits of migrating and its costs. Financial benefits ($B(X_{ij})$) are generally associated with individual specific characteristics like age, education and current employment status, while the costs of migration ($C(X_{ij})$) traditionally consist of the financial resources necessary to cover migration expenses (monetary costs) and on family and societal ties (psychological costs).

In fact, people can perceive positive or negative feelings towards the location in which they live. So, migration may be a difficult decision from a psychological point of view.[2] Psychological costs of migration mainly depend on place attachment and mobility potential, i.e., the bond between people and places (Adam, 2016). Mobility potential is often indicated in terms of disinterest in outside locations as well as place attachment, which could be either positive or negative. Episodes of violence and insecurity and the presence of local networks may be important in this context (Scheffran et al., 2012; Marchin and Orazbayev, 2018).

This implies that climate change has the potential to affect mobility potential thus causing place detachment. People, knowing that their home is under threat, can intentionally decide to run away to other places (Agyeman et al. 2009). So, for the first time in the empirical literature, maximization problem (1) above includes losses due to climate change ($L(W_j, X_{ij})$). This function is principally affected by personal experience of repeated country-specific weather change (W_j) as well as the socio-economic conditions of an agent (X_{ij}). It is thus closely connected with individual concern about climate change.

[2]The literature often associates these perceptions to the vulnerability of the socio-cultural and environmental conditions characterizing the place where people live.

Given these premises, the core of the estimation strategy is following given by the two equations:

$$M_{ij} = \alpha_0 + \alpha_1 C_{ij} + \alpha_2 X_{ij} + \sigma_i + \epsilon_{ij} \tag{2}$$

$$C_{ij} = \beta_0 + \beta_1 W_j + \beta_2 X_{ij} + \sigma_i + \epsilon_{ij} \tag{3}$$

where, in Equation (2), the desire to migrate (M_{ij}) depends on climate change awareness (C_{ij}) and on a vector of control variables X_{ij}, including individual socio-economic and demographic characteristics. At the same time, Equation (3) indicates that C_{ij} depends on a set of selected instrumental variables W_j, corresponding to a succession of country-specific climate disasters, and on the control variables X_{ij}. Individual fixed effects are introduced by the term σ_i.

Given that both M_{ij} and C_{ij} are binary variables (see Subsections 4.1 and 4.2), the empirical framework is based on a two-step probit model where one of the covariates (i.e., C_{ij}) is endogenously determined. Equation (3) is thus the first step regression in the IV strategy, while Equation (2) is the second stage regression which is the main focus of the empirical analysis. Coefficient estimates are computed by applying Newey's (1987) efficient two-step estimator.

Hypothesis 1 is supported if the Coefficient β_1 is positive and statistically significant. *Hypotheses* 2 and 3 are supported if Coefficient α_1 is positive and statistically significant. Lastly, Equations (2) and (3) are also estimated by distinguishing between male and female respondents. In this way, *Hypotheses* 4 and 5 can be tested by means of the following condition:

$$\alpha_1^M - \alpha_1^F > 0 \tag{4}$$

where α_1^M and α_1^F are the estimated climate change awareness for male and female respondents obtained from Equation (2), respectively. Note that *Hypothesis* 5 is supported if Condition 4 does not hold.

4 Data

Data presented in Subsections 4.1-4.3 are retrieved from the seventh wave of the Arab Barometer for 2021-2022. Data are obtained by means of a nationally representative probability sample of the population aged 18 and above in the following twelve countries: Algeria, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Palestine, Sudan and Tunisia. The sample represents about 80 percent of the citizen population in the Arab world. Anonymous private computer tablet-based interviews lasting approximately 45 minutes were conducted face-to-face with respondents randomly selected to represent their communities. The number of respondents in each country is about 2,300, with Kuwait and Palestine as the only exceptions (1,228 and 1,800 interviews, respectively).

4.1 Migration intentions

Data on migration intentions are obtained from those respondents whose answer is '*Yes*' to the following question '*Some people decide to leave their countries to live somewhere else. Have you ever thought about emigrating from your country?*'. Data on irregular migration intentions are computed by means of the following question: '*Would you consider leaving [COUNTRY] even if you didn't have the required papers that officially allowed you to leave?*'. Interviewees answering '*Yes*' to this question are those desiring to migrate irregularly.

4.2 Climate change awareness

Climate change awareness is proxied by means of three distinct variables, which are used alternatively in the estimation strategy. The first proxy of climate change awareness is obtained through the following question: '*Which of the following are the first and second biggest environmental challenges facing your country?*'. We compute a dummy is equal to 1 when respondents indicate *climate change* as the *first* environmental challenge, while it is equal to 0 in all the other cases.

The second proxy of climate change awareness has been obtained through the following question: '*Among the following options, what should the first priority of the United Nations be in the region?*' The derived dummy is equal to 1 when respondents indicate *climate change* as the first priority of the United Nations.

The third proxy of climate change awareness is obtained through the following question: '*Do you think our national government should do more, less, or about the same amount as it is doing right now to deal with climate change?*' The derived dummy is equal to 1 when respondents answer that their national government should do '*more*', and is equal to 0 in all the other cases.

It is worth noting that the first proxy covers the emotional component of climate change attitudes, assuming that the intensity of environmental concern is proportional to the degree of perceived gravity of climate change. The second and third variables on the other hand are more closely related to the cognitive component of mind, corresponding to increasing attention to the responsibilities of supranational and national governments in fighting climate change. Attitudes towards climate policies are crucial in terms of adaptation and mitigation behaviors.

4.3 Control variables

Lack of income and/or of education opportunities, life-cycle stages and attitudes to change and adventure can all constitute barriers to migration intentions. These factors, which could all influence migration costs, are captured by a set of dummies of individual observable characteristics such as education, employment status, age, gender, marital status,

having children, internet use and living in a rural area.

With regard to the costs of migration, the variables are the following: (i) *local networks*: a dummy capturing being part of a group when respondent has no experience of sexual violence; (ii) *sexual violence*: a dummy variable capturing sexual violence by selecting those respondents retaining that episodes of abuse and violence against women have increased in their community; (iii) *local networks and sexual violence*: a dummy capturing being part of a group when a respondent states that violence at the expense of women is increasing in his/her country. These are all proxies of mobility potentials.

The variable capturing the existence of *local networks* is obtained by means of the following question: '*Are you a member of an organization or a group or a club?*'. The literature shows that it is not clear how local networks affect migration intentions (Marchin and Orazbayev, 2018). From one hand, an organization can provide members mutual insurance, thus reducing mobility potential (Munshi and Rosenzweig, 2016). On the other hand, the presence of social networks lowers migration costs, and so has a positive impact in terms of migration flows (McKenzie and Rapoport, 2007, 2010).

The variable used to proxy *sexual violence*, which tends to dramatically increase during climate crises especially targeting women and girls (Desai and Mandal, 2021), is obtained from the answer to the following question: '*In the past 12 months, has abuse of or violence against women in the community increased, stayed the same, or decreased?*'. The dummy variable derived is equal to 1 when respondents state that violence against women in the community '*increased*' in the past 12 months, and is equal to 0 in all other cases. This variable captures negative attachment to place. Finally, the variable *local networks and sexual violence* is obtained by combining the two previous variables.

4.4 Successions of different natural disasters

Data on droughts, extreme temperature, floods and storms are retrieved from the International Disaster Database (EM-DAT) at the University of Louvain, Brussels. In particular, for each type of natural disaster, we compute four distinct ordinal variables by summing all events recorded in each category in the years 2000-2020, which is the time period preceding the survey. The cumulative absolute frequency obtained for each selected country are then used in the empirical estimates.

4.5 Stylized facts

Figure 1 shows that North African countries are generally the most affected by successions of different climate disasters in the period 2000-2020.

Figure 1 about here

In particular, floods are the most recurrent natural disaster, especially in Algeria, Morocco and Sudan, with 36, 30 and 29 episodes, respectively. Among Middle Eastern countries,

Iraq exhibits the highest absolute frequency of extreme events, with 12 episodes of flooding, while Jordan experienced all these weather events at least once.

Table 1 shows the main stylized facts in each country related to the variables describes in detail in Subsections 4.1-4.3.

Table 1 about here

For three countries in the sample (Sudan, Jordan and Tunisia), more than 40 per cent of respondents report that they have considered migrating internationally, while in five countries (Morocco, Sudan, Tunisia, Iraq and Algeria) more than 10 per cent of individuals say they wish to migrate even if they do not have all the required official papers. Independently of the mode of migration, Sudan exhibits the highest scores (44.84 and 17.64 per cent, respectively), while Mauritania, Kuwait and Egypt are the countries where people express less desire to migrate.

With regard to environmental attitudes as measured by the perception of climate change as the biggest environmental problem, Kuwait and Tunisia show the highest levels of awareness (9.69 and 9.00 per cent, respectively), and the lowest scores are recorded in Palestine (3.00 per cent), Libya (1.24 per cent) and Lebanon (0.54 per cent). When environmental concern is measured by the perception of the first priority of the United Nations, however, the highest levels of awareness are in Egypt and Kuwait (20.30 and 10.50 per cent, respectively), while Palestine and Iraq present the lowest scores (1.94 and 1.67 per cent, respectively). More than 62 per cent of respondents across the sample agree that their national government should take more actions for the environment. Quite surprisingly, all respondents were in agreement in Libya and Palestine, despite the lower scores reported in the other two indicators.

Lastly, with reference to mobility potential, the presence of a local network is particularly relevant in Kuwait and Morocco (13.19 and 12.23 per cent, respectively). Sexual abuse is primarily a concern in Middle Eastern countries. In fact, more than 50 per cent of respondents in Iraq, Jordan and Palestine state that episodes of abuse and violence against women have increased during the previous year. In North African countries, this issue is also particularly critical in Tunisia, with a share equal to 57.71 per cent.

5 Empirical results

5.1 Climate change awareness and adverse weather conditions

Table 2 presents the results of the first stage regressions (Equation 3) when all sample countries are considered. Three different proxies of climate change awareness are alternatively used, capturing the emotional and cognitive component of attitude to climate change.

Table 2 about here

The set of instruments used in all regressions is composed of a *succession* of droughts, extreme temperatures, floods and storms. This is new in comparison with previous empirical literature, where only one, or at most, two distinct weather events over a period of time were used in the estimation strategy. This however fails to capture how adverse weather conditions affect individual adaptation choices in the long run and only captures short-run effects of random geophysical processes on individual perceptions. To the best of our knowledge, only Falco et al. (2019) use long-run decennial variations of temperatures and precipitations, in order to investigate the effects of permanent climate changes. Eastin (2018) follows a similar approach by including in the empirical analysis standardized deviations in inter-annual temperature estimates and standardized country-level precipitation measurements.

Independently of the type of indicator used to proxy climate change awareness, estimates in Table 2 show that the repetition of climate shocks does not necessarily imply an increase in climate change concern in all cases. A succession of floods positively affects individual concern about climate change, as does a repetition of extreme temperatures, except for the instance where climate change awareness is measured by the wish for more effort by national government.

But when a series of slow-onset climate events, like storms and droughts, is considered, the estimated coefficients are negative and generally statistically significant. The repetition of slow-onset climate events thus decreases climate change awareness. This counter-intuitive finding is not new in the literature regarding the relationship between international migration and climate disasters in middle income countries (Cattaneo et al., 2019). Koubi et al. (2016a,b) and Mastrorillo et al. (2016) in fact find that, although droughts potentially exacerbate conflicts over resources, they do not prompt people to leave. Falco et al. (2019) find that precipitations are never statistically significant. Mueller et al. (2020) highlight that climate variation is poorly understood in African countries.

So, *Hypothesis* 1 is only supported in relation to fast-onset weather events like floods and extreme temperatures. These findings are also robust when each succession of climate shocks is alternatively used in Equation (3), as reported in Tables A.1-A.3 in the Appendix. The different effects of different types of event on environmental perceptions may shed some light on previous evidence that droughts potentially reduce migration intentions, while water surpluses are associated with higher migration flow (Cottier and Salehyan, 2021).

With regard to the other control variables, Table 2 shows that the presence of local networks positively affects climate change concern, while no clear conclusions can be reached on perceptions related to increasing sexual violence against women. The relationship between environmental attitudes and gender is also inconsistent (Mohai, 1997; Zelezny et al., 2000). Higher educational levels and having a child increase climate change awareness, while family ties (i.e. either being married or divorced) are sometimes accompanied by

lower concern about climate change.[3]

5.2 Climate change awareness and migration

Table 3 reports the second stage probit results of Equation (2), where climate change awareness is the endogenous variable.[4] The Endogenous Wald χ^2 statistic, reported at the bottom of Table 3, is always significant at the level of 0.01, which confirms the endogeneity of climate change awareness. This implies that it is appropriate to use an iv-probit model as estimation method.

Table 3 about here

The estimated coefficients of climate change awareness shown in Table 3 are always positive and statistically significant. This evidence supports *Hypotheses* 2 and 3 and implies that environmental change is increasingly affecting climate beliefs, which are in turn becoming an important driver of migration (Bardsley and Hugo, 2010). More precisely, when the willingness to migrate is considered (Columns 1-3), the positive impact of climate concern is the strongest when individuals believe that climate change should be the first priority of the United Nations (Column 2), while irregular migration is boosted especially when individuals perceive climate change as the biggest environmental problem the world is facing (Column 4).

With reference to mobility potentials, some differences emerge. Being part of a local network is an incentive to migrate (Columns 1-3). This result is new compared to Manchin and Orazbayev (2018), who find that overseas rather than local social networks are the most important factor in international migration intentions. Moreover, the highest coefficients are observed when individuals are part of a group and, at the same time, experience increasing violence. This further highlights the relevance of local networks in reducing the costs of migration.

Young men are more willing to migrate than women. This result is robust to all the indicators used to proxy climate change awareness and confirm that migration from the Arab World is male-dominated, in line with the literature (Falco and Rotondi, 2016).

With regard to the remaining control variables, a positive relationship is also found for the use of the Internet as a source of information. The estimated coefficients for high educational levels (school-leaving diploma, bachelor's and master's degree) are negative and statistically significant only when irregular migration intentions are analyzed (Columns 4-6). This is a very interesting result with important repercussions in terms of policy decisions. Lastly, family ties, such as being married, or widowed or having children, negatively affect the willingness to migrate. Similarly, being employed is a disincentive to migration. The same is observed for people living in rural areas (Columns 1-3).

[3]Specifically, this occurs when climate change awareness in measured in terms of desire for more government efforts.

[4]The corresponding first stage regressions are displayed in Table 2 and discussed above.

It is worth noting that previous literature suggests that migration flows may be stronger in countries more reliant on agriculture, but no clear evidence has been reached on this (Cottier and Salehyan, 2021). We therefore briefly investigate migration flows distinguishing between countries with lower/higher labor dependency on agriculture. The rule of thumb followed here to identify non-agrarian countries is that non-agrarian countries exhibit a share of labor employment in the agricultural sector lower than the average recorded in North Africa and Middle East, which was 24.17 per cent in the years 2000-2019.[5] This is the case of Kuwait (2.26 per cent), Jordan (3.37 per cent), Lebanon (14.92 per cent), Algeria (15.19 per cent), Tunisia (16.86 per cent), Libya (21.36 per cent) and Iraq (23.35 per cent). The remaining economies are treated as agrarian economies. In our sample, these countries are: Egypt, Mauritania, Morocco and Sudan, with an average share equal to 27.12, 35.95, 40.07 and 45.04 per cent, respectively. Note also that the incidence of natural disasters is especially intense in Morocco, Sudan and Mauritania (30, 29 and 21 climate events in the years 2000-2019, respectively).

Tables 4 and 5 about here

We also split the sample by using the climate change vulnerability index, calculated by the Notre Dame Global Adaptation Initiative.[6] In this case, the rule of thumb is that countries *less* vulnerable to climate change exhibit a value of this index lower than 0.40 in 2020. This is the case of Jordan (0.379), Morocco (0.380), Kuwait (0.383) and Algeria and Tunisia (both 0.390). The remaining economies are treated as countries *more* vulnerable to climate change.[7] Results are reported in Tables 6 and 7.[8]

Tables 6 and 7 about here

Hypothesis 2 does not hold in all the clusters of countries analyzed (Tables 4-7, Columns 1-3). In fact, its estimated coefficient is mainly negative and statistically significant independently of the kind of intentions analyzed. Note that climate change awareness is a push factor in migration only when it is perceived as the first priority of the United Nations in countries more exposed to environmental disease (Tables 5 and 7, Column 2). In all the other circumstances, and in particularly when respondents retain that climate change needs more national government efforts, higher environmental awareness goes hand in hand with the willingness to stay.

[5]Data are retrieved from database: World Development Indicators (World Bank, 2022 Edition).

[6]This is a composite indicator of the vulnerability of human society to climate hazards. It is computed through six sectors: food, water, health, ecosystem services, human habitat and infrastructure. For more information, see *https* : *//gain.nd.edu/*.

[7]The climate change vulnerability index is not available for Palestine, which is thus excluded from the empirical estimates when countries less/more vulnerable to climate change are analyzed.

[8]Note that non-agrarian and less vulnerable (agrarian and more vulnerable) countries are also the economies in the sample characterized by a lower (higher) vulnerability to climate change.

Findings support *Hypothesis* 3 only when non-agrarian economies are considered (Table 4, columns 4-6). The findings also hold when climate change is perceived as the first priority of the United Nations and when respondents believe that climate change needs more national government efforts.

Finally, an increase in episodes of abuse or violence against women is always the most relevant variable in mobility potential (Tables 5-7), which confirms the seriousness of this problem in economies hit by erratic and persistent natural disasters.

5.3 The gender dimension of climate change-induced migration

Condition 4 is tested in economies characterized by a lower susceptibility to climate change, i.e., non-agrarian countries and economies less vulnerable to climate change. Results are reported in Table 8. Both men and women exhibit higher levels of environmental concern among migrants. In fact, Condition 4 holds when climate change awareness is considered as the biggest environmental challenge, which implies that migrant men are more aware of climate change. This is principally due to the non-agrarian nature of their economies, as shown in the second column of Table 8.

Table 8 about here

At the same time, the negative and highly significant coefficient recorded when climate concern is measured in terms of more national government efforts is a signal that awareness of climate conditions is a key driver among migrant women. This result is driven by economies less vulnerable to climate change, as shown in the third column of Table 8. So, with regard to the intentions to migrate internationally, results do not support *Hypothesis* 4. This is in line with Hunter and David (2009), who show that environmental conditions are a push factor in terms of migration decisions, and impact men and women with no distinction.

Table 9 reports results related to illegal migration intentions in the same clusters of countries.

Table 9 about here

In this context, Condition 4 is positive and statistically significant in two out of three cases (i.e. when people perceive that climate change concern is the biggest environmental challenge and the first priority of the United Nations). This finding is also robust when non-agrarian countries and economies less vulnerable to climate change are analyzed. So, with reference to illegal migration intentions, *Hypothesis* 4 is supported.

Lastly, we analyze the composition of irregular migration flows among climate aware individuals in countries characterized by greater vulnerability to climate change, i.e., agrarian countries and economies more vulnerable to climate change.

Table 10 about here

Table 10 indicates that women's desire to migrate internationally does not fit a regular pattern, given that Condition 4 is negative and highly significant. This is the case in both agrarian countries and economies more vulnerable to environmental problems. These findings support *Hypothesis* 5, and suggest that a persistent climate emergency may change the composition of international illegal migratory flows especially in economies highly exposed to a repetition of severe weather events.

This is likely to have tragic humanitarian consequences. Irregular migrants are often arbitrarily detained in inhumane conditions, and the frequency of serious sexual and gender-based violence is increasing, especially along the Central Mediterranean Route, with Libya - and more recently also Algeria - as the last stop before arriving in Europe. And many lives are being lost by people making irregular crossings of the Mediterranean Sea.

6 Conclusions and policy implications

This paper analyzes the effect of climate change awareness on migration intentions in the Arab World when the frequency of climate disasters accelerates. Individuals wishing to migrate abroad illegally are also considered. The empirical analysis is performed by merging individual-level data retrieved from the seventh wave of the Arab Barometer in the period 2021-2022 and EM-DAT data on droughts, extreme temperatures, floods and storms for 2000-2020. The estimation strategy is based on a IV-probit model, which estimates the role of a repetition of different climate hazards on climate change awareness, and, at the same time, its influence on the personal desire to migrate internationally.

Our main findings open up several challenges for the policymaker. First, they show that repetitions of severe weather events do not necessarily strengthen climate change perceptions. On one hand, the occurrence of extreme temperature and flooding events has a positive effect on climate change awareness, and increases international migration. But on the other hand, the repetition of droughts and storms lowers the level of awareness of climate change. Where repeated droughts and storms occur, the expected positive relationship between higher environmental concern and migration was not observed. This suggests that adaptive policies need to take into account which combination of natural hazards a country faces.

This is crucial for tailoring policies to promote environmentally friendly behavior, because their success is closely linked to individual awareness of the environment. It would also be important for improving the resiliency of infrastructures and systems where repeated climate disasters force people to move from rural to urban areas in the same country rather than international migration flows.

Secondly, there are interesting findings on individual perceptions. The emotional component of mind is the main driver of illegal migration intentions. This is true in most of the cases analyzed, and especially in economies more vulnerable to climate change.

Given that many long and dangerous irregular journeys are made from North African countries to the European Union, international authorities need to take into account that today many of these are driven by the perception of the gravity of climate change and not, as in the past, only by economic factors.

This can have crucial implications for improving migration management as well as social inclusion and integration. It particularly suggests the importance of host countries offering *ad-hoc* support to immigrants who may be harmed by climate change in terms of their society, psychology and health. On the other hand, when environmental awareness is measured by strength of desire for more effort by national governments, results indicate that the wish to migrate abroad is weaker. This implies the importance of national authorities in making adaptation policies more effective.

Given that our findings also indicate that the composition of international migratory flows is changing in terms of individual awareness, a particular attention to the role of women as agents of resilience in families and communities is needed.[9] Adaptation policies need to facilitate the engagement of local female-led organizations and gender programming, ensuring easier access to natural resources, communication, information, knowledge, financial opportunities and institutional practices.

These aspects remain a serious challenge, especially given the increasing numbers of episodes of sexual violence targeting women and girls during climate crises (OCHA, 2021). These clearly deteriorate security conditions in the home country, and increase the willingness to migrate at any cost. There is an urgent need for more psychological services fighting gender-based violence, and these are extremely important in both home and host countries.

Lastly, policymakers in both sending and receiving countries should also promote *environmental education* in all levels of the education system as well as in training and social programs. This would help wider the society to better understand the urgency, severity and scientific basis of climate change and its impact on human well-being, to better mitigate environmental risks, and to introduce green public work programs. This in turn is crucial to reduce gender discrimination and gender inequality worldwide.

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Table 1: Stylized facts

	Middle Eastern countries						North African countries					
	Iraq	*Jordan*	*Kuwait*	*Lebanon*	*Mauritania*	*Palestine*	*Algeria*	*Egypt*	*Libya*	*Morocco*	*Sudan*	*Tunisia*
Migration intentions												
Willingness to migrate	34.96	41.06	13.84	36.60	15.00	23.83	27.38	13.80	20.32	34.03	44.84	40.54
Willingness to migrate irregularly	14.02	9.59	2.04	6.67	3.20	6.94	10.78	1.66	8.26	17.97	17.64	15.96
Climate change as:												
the biggest environmental problem	4.63	5.79	9.69	0.54	5.50	2.61	7.31	4.26	1.24	6.41	3.99	8.58
the first priority of the United Nations	1.67	2.67	10.50	2.50	3.95	1.94	9.57	20.30	5.27	8.36	6.84	5.08
More efforts by national government	48.90	45.94	56.27	49.60	56.55	100.00	63.97	68.00	100.00	48.09	42.71	68.29
Mobility potentials												
Local networks	2.20	1.67	13.19	1.92	7.35	4.00	6.34	2.50	7.74	12.23	9.86	2.46
Sexual violence	50.00	50.94	0.00	39.68	12.00	48.50	22.99	36.55	19.08	19.30	29.58	57.71
Local networks and sexual violence	1.83	2.17	0.00	2.13	1.30	4.00	2.41	1.32	4.11	3.49	3.95	3.33

Notes: Author's elaboration on Arab Baromenter and EM-DAT data.

Table 2: First stage regressions of Equation (3) when all countries are considered

	Climate change as the biggest environmental challenge	Climate change as the first priority of the United Nations	Climate change needs more efforts by national government
Succession of climate disasters			
Drought	-0.0002	-0.0016*	-0.0072***
	(0.0009)	(0.0008)	(0.0023)
Extreme Temperatures	0.0046***	0.0057***	-0.0105***
	(0.0010)	(0.0009)	(0.0025)
Flood	0.0005***	0.0013***	0.0018***
	(0.0002)	(0.0002)	(0.0005)
Storm	-0.0069***	-0.0027***	-0.0016
	(0.0007)	(0.0007)	(0.0019)
Mobility potentials			
Local networks	0.0023	0.0102**	0.0543***
	(0.0058)	(0.0051)	(0.0153)
Sexual violence	-0.0037	-0.0068***	0.0216***
	(0.0029)	(0.0026)	(0.0076)
Local networks and sexual violence	-0.0241***	0.0010	0.0768***
	(0.0083)	(0.0073)	(0.0228)
Socio-economic characteristics			
Female	-0.0028	-0.0010	-0.0205***
	(0.0029)	(0.0026)	(0.0077)
Age (less than 24 years old)	-0.0002	-0.0023	0.0251*
	(0.0051)	(0.0045)	(0.0134)
Age (between 25 and 34 years old)	0.0059	-0.0017	0.0012
	(0.0039)	(0.0035)	(0.0103)
Age (between 35 and 44 years old)	0.0036	-0.0063*	-0.0157
	(0.0038)	(0.0034)	(0.0099)
Preparatory level of education	0.0101**	-0.0021	-0.0388***
	(0.0046)	(0.0041)	(0.0116)
Secondary level of education	0.0054	0.0066*	0.0074
	(0.0041)	(0.0037)	(0.0104)
Mid-level diploma level of education	0.0041	0.0187***	-0.0008
	(0.0051)	(0.0045)	(0.0135)
Bachelor's and/or Master's level of education	0.0089**	0.0200***	0.0310***
	(0.0045)	(0.0039)	(0.0115)
Married	-0.0027	0.0021	-0.0332**
	(0.0057)	(0.0050)	(0.0149)
Divorced	0.0056	-0.0099	-0.0424**
	(0.0084)	(0.0074)	(0.0213)
Widowed	-0.0018	0.0103	-0.0255
	(0.0086)	(0.0076)	(0.0224)
Having children	0.0131**	-0.0063	0.0508***
	(0.0053)	(0.0047)	(0.0138)
Internet use	-0.0024	-0.0097***	0.0019
	(0.0033)	(0.0029)	(0.0084)
Living in a rural area	-0.0037	0.0008	-0.0374***
	(0.0029)	(0.0026)	(0.0077)
Being employed	-0.0024	0.0092***	0.0033
	(0.0031)	(0.0027)	(0.0081)
Constant	0.0443***	0.0235***	0.5236***
	(0.0061)	(0.0054)	(0.0164)

Notes: Probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively.

Table 3: IV-probit regressions of Equation (2) when all countries are considered

	Willingness to migrate (1)	Willingness to migrate (2)	Willingness to migrate (3)	Willingness to migrate irregularly (4)	Willingness to migrate irregularly (5)	Willingness to migrate irregularly (6)
Climate change as:						
the biggest environmental challenge	2.2664***	-	-	12.3421***	-	-
	(0.5965)			(1.3794)		
the first priority of the United Nations	-	3.7200***	-	-	9.4492***	-
		(0.5201)			(0.8327)	
more efforts by national government	-	-	2.6073***	-	-	3.6698***
			(0.7010)			(0.9179)
Mobility potentials						
Local networks	0.2201***	0.1713***	0.0952	0.1007	0.0257	-0.0257
	(0.0389)	(0.0428)	(0.0680)	(0.0878)	(0.0685)	(0.0880)
Sexual violence	0.3597***	0.3806***	0.2797***	0.3115***	0.3357***	0.1323***
	(0.0200)	(0.0220)	(0.0338)	(0.0451)	(0.0359)	(0.0449)
Local networks and sexual violence	0.5641***	0.5102***	0.3017***	0.6338***	0.3319***	0.0928
	(0.0560)	(0.0592)	(0.1008)	(0.1275)	(0.0943)	(0.1295)
Socio-economic characteristics						
Age (less than 24 years old)	0.4233***	0.4405***	0.3289***	0.3517***	0.3915***	0.2553***
	(0.0345)	(0.0375)	(0.0541)	(0.0784)	(0.0614)	(0.0716)
Female	-0.3252***	-0.3278***	-0.2801***	-0.4840***	-0.5105***	-0.4309***
	(0.0202)	(0.0218)	(0.0326)	(0.0454)	(0.0356)	(0.0436)
Age (between 25 and 34 years old)	0.3599***	0.3885***	0.3832***	0.3219***	0.4270***	0.4326***
	(0.0273)	(0.0294)	(0.0395)	(0.0621)	(0.0490)	(0.0539)
Age (between 35 and 44 years old)	0.3041***	0.3419***	0.3550***	0.2938***	0.4167***	0.4366***
	(0.0266)	(0.0290)	(0.0399)	(0.0602)	(0.0483)	(0.0545)
Preparatory level of education	0.0075	0.0336	0.1400***	-0.0988	0.0222	0.1470**
	(0.0329)	(0.0354)	(0.0533)	(0.0722)	(0.0564)	(0.0698)
Secondary level of education	-0.0095	-0.0208	0.0229	-0.1564**	-0.1740***	-0.1592***
	(0.0288)	(0.0313)	(0.0402)	(0.0635)	(0.0504)	(0.0535)
Mid-level diploma level of education	-0.0329	-0.0931**	0.0807	-0.1483*	-0.2843***	-0.0592
	(0.0351)	(0.0390)	(0.0517)	(0.0778)	(0.0626)	(0.0679)
Bachelor's and/or Master's level of education	0.0875***	0.0311	0.0461	-0.2530***	-0.3563***	-0.3353***
	(0.0308)	(0.0345)	(0.0501)	(0.0689)	(0.0558)	(0.0664)
Married	-0.2371***	-0.2370***	-0.1901***	-0.1659*	-0.2281***	-0.1755**
	(0.0385)	(0.0417)	(0.0607)	(0.0869)	(0.0673)	(0.0797)
Divorced	-0.1138**	-0.0634	-0.0562	0.0132	0.1571	0.2061*
	(0.0564)	(0.0616)	(0.0869)	(0.1256)	(0.0975)	(0.1124)
Widowed	-0.3326***	-0.3596***	-0.3062***	-0.2056	-0.3426***	-0.2113*
	(0.0638)	(0.0686)	(0.0917)	(0.1403)	(0.1143)	(0.1262)
Having children	-0.1051***	-0.0454	-0.2100***	-0.3372***	-0.0920	-0.3366***
	(0.0371)	(0.0396)	(0.0622)	(0.0834)	(0.0642)	(0.0829)
Internet use	0.3373***	0.3786***	0.3565***	0.2092***	0.2832***	0.1680***
	(0.0226)	(0.0256)	(0.0317)	(0.0502)	(0.0414)	(0.0424)
Living in a rural area	-0.0578***	-0.0809***	0.0503	0.0180	-0.0444	0.1463***
	(0.0200)	(0.0219)	(0.0390)	(0.0446)	(0.0351)	(0.0512)
Being employed	-0.0866***	-0.1321***	-0.0790**	-0.0601	-0.1886***	-0.1354***
	(0.0211)	(0.0234)	(0.0309)	(0.0474)	(0.0377)	(0.0407)
Constant	-0.8725***	-0.9338***	-2.1122***	-1.7610***	-1.6121***	-3.0704***
	(0.0478)	(0.0481)	(0.3708)	(0.1082)	(0.0787)	(0.4852)
Observations	26,043	25,354	20,993	26,121	25,426	21,041
Wald test of exogeneity (χ^2)	15.2400	74.8000	27.8400	238.6100	273.0600	30.4000
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: IV-Probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively.

Table 4: IV-probit regressions of Equation (2) when non-agrarian countries are considered

	Willingness to migrate (1)	Willingness to migrate (2)	Willingness to migrate (3)	Willingness to migrate irregularly (4)	Willingness to migrate irregularly (5)	Willingness to migrate irregularly (6)
Climate change as:						
the biggest environmental challenge	0.0234	-	-	5.2051***	-	-
	(0.5039)			(0.8225)		
the first priority of the United Nations	-	-4.9855***	-	-	0.8010	-
		(0.5740)			(0.6364)	
more efforts by national government	-	-	-1.8717***	-	-	0.4078*
			(0.2028)			(0.2245)
Mobility potentials						
Local networks	0.1134**	0.1438**	0.3108***	0.1670**	0.1744***	0.1047
	(0.0515)	(0.0617)	(0.0808)	(0.0770)	(0.0659)	(0.0857)
Sexual violence	0.3788***	0.3565***	0.4624***	0.3084***	0.2653***	0.2413***
	(0.0227)	(0.0267)	(0.0322)	(0.0351)	(0.0299)	(0.0349)
Local networks and sexual violence	0.4835***	0.4851***	0.6937***	0.4337***	0.3261***	0.3047***
	(0.0639)	(0.0761)	(0.1020)	(0.0970)	(0.0806)	(0.1021)
Socio-economic characteristics						
Female	-0.2897***	-0.2850***	-0.3239***	-0.4874***	-0.4947***	-0.4847***
	(0.0230)	(0.0273)	(0.0325)	(0.0360)	(0.0312)	(0.0359)
Age (less than 24 years old)	0.4905***	0.4329***	0.4603***	0.4237***	0.4205***	0.4444***
	(0.0395)	(0.0478)	(0.0562)	(0.0615)	(0.0536)	(0.0606)
Age (between 25 and 34 years old)	0.4423***	0.3807***	0.4189***	0.4626***	0.4924***	0.5816***
	(0.0314)	(0.0381)	(0.0453)	(0.0501)	(0.0447)	(0.0516)
Age (between 35 and 44 years old)	0.3597***	0.2985***	0.3371***	0.3884***	0.4245***	0.5015***
	(0.0311)	(0.0376)	(0.0440)	(0.0495)	(0.0442)	(0.0500)
Preparatory level of education	0.0267	0.0216	-0.0480	-0.0698	-0.0405	-0.0051
	(0.0394)	(0.0466)	(0.0529)	(0.0588)	(0.0504)	(0.0548)
Secondary level of education	-0.0135	0.0349	0.0158	-0.1438***	-0.1900***	-0.1666***
	(0.0358)	(0.0425)	(0.0476)	(0.0540)	(0.0468)	(0.0503)
Mid-level diploma level of education	-0.1188***	-0.0218	-0.0110	-0.1620**	-0.2453***	-0.1936***
	(0.0421)	(0.0505)	(0.0591)	(0.0637)	(0.0558)	(0.0630)
Bachelor's and/or Master's level of education	0.0201	0.1696***	0.0930*	-0.3128***	-0.3447***	-0.4050***
	(0.0369)	(0.0468)	(0.0508)	(0.0564)	(0.0522)	(0.0549)
Married	-0.2529***	-0.3082***	-0.3663***	-0.1177*	-0.1288**	-0.1784***
	(0.0451)	(0.0543)	(0.0644)	(0.0683)	(0.0585)	(0.0672)
Divorced	-0.1035	-0.2140**	-0.2009**	0.1142	0.0988	0.0682
	(0.0722)	(0.0876)	(0.1006)	(0.1092)	(0.0949)	(0.1038)
Widowed	-0.3662***	-0.3808***	-0.5073***	-0.1511	-0.1752*	-0.2182*
	(0.0744)	(0.0866)	(0.1013)	(0.1180)	(0.1048)	(0.1186)
Having children	0.0018	-0.0233	0.0291	-0.2200***	-0.1738***	-0.1486**
	(0.0434)	(0.0514)	(0.0607)	(0.0661)	(0.0564)	(0.0649)
Internet use	0.3223***	0.2413***	0.2854***	0.0850*	0.0722*	0.1076**
	(0.0291)	(0.0352)	(0.0404)	(0.0441)	(0.0397)	(0.0441)
Living in a rural area	-0.0655***	-0.0296	-0.0270	-0.0486	-0.0151	0.0020
	(0.0252)	(0.0298)	(0.0355)	(0.0383)	(0.0328)	(0.0373)
Being employed	-0.1227***	-0.0536*	-0.0875**	-0.0792**	-0.1224***	-0.1611***
	(0.0246)	(0.0303)	(0.0348)	(0.0375)	(0.0333)	(0.0373)
Constant	-0.8378***	-0.6318***	0.2749**	-1.4704***	-1.2026***	-1.4181***
	(0.0542)	(0.0601)	(0.1346)	(0.0851)	(0.0674)	(0.1493)
Observations	17,296	17,067	12,702	17,342	17,110	12,725
Wald test of exogeneity (χ^2)	0.0400	99.6300	137.5900	52.7600	3.4900	3.4600
p-value	0.8380	0.0000	0.0000	0.0000	0.0616	0.0630

Notes: Non-agrarian countries are: Algeria, Iraq, Jordan, Kuwait, Lebanon, Libya and Tunisia. IV-Probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

Table 5: IV-probit regressions of Equation (2) when agrarian countries are considered

	Willingness to migrate (1)	Willingness to migrate (2)	Willingness to migrate (3)	Willingness to migrate irregularly (4)	Willingness to migrate irregularly (5)	Willingness to migrate irregularly (6)
Climate change as:						
the biggest environmental challenge	-9.3758**	-	-	1.3478	-	-
	(3.7687)			(2.7410)		
the first priority of the United Nations	-	10.5055***	-	-	20.2902***	-
		(1.5058)			(2.4698)	
more efforts by national government	-	-	-3.6516***	-	-	-5.2080***
			(0.2879)			(0.4254)
Mobility potentials						
Local networks	0.4127***	0.0631	0.3783***	0.0829	-0.3439**	0.2535**
	(0.1121)	(0.1065)	(0.0895)	(0.0788)	(0.1710)	(0.1188)
Sexual violence	0.1712**	0.3640***	0.1712***	0.1330**	0.4400***	0.0683
	(0.0714)	(0.0703)	(0.0597)	(0.0543)	(0.1132)	(0.0809)
Local networks and sexual violence	0.3115	0.4375**	0.6816***	0.3854***	0.1785	0.6482***
	(0.2038)	(0.1701)	(0.1509)	(0.1375)	(0.2697)	(0.1968)
Socio-economic characteristics						
Female	-0.4288***	-0.3276***	-0.5172***	-0.5012***	-0.3834***	-0.7126***
	(0.0674)	(0.0656)	(0.0585)	(0.0508)	(0.1053)	(0.0788)
Age (less than 24 years old)	0.4002***	0.1328	0.7782***	0.2715***	-0.0875	0.9516***
	(0.1196)	(0.1145)	(0.1049)	(0.0908)	(0.1847)	(0.1429)
Age (between 25 and 34 years old)	0.4045***	0.0298	0.5735***	0.2534***	-0.1815	0.7414***
	(0.1044)	(0.0913)	(0.0792)	(0.0841)	(0.1494)	(0.1103)
Age (between 35 and 44 years old)	0.2896***	0.1632**	0.3019***	0.2259***	0.1210	0.3642***
	(0.0865)	(0.0812)	(0.0723)	(0.0719)	(0.1323)	(0.1007)
Preparatory level of education	0.0498	0.0104	-0.1400*	0.0226	0.1020	-0.1692
	(0.0986)	(0.0935)	(0.0847)	(0.0781)	(0.1500)	(0.1148)
Secondary level of education	0.0832	0.0865	0.0936	-0.0982	0.0505	-0.0303
	(0.0888)	(0.0807)	(0.0713)	(0.0717)	(0.1311)	(0.0983)
Mid-level diploma level of education	0.5262***	0.0183	0.1008	0.0045	-0.3070*	-0.1198
	(0.1678)	(0.1136)	(0.0987)	(0.1216)	(0.1815)	(0.1323)
Bachelor's and/or Master's level of education	0.4694***	0.3557***	0.4549***	0.0554	0.1683	0.2289**
	(0.1110)	(0.0927)	(0.0827)	(0.0822)	(0.1501)	(0.1121)
Married	-0.3479***	-0.4008***	-0.3410***	-0.4068***	-0.8027***	-0.6021***
	(0.1257)	(0.1177)	(0.1036)	(0.0932)	(0.1910)	(0.1398)
Divorced	0.0708	-0.0804	-0.3758***	0.0041	-0.0461	-0.3853**
	(0.1707)	(0.1513)	(0.1380)	(0.1205)	(0.2403)	(0.1819)
Widowed	-0.3324*	-0.5627***	-0.3014*	-0.3948**	-1.1051***	-0.4691*
	(0.1913)	(0.1903)	(0.1699)	(0.1728)	(0.3154)	(0.2397)
Having children	-0.0148	-0.0913	0.1255	-0.1790*	0.0845	0.2833**
	(0.1357)	(0.1071)	(0.0983)	(0.1048)	(0.1739)	(0.1342)
Internet use	0.2408***	0.4162***	0.4401***	0.2490***	0.4154***	0.3993***
	(0.0749)	(0.0651)	(0.0575)	(0.0557)	(0.1046)	(0.0779)
Living in a rural area	-0.2158***	-0.0426	-0.3264***	0.0267	0.0589	-0.3991***
	(0.0818)	(0.0579)	(0.0555)	(0.0633)	(0.0930)	(0.0762)
Being employed	0.0132	0.0011	0.0276	-0.0412	-0.0083	0.0136
	(0.0704)	(0.0668)	(0.0596)	(0.0526)	(0.1069)	(0.0798)
Constant	-0.2974*	-1.0939***	0.9590***	-1.0822***	-2.0391***	1.1730***
	(0.1793)	(0.1328)	(0.1629)	(0.1327)	(0.2174)	(0.2310)
Observations	8,747	8,287	8,291	8,779	8,316	8,316
Wald test of exogeneity (χ^2)	28.4700	144.2600	350.5400	2.4300	248.7800	283.3500
p-value	0.0000	0.0000	0.0000	0.1189	0.0000	0.0000

Notes: Agrarian countries are: Egypt, Mauritania, Morocco and Sudan. IV-Probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

Table 6: IV-probit regressions of Equation (2) when less vulnerable countries are considered

	Willingness to migrate (1)	Willingness to migrate (2)	Willingness to migrate (3)	Willingness to migrate irregularly (4)	Willingness to migrate irregularly (5)	Willingness to migrate irregularly (6)
Climate change as:						
the biggest environmental challenge	-9.6919***	-	-	-7.3448***	-	-
	(1.9327)			(1.8619)		
the first priority of the United Nations	-	-4.4713***	-	-	1.0572*	-
		(0.5552)			(0.6007)	
more efforts by national government	-	-	-1.6117***	-	-	-0.6526***
			(0.1808)			(0.2036)
Mobility potentials						
Local networks	0.2321**	0.2761***	0.3349***	0.1702*	0.1050	0.2041***
	(0.1095)	(0.0635)	(0.0639)	(0.0993)	(0.0666)	(0.0689)
Sexual violence	0.2119***	0.2804***	0.3727***	0.1051**	0.1970***	0.2049***
	(0.0585)	(0.0312)	(0.0306)	(0.0533)	(0.0334)	(0.0337)
Local networks and sexual violence	0.2297	0.6259***	0.6270***	0.1036	0.2798***	0.3762***
	(0.1711)	(0.0917)	(0.0905)	(0.1520)	(0.0912)	(0.0923)
Socio-economic characteristics						
Female	-0.3331***	-0.3216***	-0.3532***	-0.5255***	-0.5166***	-0.5301***
	(0.0537)	(0.0310)	(0.0306)	(0.0496)	(0.0338)	(0.0343)
Age (less than 24 years old)	0.3656***	0.3193***	0.3689***	0.3576***	0.3851***	0.3736***
	(0.0954)	(0.0548)	(0.0535)	(0.0874)	(0.0591)	(0.0592)
Age (between 25 and 34 years old)	0.4718***	0.3658***	0.3469***	0.5727***	0.5283***	0.5126***
	(0.0768)	(0.0439)	(0.0436)	(0.0724)	(0.0498)	(0.0507)
Age (between 35 and 44 years old)	0.4659***	0.3193***	0.3111***	0.5549***	0.5066***	0.4698***
	(0.0750)	(0.0429)	(0.0424)	(0.0705)	(0.0483)	(0.0488)
Preparatory level of education	0.0848	0.0116	-0.0578	0.0250	-0.0391	-0.0669
	(0.0843)	(0.0480)	(0.0481)	(0.0767)	(0.0496)	(0.0508)
Secondary level of education	0.1121	0.1027**	0.0856*	-0.1589**	-0.2291***	-0.1853***
	(0.0789)	(0.0455)	(0.0444)	(0.0722)	(0.0486)	(0.0483)
Mid-level diploma level of education	0.0601	0.1134*	-0.0012	-0.1263	-0.2411***	-0.1737***
	(0.0983)	(0.0588)	(0.0544)	(0.0896)	(0.0627)	(0.0588)
Bachelor's and/or Master's level of education	0.1321	0.1284**	0.0583	-0.3343***	-0.4960***	-0.4190***
	(0.0917)	(0.0528)	(0.0487)	(0.0845)	(0.0574)	(0.0543)
Married	-0.3854***	-0.3819***	-0.3299***	-0.3727***	-0.3403***	-0.3187***
	(0.1118)	(0.0639)	(0.0632)	(0.1017)	(0.0674)	(0.0685)
Divorced	-0.2629*	-0.3036***	-0.2005**	-0.0843	-0.0171	-0.0234
	(0.1567)	(0.0900)	(0.0883)	(0.1407)	(0.0923)	(0.0931)
Widowed	-0.3943**	-0.3759***	-0.4366***	-0.3869**	-0.3863***	-0.3747***
	(0.1641)	(0.0971)	(0.0971)	(0.1578)	(0.1134)	(0.1165)
Having children	0.0846	-0.0556	-0.0199	-0.0491	-0.1053	-0.1256*
	(0.1067)	(0.0609)	(0.0599)	(0.0983)	(0.0660)	(0.0665)
Internet use	0.2888***	0.2387***	0.3351***	0.0210	0.1030**	0.0815**
	(0.0636)	(0.0391)	(0.0360)	(0.0588)	(0.0420)	(0.0396)
Living in a rural area	0.0318	0.0308	-0.0477	0.0361	-0.0061	-0.0134
	(0.0565)	(0.0326)	(0.0323)	(0.0517)	(0.0344)	(0.0348)
Being employed	-0.1233**	0.0077	-0.0918***	-0.1722***	-0.1740***	-0.1646***
	(0.0590)	(0.0360)	(0.0333)	(0.0539)	(0.0379)	(0.0362)
Constant	-0.0853	-0.4198***	0.1871	-0.4565***	-0.9577***	-0.5779***
	(0.1550)	(0.0674)	(0.1149)	(0.1457)	(0.0726)	(0.1277)
Observations	13,006	12,861	12,610	13,033	12,888	12,633
Wald test of exogeneity (χ^2)	104.2400	79.4900	106.1700	33.7500	4.7300	7.1500
p-value	0.0000	0.0000	0.0000	0.0000	0.0296	0.0075

Notes: Less vulnerable countries are: Algeria, Jordan, Kuwait, Morocco and Tunisia. IV-Probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

Table 7: IV-probit regressions of Equation (2) when more vulnerable countries are considered

	Willingness to migrate (1)	Willingness to migrate (2)	Willingness to migrate (3)	Willingness to migrate irregularly (4)	Willingness to migrate irregularly (5)	Willingness to migrate irregularly (6)
Climate change as						
the biggest environmental challenge	1.0964	-	-	3.6953***	-	-
	(0.7700)			(1.1011)		
the first priority of the United Nations	-	23.0586***	-	-	34.7815***	-
		(4.4995)			(6.6243)	
more efforts by national government	-	-	-3.6499***	-		-4.2930***
			(0.3038)			(0.4198)
Mobility potentials						
Local networks	0.3238***	0.2111	0.3027***	0.2559***	0.0550	0.1464
	(0.0563)	(0.1686)	(0.1097)	(0.0713)	(0.2484)	(0.1367)
Sexual violence	0.3674***	0.5588***	0.4433***	0.2532***	0.5096***	0.3541***
	(0.0314)	(0.0969)	(0.0577)	(0.0443)	(0.1429)	(0.0753)
Local networks and sexual violence	0.5653***	0.7830***	0.7965***	0.4675***	0.7110**	0.8021***
(0.0809)	(0.2455)	(0.1669)	(0.1003)	(0.3602)	(0.2043)	
Socio-economic characteristics						
Female	-0.3183***	-0.2567***	-0.4839***	-0.4754***	-0.3395**	-0.6640***
	(0.0317)	(0.0921)	(0.0607)	(0.0448)	(0.1375)	(0.0793)
Age (less than 24 years old)	0.4527***	0.2178	0.8927***	0.3505***	-0.0703	0.8900***
	(0.0537)	(0.1660)	(0.1052)	(0.0742)	(0.2463)	(0.1361)
Age (between 25 and 34 years old)	0.3123***	0.1907	0.6703***	0.2188***	-0.0109	0.6504***
	(0.0421)	(0.1214)	(0.0771)	(0.0611)	(0.1819)	(0.1025)
Age (between 35 and 44 years old)	0.2273***	0.1755	0.3825***	0.1467**	0.0311	0.3512***
	(0.0412)	(0.1152)	(0.0726)	(0.0620)	(0.1722)	(0.0986)
Preparatory level of education	0.0735	0.1459	-0.0433	0.0461	0.2585	-0.0626
	(0.0553)	(0.1528)	(0.0899)	(0.0832)	(0.2287)	(0.1216)
Secondary level of education	0.0070	0.1362	-0.0709	0.0737	0.3221*	-0.0544
	(0.0448)	(0.1263)	(0.0746)	(0.0677)	(0.1898)	(0.1006)
Mid-level diploma level of education	0.0394	-0.0154	0.0433	0.0924	0.1156	-0.0439
	(0.0534)	(0.1500)	(0.1052)	(0.0766)	(0.2224)	(0.1363)
Bachelor's and/or Master's level of education	0.3083***	0.3135**	0.3885***	0.2438***	0.3231	0.2626**
	(0.0468)	(0.1319)	(0.0830)	(0.0685)	(0.1965)	(0.1089)
Married	-0.0837	-0.1536	-0.4644***	-0.0782	-0.2688	-0.4700***
	(0.0544)	(0.1603)	(0.1031)	(0.0724)	(0.2375)	(0.1306)
Divorced	-0.0026	0.0714	-0.4725***	0.1975*	0.2398	-0.1071
	(0.0844)	(0.2377)	(0.1524)	(0.1083)	(0.3486)	(0.1887)
Widowed	-0.2654**	-0.3862	-0.4350**	-0.0095	-0.3297	-0.1551
	(0.1054)	(0.2681)	(0.1730)	(0.1589)	(0.4028)	(0.2362)
Having children	-0.1807***	-0.0763	0.2086**	-0.3017***	-0.0848	0.1615
	(0.0521)	(0.1506)	(0.0969)	(0.0709)	(0.2237)	(0.1244)
Internet use	0.2503***	0.5043***	0.4102***	0.1526***	0.5370***	0.3087***
	(0.0358)	(0.1048)	(0.0589)	(0.0506)	(0.1556)	(0.0775)
Living in a rural area	-0.0999***	-0.3225***	-0.2755***	0.0879**	-0.2694**	-0.1359*
	(0.0301)	(0.0925)	(0.0563)	(0.0415)	(0.1362)	(0.0737)
Being employed	-0.0504	-0.0639	0.0254	0.0257	0.0525	0.0555
	(0.0327)	(0.0928)	(0.0598)	(0.0452)	(0.1371)	(0.0769)
Constant	-0.9201***	-1.6880***	0.8824***	-1.6487***	-2.8512***	0.3615
	(0.0631)	(0.2230)	(0.1818)	(0.0930)	(0.3346)	(0.2448)
Observations	11,242	10,713	8,383	11,290	10,756	8,408
Wald test of exogeneity (χ^2)	2.9900	216.2300	358.8300	3.4300	257.4200	207.1800
p-value	0.0840	0.0000	0.0000	0.0638	0.0000	0.0000

Notes: More vulnerable countries are: Egypt, Iraq, Lebanon, Libya, Mauritania and Sudan. IV-Probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

Table 8: Testing *Hypothesis* 4 when the willingness to migrate, all countries and economies less susceptible to climate change are considered

	All countries	Non-Agrarian countries	Less vulnerable countries
Climate change as:			
the biggest environmental challenge	3.2161**	3.0895***	-3.6853
	(1.1623)	(0.7554)	(2.6012)
the first priority of the United Nations	0.6059	0.6560	-0.1950
	(0.7529)	(0.8472)	(0.8314)
more efforts by national government	-3.5459***	-0.3139	-0.7732***
	(07435)	(0.2718)	(0.2528)

Notes: Non-agrarian countries are: Algeria, Iraq, Jordan, Kuwait, Lebanon, Libya and Tunisia. Less vulnerable countries are: Algeria, Jordan, Kuwait, Morocco and Tunisia. Wald tests on the coefficients computed from IV-probit estimates shown in Tables A.4, A.6 and A.8. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively.

Table 9: Testing *Hypothesis* 4 when the willingness to migrate irregularly, all countries and economies less susceptible to climate change are considered

	All countries	Non-Agrarian countries	Less vulnerable countries
Climate change as:			
the biggest environmental challenge	9.1032**	3.0169**	2.4616
	(2.9175)	(1.1925)	(1.9457)
the first priority of the United Nations	4.1007***	5.3110***	4.0833***
	(1.2856)	(0.9381)	(0.8905)
more efforts by national government	-1.4890	0.4959*	0.2266
	(0.9676)	(0.2802)	(0.2546)

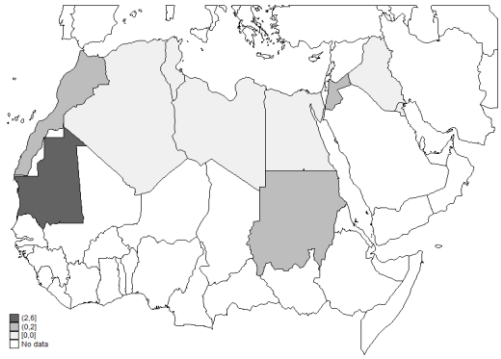
Notes: Non-agrarian countries are: Algeria, Iraq, Jordan, Kuwait, Lebanon, Libya and Tunisia. Less vulnerable countries are: Algeria, Jordan, Kuwait, Morocco and Tunisia. Wald tests on the coefficients computed from IV-probit estimates shown in Tables A.5, A.7 and A.9. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively.

Table 10: Testing *Hypothesis* 5 when countries more susceptible to climate change are considered

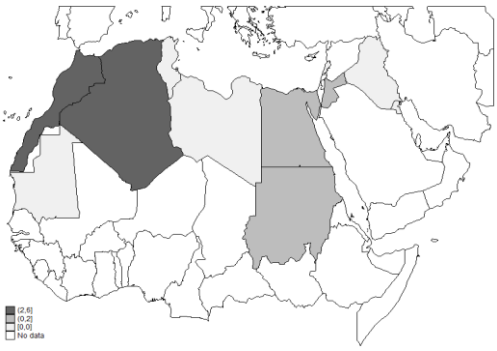
	Agrarian countries	More vulnerable countries
Climate change as:		
the biggest environmental challenge	-63.5872***	-7.6353***
	(7.1697)	(1.3743)
the first priority of the United Nations	-5.5880*	10.5282
	(2.8604)	(10.4510)
more efforts by national government	0.3079	-0.2687
	(0.4827)	(0.5097)

Notes: Agrarian countries are: Egypt, Mauritania, Morocco and Sudan. More vulnerable countries are: Egypt, Iraq, Lebanon, Libya, Mauritania and Sudan. Wald tests on the coefficients computed from IV-probit estimates shown in Tables A.10 and A.11. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively.

Figure 1 - Geographic distribution of the occurrence of climate hazards in the Middle East and North Africa

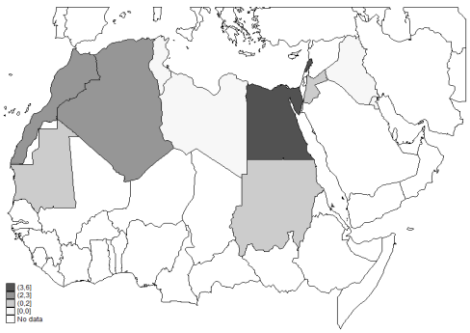


Panel (A) - Droughts



Panel (B) – Extreme temperature

Panel (C) - Floods



Panel (D) - Storms

Notes: Author's elaboration on data retrieved from EM-DAT. Reference time period: 2000-2020. Country list includes: Algeria, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Palestine, Sudan and Tunisia. This is the sample covered by the seventh wave of the Arab Barometer survey (2021-2022).

Appendix A

A.1: First stage regressions of Equation 3 when each succession of climate shocks are alternatively considered and climate change awareness is measured as the biggest environmental challenge and all countries are considered

	(1)	(2)	(3)	(4)
Succession of climate disasters				
Drought	0.0004	-	-	-
	(0.0008)			
Extreme Temperatures	-	0.0034***	-	-
		(0.0007)		
Flood	-	-	0.0010***	-
			(0.0001)	
Storm	-	-	-	-0.0055***
				(0.0007)
Mobility potentials				
Local networks	0.0077	0.0059	0.0052	0.0064
	(0.0058)	(0.0058)	(0.0058)	(0.0058)
Sexual violence	-0.0058**	-0.0048*	-0.0046	-0.0058**
	(0.0029)	(0.0029)	(0.0029)	(0.0029)
Local networks and sexual violence	-0.0225***	-0.0229***	-0.0235***	-0.0230***
	(0.0084)	(0.0083)	(0.0083)	(0.0083)
Socio-economic characteristics				
Female	-0.0026	-0.0028	-0.0027	-0.0025
	(0.0029)	(0.0029)	(0.0029)	(0.0029)
Age (less than 24 years old)	0.0010	0.0015	0.0002	-0.0000
	(0.0051)	(0.0051)	(0.0051)	(0.0051)
Age (between 25 and 34 years old)	0.0064	0.0066*	0.0061	0.0061
	(0.0039)	(0.0039)	(0.0039)	(0.0039)
Age (between 35 and 44 years old)	0.0036	0.0038	0.0035	0.0035
	(0.0038)	(0.0038)	(0.0038)	(0.0038)
Preparatory level of education	0.0079*	0.0078*	0.0083*	0.0095**
	(0.0046)	(0.0046)	(0.0046)	(0.0046)
Secondary level of education	0.0005	0.0007	0.0022	0.0033
	(0.0041)	(0.0041)	(0.0041)	(0.0041)
Mid-level diploma level of education	0.0029	0.0029	0.0046	0.0029
	(0.0051)	(0.0051)	(0.0051)	(0.0051)
Bachelor's and/or Master's level of education	0.0061	0.0070	0.0067	0.0070
	(0.0044)	(0.0044)	(0.0044)	(0.0044)
Married	-0.0072	-0.0059	-0.0057	-0.0056
	(0.0057)	(0.0057)	(0.0057)	(0.0057)
Divorced	0.0053	0.0056	0.0047	0.0057
	(0.0084)	(0.0083)	(0.0083)	(0.0083)
Widowed	-0.0073	-0.0064	-0.0051	-0.0048
	(0.0086)	(0.0086)	(0.0086)	(0.0086)
Having children	0.0132**	0.0131**	0.0144***	0.0128**
	(0.0053)	(0.0053)	(0.0053)	(0.0053)
Internet use	-0.0055*	-0.0047	-0.0019	-0.0055*
	(0.0032)	(0.0032)	(0.0032)	(0.0032)
Living in a rural area	-0.0016	-0.0021	-0.0038	-0.0016
	(0.0029)	(0.0029)	(0.0029)	(0.0029)
Being employed	-0.0028	-0.0030	-0.0029	-0.0022
	(0.0031)	(0.0031)	(0.0031)	(0.0031)
Constant	0.0464***	0.0413***	0.0324***	0.0563***
	(0.0056)	(0.0057)	(0.0060)	(0.0057)
Observations	26,121	26,121	26,121	26,121
R-squared	0.0014	0.0021	0.0030	0.0038

Notes: Probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively.

A.2: First stage regressions of Equation 3 when each succession of climate shocks are alternatively considered and climate change awareness is measured as the first priority of the United Nations and all countries are considered

	(1)	(2)	(3)	(4)
Succession of climate disasters				
Drought	-0.0016**	-	-	-
	(0.0007)			
Extreme Temperatures	-	0.0084***	-	-
		(0.0007)		
Flood	-	-	0.0018***	-
			(0.0001)	
Storm	-	-	-	-0.0007
				(0.0006)
Mobility potentials				
Local networks	0.0172***	0.0123**	0.0122**	0.0168***
	(0.0051)	(0.0051)	(0.0051)	(0.0051)
Sexual violence	-0.0105***	-0.0072***	-0.0074***	-0.0098***
	(0.0026)	(0.0026)	(0.0026)	(0.0026)
Local networks and sexual violence	0.0031	0.0022	0.0014	0.0032
	(0.0074)	(0.0073)	(0.0073)	(0.0074)
Socio-economic characteristics				
Female	-0.0005	-0.0011	-0.0008	-0.0005
	(0.0026)	(0.0026)	(0.0026)	(0.0026)
Age (less than 24 years old)	-0.0011	-0.0004	-0.0034	-0.0017
	(0.0046)	(0.0045)	(0.0045)	(0.0045)
Age (between 25 and 34 years old)	-0.0010	-0.0009	-0.0022	-0.0013
	(0.0035)	(0.0035)	(0.0035)	(0.0035)
Age (between 35 and 44 years old)	-0.0061*	-0.0060*	-0.0068**	-0.0065*
	(0.0034)	(0.0034)	(0.0034)	(0.0034)
Preparatory level of education	-0.0038	-0.0037	-0.0023	-0.0032
	(0.0041)	(0.0041)	(0.0041)	(0.0041)
Secondary level of education	0.0018	0.0032	0.0060*	0.0027
	(0.0036)	(0.0036)	(0.0036)	(0.0037)
Mid-level diploma level of education	0.0153***	0.0166***	0.0200***	0.0161***
	(0.0045)	(0.0045)	(0.0045)	(0.0045)
Bachelor's and/or Master's level of education	0.0165***	0.0195***	0.0189***	0.0173***
	(0.0040)	(0.0039)	(0.0039)	(0.0039)
Married	-0.0028	0.0001	-0.0002	-0.0029
	(0.0050)	(0.0050)	(0.0050)	(0.0050)
Divorced	-0.0089	-0.0101	-0.0117	-0.0101
	(0.0074)	(0.0074)	(0.0074)	(0.0074)
Widowed	0.0048	0.0069	0.0088	0.0050
	(0.0077)	(0.0076)	(0.0076)	(0.0077)
Having children	-0.0074	-0.0074	-0.0052	-0.0073
	(0.0047)	(0.0047)	(0.0047)	(0.0047)
Internet use	-0.0168***	-0.0133***	-0.0082***	-0.0157***
	(0.0029)	(0.0028)	(0.0029)	(0.0028)
Living in a rural area	0.0053**	0.0030	0.0001	0.0046*
	(0.0026)	(0.0026)	(0.0026)	(0.0026)
Being employed	0.0095***	0.0090***	0.0092***	0.0095***
	(0.0027)	(0.0027)	(0.0027)	(0.0027)
Constant	0.0476***	0.0319***	0.0179***	0.0468***
	(0.0050)	(0.0050)	(0.0053)	(0.0050)
Observations	25,426	25,426	25,426	25,426
R-squared	0.0065	0.0128	0.0141	0.0063

Notes: Probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively.

A.3: First stage regressions of Equation 3 when each succession of climate shocks are alternatively considered and climate change awareness is measured as the necessity of more efforts by national government and all countries are considered

	(1)	(2)	(3)	(4)
Succession of climate disasters				
Drought	-0.0024	-	-	-
	(0.0021)			
Extreme Temperatures	-	-0.0048***	-	-
		(0.0018)		
Flood	-	-	0.0007*	-
			(0.0004)	
Storm	-	-	-	-0.0042**
				(0.0018)
Mobility potentials				
Local networks	0.0524***	0.0548***	0.0500***	0.0505***
	(0.0152)	(0.0152)	(0.0152)	(0.0152)
Sexual violence	0.0252***	0.0244***	0.0274***	0.0257***
	(0.0076)	(0.0075)	(0.0075)	(0.0075)
Local networks and sexual violence	0.0780***	0.0794***	0.0771***	0.0777***
	(0.0228)	(0.0228)	(0.0228)	(0.0228)
Socio-economic characteristics				
Female	-0.0212***	-0.0207***	-0.0216***	-0.0208***
	(0.0077)	(0.0077)	(0.0077)	(0.0077)
Age (less than 24 years old)	0.0277**	0.0258*	0.0271**	0.0256*
	(0.0134)	(0.0134)	(0.0134)	(0.0134)
Age (between 25 and 34 years old)	0.0019	0.0013	0.0014	0.0011
	(0.0103)	(0.0103)	(0.0103)	(0.0103)
Age (between 35 and 44 years old)	-0.0158	-0.0167*	-0.0161	-0.0166*
	(0.0099)	(0.0099)	(0.0099)	(0.0099)
Preparatory level of education	-0.0400***	-0.0394***	-0.0396***	-0.0385***
	(0.0116)	(0.0116)	(0.0116)	(0.0116)
Secondary level of education	0.0050	0.0056	0.0063	0.0084
	(0.0103)	(0.0103)	(0.0103)	(0.0104)
Mid-level diploma level of education	-0.0030	-0.0007	-0.0023	0.0001
	(0.0135)	(0.0135)	(0.0135)	(0.0135)
Bachelor's and/or Master's level of education	0.0343***	0.0345***	0.0347***	0.0370***
	(0.0115)	(0.0114)	(0.0114)	(0.0115)
Married	-0.0331**	-0.0360**	-0.0320**	-0.0331**
	(0.0148)	(0.0149)	(0.0149)	(0.0148)
Divorced	-0.0440**	-0.0468**	-0.0456**	-0.0463**
	(0.0213)	(0.0213)	(0.0213)	(0.0213)
Widowed	-0.0272	-0.0293	-0.0254	-0.0260
	(0.0224)	(0.0224)	(0.0224)	(0.0224)
Having children	0.0486***	0.0490***	0.0499***	0.0482***
	(0.0137)	(0.0137)	(0.0137)	(0.0137)
Internet use	0.0003	0.0008	0.0047	0.0023
	(0.0083)	(0.0082)	(0.0083)	(0.0082)
Living in a rural area	-0.0365***	-0.0366***	-0.0395***	-0.0376***
	(0.0076)	(0.0076)	(0.0076)	(0.0076)
Being employed	0.0022	0.0027	0.0016	0.0033
	(0.0081)	(0.0081)	(0.0081)	(0.0081)
Constant	0.5248***	0.5303***	0.5109***	0.5294***
	(0.0146)	(0.0148)	(0.0157)	(0.0148)
Observations	21,041	21,041	21,041	21,041
R-squared	0.0070	0.0072	0.0071	0.0072

Notes: Probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively.

A.4: IV-probit regressions of Equation 3 by gender when all countries are considered

	F Willingness to migrate	M Willingness to migrate	F Willingness to migrate	M Willingness to migrate	F Willingness to migrate	M Willingness to migrate
Climate change as:						
the biggest environmental challenge	1.1770*	4.3931***	-	-	-	-
	(0.6951)	(1.1623)				
the first priority of the United Nations	-	-	3.4049***	4.0108***	-	-
			(0.7218)	(0.7529)		
more efforts by national government	-	-	-	-	3.7962***	0.2502
					(1.0653)	(0.7135)
Mobility potentials						
Local networks	0.3104***	0.1745***	0.2732***	0.1158**	0.0013	0.1865***
	(0.0632)	(0.0557)	(0.0694)	(0.0561)	(0.1459)	(0.0568)
Sexual violence	0.4147***	0.3240***	0.4598***	0.2950***	0.2853***	0.2798***
	(0.0267)	(0.0346)	(0.0311)	(0.0318)	(0.0607)	(0.0318)
Local networks and sexual violence	0.6183***	0.5159***	0.6042***	0.4224***	0.2864	0.3885***
	(0.0821)	(0.0855)	(0.0867)	(0.0821)	(0.1891)	(0.0925)
Socio-economic characteristics						
Age (less than 24 years old)	0.3605***	0.4551***	0.3723***	0.4906***	0.2689***	0.4566***
	(0.0472)	(0.0573)	(0.0518)	(0.0555)	(0.0886)	(0.0601)
Age (between 25 and 34 years old)	0.3188***	0.3456***	0.3493***	0.4062***	0.3890***	0.4316***
	(0.0369)	(0.0496)	(0.0406)	(0.0449)	(0.0687)	(0.0446)
Age (between 35 and 44 years old)	0.2297***	0.3493***	0.2756***	0.3885***	0.3160***	0.3824***
	(0.0379)	(0.0429)	(0.0419)	(0.0414)	(0.0717)	(0.0398)
Preparatory level of education	0.0552	-0.0513	0.0560	0.0112	0.2066**	0.0028
	(0.0470)	(0.0520)	(0.0509)	(0.0505)	(0.0867)	(0.0560)
Secondary level of education	0.0960**	-0.0885*	0.0757*	-0.1009**	0.1505**	-0.0543
	(0.0413)	(0.0454)	(0.0451)	(0.0444)	(0.0708)	(0.0413)
Mid-level diploma level of education	0.1653***	-0.1867***	0.1303**	-0.2782***	0.3134***	-0.1241**
	(0.0505)	(0.0546)	(0.0557)	(0.0557)	(0.0935)	(0.0509)
Bachelor's and/or Master's level of education	0.2893***	-0.0845*	0.2402***	-0.1485***	0.2290***	-0.0556
	(0.0442)	(0.0483)	(0.0494)	(0.0493)	(0.0862)	(0.0529)
Married	-0.1767***	-0.2736***	-0.1996***	-0.2335***	-0.1107	-0.3031***
	(0.0522)	(0.0638)	(0.0570)	(0.0630)	(0.0991)	(0.0648)
Divorced	-0.0085	-0.2829**	0.0086	-0.1421	0.0189	-0.2369**
	(0.0696)	(0.1105)	(0.0764)	(0.1060)	(0.1305)	(0.1081)
Widowed	-0.2097***	-0.5513***	-0.2459***	-0.6059***	-0.0842	-0.6233***
	(0.0766)	(0.1358)	(0.0837)	(0.1329)	(0.1423)	(0.1237)
Having children	-0.1012**	-0.1228**	-0.0350	-0.0668	-0.2507***	-0.0778
	(0.0496)	(0.0625)	(0.0540)	(0.0593)	(0.0966)	(0.0701)
Internet use	0.3298***	0.3295***	0.3460***	0.4015***	0.3798***	0.3643***
	(0.0323)	(0.0355)	(0.0354)	(0.0381)	(0.0566)	(0.0330)
Living in a rural area	-0.1500***	0.0165	-0.1650***	-0.0116	0.0098	0.0482
	(0.0289)	(0.0312)	(0.0316)	(0.0309)	(0.0687)	(0.0369)
Being employed	-0.0756**	-0.0879***	-0.1155***	-0.1589***	0.0110	-0.1105***
	(0.0330)	(0.0328)	(0.0371)	(0.0315)	(0.0649)	(0.0308)
Constant	-1.2675***	-0.8563***	-1.3592***	-0.8486***	-3.1670***	-0.7902**
	(0.0624)	(0.0803)	(0.0666)	(0.0695)	(0.5632)	(0.3589)
Observations	12,885	13,158	12,479	12,875	10,329	10,664
Wald test of exogeneity (χ^2)	2.6800	20.5500	29.9200	45.0300	35.3100	0.2200
	0.1014	0.0000	0.0000	0.0000	0.0000	0.6370

Notes: IV-probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

A.5: IV-probit regressions of Equation 3 by gender when all countries are considered

	F Willingness to migrate irregularly	M Willingness to migrate irregularly	F Willingness to migrate irregularly	M Willingness to migrate irregularly	F Willingness to migrate irregularly	M Willingness to migrate irregularly
Climate change as:						
the biggest environmental challenge	8.2462***	17.3494***	-	-	-	-
	(1.4043)	(2.9175)				
the first priority of the United Nations	-	-	7.1467***	11.2474***	-	-
			(1.1014)	(1.2856)		
more efforts by national government	-	-	-	-	3.0801***	1.5911
					(1.1519)	(0.9677)
Mobility potentials						
Local networks	0.1700	0.0897	0.1973*	-0.0816	-0.0120	0.0771
	(0.1187)	(0.1410)	(0.1045)	(0.0966)	(0.1539)	(0.0768)
Sexual violence	0.2554***	0.4174***	0.3415***	0.2989***	0.1308**	0.1900***
	(0.0508)	(0.0874)	(0.0487)	(0.0549)	(0.0666)	(0.0437)
Local networks and sexual violence	0.5903***	0.6215***	0.3430***	0.2758**	0.0883	0.2646**
	(0.1572)	(0.2171)	(0.1309)	(0.1400)	(0.1951)	(0.1224)
Socio-economic characteristics						
Age (less than 24 years old)	0.2342***	0.3411**	0.2471***	0.4595***	0.1259	0.3978***
	(0.0906)	(0.1465)	(0.0815)	(0.0963)	(0.0964)	(0.0826)
Age (between 25 and 34 years old)	0.2952***	0.1704	0.3367***	0.4255***	0.3379***	0.4940***
	(0.0708)	(0.1270)	(0.0649)	(0.0789)	(0.0769)	(0.0636)
Age (between 35 and 44 years old)	0.2324***	0.2646**	0.3146***	0.4370***	0.3172***	0.4649***
	(0.0721)	(0.1093)	(0.0667)	(0.0730)	(0.0803)	(0.0580)
Preparatory level of education	-0.1056	-0.1338	-0.0660	0.1019	0.0546	0.0904
	(0.0869)	(0.1305)	(0.0785)	(0.0862)	(0.0959)	(0.0755)
Secondary level of education	-0.0730	-0.1631	-0.0770	-0.2095***	-0.0211	-0.2299***
	(0.0760)	(0.1139)	(0.0690)	(0.0766)	(0.0775)	(0.0578)
Mid-level diploma level of education	-0.0696	-0.1485	-0.1126	-0.4071***	0.0512	-0.1426**
	(0.0945)	(0.1365)	(0.0857)	(0.0947)	(0.1000)	(0.0698)
Bachelor's and/or Master's level of education	-0.1497*	-0.2900**	-0.2038***	-0.4540***	-0.2146**	-0.3340***
	(0.0833)	(0.1215)	(0.0763)	(0.0845)	(0.0941)	(0.0726)
Married	-0.0981	-0.2160	-0.1932**	-0.1609	-0.1320	-0.2554***
	(0.0977)	(0.1622)	(0.0866)	(0.1082)	(0.1048)	(0.0889)
Divorced	0.2189*	-0.4450	0.2492**	-0.0155	0.2316*	0.0373
	(0.1255)	(0.2784)	(0.1106)	(0.1815)	(0.1327)	(0.1470)
Widowed	-0.0557	-0.4767	-0.1976	-0.6772***	-0.0226	-0.6435***
	(0.1413)	(0.3335)	(0.1288)	(0.2388)	(0.1553)	(0.1936)
Having children	-0.2842***	-0.4194***	-0.0598	-0.1648	-0.3097***	-0.2262**
	(0.0926)	(0.1585)	(0.0820)	(0.1026)	(0.1040)	(0.0976)
Internet use	0.2200***	0.1805**	0.2132***	0.3587***	0.2283***	0.1303***
	(0.0603)	(0.0888)	(0.0546)	(0.0654)	(0.0622)	(0.0462)
Living in a rural area	-0.0249	0.0284	-0.0774	-0.0334	0.0579	0.1136**
	(0.0541)	(0.0786)	(0.0487)	(0.0530)	(0.0748)	(0.0502)
Being employed	-0.0075	-0.0139	-0.0791	-0.2394***	0.0327	-0.1972***
	(0.0625)	(0.0821)	(0.0574)	(0.0540)	(0.0705)	(0.0425)
Constant	-2.1160***	-1.9107***	-2.0447***	-1.6774***	-3.2641***	-1.9243***
	(0.1197)	(0.2020)	(0.1038)	(0.1214)	(0.6076)	(0.4870)
Observations	12,922	13,199	12,513	12,913	10,352	10,689
Wald test of exogeneity (χ^2)	59.2900	201.4200	66.7700	218.6500	12.7600	4.2400
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0394

Notes: IV-probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

A.6: IV-probit regressions of Equation 3 by gender when non-agrarian countries are considered

	F Willingness to migrate	M Willingness to migrate	F Willingness to migrate	M Willingness to migrate	F Willingness to migrate	M Willingness to migrate
Climate change as:						
the biggest environmental challenge	-1.3770**	1.7125**	-	-	-	-
	(0.7024)	(0.7554)				
the first priority of the United Nations	-	-	-5.3287***	-4.6727***	-	-
			(0.7923)	(0.8472)		
more efforts by national government	-	-	-	-	-1.6709***	-1.9849***
					(0.2955)	(0.2718)
Mobility potentials						
Local networks	0.2278**	0.0629	0.1810*	0.1244	0.4835***	0.2071**
	(0.0888)	(0.0664)	(0.1044)	(0.0770)	(0.1379)	(0.1000)
Sexual violence	0.4425***	0.3334***	0.4193***	0.2960***	0.5377***	0.3872***
	(0.0326)	(0.0339)	(0.0381)	(0.0377)	(0.0452)	(0.0458)
Local networks and sexual violence	0.4955***	0.4400***	0.4899***	0.4691***	0.8646***	0.5688***
	(0.1035)	(0.0861)	(0.1185)	(0.0997)	(0.1625)	(0.1309)
Socio-economic characteristics						
Age (less than 24 years old)	0.4723***	0.4930***	0.4431***	0.4209***	0.4773***	0.4509***
	(0.0580)	(0.0585)	(0.0681)	(0.0688)	(0.0781)	(0.0818)
Age (between 25 and 34 years old)	0.4036***	0.4469***	0.3375***	0.4110***	0.3742***	0.4727***
	(0.0451)	(0.0490)	(0.0534)	(0.0566)	(0.0620)	(0.0692)
Age (between 35 and 44 years old)	0.3220***	0.3594***	0.2567***	0.3266***	0.3083***	0.3528***
	(0.0462)	(0.0459)	(0.0546)	(0.0527)	(0.0618)	(0.0632)
Preparatory level of education	0.0457	-0.0139	0.0721	-0.0372	0.0023	-0.0992
	(0.0589)	(0.0566)	(0.0680)	(0.0648)	(0.0742)	(0.0753)
Secondary level of education	0.0738	-0.0785	0.1490**	-0.0713	0.0917	-0.0483
	(0.0530)	(0.0518)	(0.0622)	(0.0587)	(0.0672)	(0.0675)
Mid-level diploma level of education	0.0460	-0.2483***	0.1490**	-0.1773**	0.2306***	-0.2050**
	(0.0631)	(0.0602)	(0.0738)	(0.0698)	(0.0844)	(0.0826)
Bachelor's and/or Master's level of education	0.1762***	-0.1137**	0.3404***	0.0105	0.2485***	-0.0378
	(0.0553)	(0.0532)	(0.0681)	(0.0651)	(0.0722)	(0.0720)
Married	-0.2526***	-0.2293***	-0.2581***	-0.3272***	-0.3086***	-0.4002***
	(0.0653)	(0.0672)	(0.0763)	(0.0794)	(0.0868)	(0.0976)
Divorced	-0.0648	-0.1658	-0.1605	-0.2718*	-0.0996	-0.3270**
	(0.0947)	(0.1240)	(0.1123)	(0.1446)	(0.1274)	(0.1664)
Widowed	-0.2857***	-0.7714***	-0.2218**	-0.8393***	-0.4007***	-0.7301***
	(0.0935)	(0.1620)	(0.1074)	(0.1780)	(0.1227)	(0.1960)
Having children	0.0645	-0.0607	-0.0058	-0.0438	0.0392	0.0373
	(0.0624)	(0.0648)	(0.0724)	(0.0741)	(0.0811)	(0.0918)
Internet use	0.2577***	0.3568***	0.2096***	0.2520***	0.2171***	0.3313***
	(0.0433)	(0.0418)	(0.0503)	(0.0503)	(0.0561)	(0.0579)
Living in a rural area	-0.1710***	0.0093	-0.1474***	0.0690*	-0.1500***	0.0754
	(0.0380)	(0.0363)	(0.0441)	(0.0409)	(0.0510)	(0.0495)
Being employed	-0.1199***	-0.1196***	-0.0122	-0.0858**	-0.1132**	-0.0836*
	(0.0409)	(0.0335)	(0.0506)	(0.0386)	(0.0564)	(0.0455)
Constant	-1.1410***	-0.8419***	-1.0389***	-0.5115***	-0.2476	0.3987**
	(0.0770)	(0.0788)	(0.0821)	(0.0893)	(0.1856)	(0.1859)
Observations	8,567	8,729	8,439	8,628	6,281	6,421
Wald test of exogeneity (χ^2)	4.9300	5.0700	60.1900	39.9500	52.1200	84.8800
	0.0264	0.0244	0.0000	0.0000	0.0000	0.0000

Notes: Non-agrarian countries are: Algeria, Iraq, Jordan, Kuwait, Lebanon, Libya and Tunisia. IV-probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

A.7: IV-probit regressions of Equation 3 by gender when non-agrarian countries are considered

	F Willingness to migrate irregularly	M Willingness to migrate irregularly	F Willingness to migrate irregularly	M Willingness to migrate irregularly	F Willingness to migrate irregularly	M Willingness to migrate irregularly
Climate change as:						
the biggest environmental challenge	3.4951***	6.5121***	-	-	-	-
	(1.1157)	(1.1926)				
the first priority of the United Nations	-	-	-2.2241**	3.0870***	-	-
			(0.9959)	(0.9381)		
more efforts by national government	-	-	-	-	0.0690	0.5649**
					(0.3738)	(0.2802)
Mobility potentials						
Local networks	0.1925	0.1740*	0.2212*	0.1296	0.1596	0.1057
	(0.1312)	(0.0998)	(0.1239)	(0.0838)	(0.1704)	(0.0992)
Sexual violence	0.2965***	0.3351***	0.2658***	0.2664***	0.2809***	0.2253***
	(0.0496)	(0.0521)	(0.0475)	(0.0416)	(0.0557)	(0.0453)
Local networks and sexual violence	0.4571***	0.3757***	0.2926**	0.3025***	0.4040**	0.2480**
	(0.1532)	(0.1311)	(0.1385)	(0.1072)	(0.1776)	(0.1254)
Socio-economic characteristics						
Age (less than 24 years old)	0.3630***	0.4203***	0.3267***	0.4808***	0.3276***	0.5191***
	(0.0890)	(0.0899)	(0.0850)	(0.0758)	(0.0946)	(0.0813)
Age (between 25 and 34 years old)	0.3994***	0.4354***	0.3515***	0.5503***	0.4409***	0.6574***
	(0.0702)	(0.0768)	(0.0686)	(0.0646)	(0.0781)	(0.0717)
Age (between 35 and 44 years old)	0.3500***	0.3512***	0.3063***	0.4705***	0.3961***	0.5439***
	(0.0714)	(0.0723)	(0.0696)	(0.0612)	(0.0771)	(0.0666)
Preparatory level of education	-0.0446	-0.1133	-0.0193	-0.0466	0.0049	-0.0251
	(0.0874)	(0.0844)	(0.0836)	(0.0693)	(0.0880)	(0.0717)
Secondary level of education	0.0122	-0.2266***	0.0350	-0.3175***	0.0063	-0.2767***
	(0.0779)	(0.0782)	(0.0755)	(0.0642)	(0.0793)	(0.0663)
Mid-level diploma level of education	-0.0297	-0.2262**	-0.0306	-0.3906***	0.0168	-0.3284***
	(0.0945)	(0.0908)	(0.0913)	(0.0763)	(0.1005)	(0.0820)
Bachelor's and/or Master's level of education	-0.1247	-0.4200***	-0.0615	-0.5289***	-0.2038**	-0.5323***
	(0.0829)	(0.0810)	(0.0840)	(0.0720)	(0.0875)	(0.0722)
Married	-0.0329	-0.1579	-0.0616	-0.0958	-0.1279	-0.1489
	(0.0946)	(0.1016)	(0.0893)	(0.0853)	(0.0996)	(0.0945)
Divorced	0.2440*	-0.0654	0.1664	-0.0253	0.1451	0.0230
	(0.1312)	(0.1918)	(0.1254)	(0.1627)	(0.1392)	(0.1635)
Widowed	0.0522	-0.7885***	0.0219	-0.6262***	-0.0630	-0.6540***
	(0.1377)	(0.2676)	(0.1302)	(0.2412)	(0.1462)	(0.2464)
Having children	-0.1588*	-0.2642***	-0.1385	-0.2325***	-0.1116	-0.1886**
	(0.0903)	(0.0989)	(0.0850)	(0.0815)	(0.0940)	(0.0914)
Internet use	0.0063	0.1233*	-0.0371	0.1580***	0.0209	0.1520**
	(0.0631)	(0.0635)	(0.0608)	(0.0568)	(0.0666)	(0.0596)
Living in a rural area	-0.0921	-0.0415	-0.0678	0.0088	-0.1155*	0.0814*
	(0.0569)	(0.0550)	(0.0543)	(0.0446)	(0.0616)	(0.0479)
Being employed	-0.0300	-0.0792	0.0088	-0.1730***	-0.0774	-0.2092***
	(0.0624)	(0.0506)	(0.0632)	(0.0423)	(0.0701)	(0.0451)
Constant	-1.9709***	-1.4495***	-1.6897***	-1.2483***	-1.7524***	-1.4878***
	(0.1183)	(0.1225)	(0.1015)	(0.0997)	(0.2329)	(0.1919)
Observations	8,585	8,757	8,456	8,654	6,291	6,434
Wald test of exogeneity (χ^2)	10.9500	46.3800	3.2900	15.3300	0.0400	4.0400
	0.0000	0.0000	0.0696	0.0000	0.8392	0.0444

Notes: Non-agrarian countries are: Algeria, Iraq, Jordan, Kuwait, Lebanon, Libya and Tunisia. IV-probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

A.8: IV-probit regressions of Equation 3 by gender when less vulnerable countries are considered

	F Willingness to migrate	M Willingness to migrate	F Willingness to migrate	M Willingness to migrate	F Willingness to migrate	M Willingness to migrate
Climate change as:						
the biggest environmental challenge	-6.6451***	-10.3303***	-	-	-	-
	(2.2105)	(2.6013)				
the first priority of the United Nations	-	-	-4.4363***	-4.6314***	-	-
			(0.7524)	(0.8314)		
more efforts by national government	-	-	-	-	-1.1708***	-1.9440***
					(0.2590)	(0.2528)
Local networks	0.3085**	0.1819	0.3270***	0.2566***	0.3820***	0.3166***
	(0.1402)	(0.1423)	(0.1030)	(0.0829)	(0.0987)	(0.0848)
Sexual violence	0.3217***	0.1275	0.3284***	0.2345***	0.4222***	0.3215***
	(0.0630)	(0.0874)	(0.0442)	(0.0451)	(0.0411)	(0.0457)
Local networks and sexual violence	0.2869	0.2429	0.7298***	0.5345***	0.7268***	0.5455***
	(0.2313)	(0.2205)	(0.1404)	(0.1238)	(0.1335)	(0.1238)
Age (less than 24 years old)	0.3354***	0.3899***	0.2562***	0.3704***	0.3090***	0.4184***
	(0.1042)	(0.1446)	(0.0770)	(0.0808)	(0.0722)	(0.0810)
Age (between 25 and 34 years old)	0.3740***	0.5795***	0.3228***	0.4045***	0.3175***	0.3831***
	(0.0790)	(0.1281)	(0.0598)	(0.0685)	(0.0575)	(0.0697)
Age (between 35 and 44 years old)	0.4085***	0.4813***	0.2947***	0.3324***	0.2958***	0.3171***
	(0.0811)	(0.1123)	(0.0608)	(0.0623)	(0.0580)	(0.0631)
Preparatory level of education	0.1307	0.0034	0.1093	-0.0880	0.0116	-0.1214*
	(0.0944)	(0.1227)	(0.0690)	(0.0689)	(0.0663)	(0.0702)
Secondary level of education	0.2650***	-0.0733	0.2275***	-0.0074	0.1743***	0.0118
	(0.0956)	(0.1126)	(0.0661)	(0.0643)	(0.0612)	(0.0650)
Mid-level diploma level of education	0.2928**	-0.1857	0.3175***	-0.0538	0.2081***	-0.1667**
	(0.1147)	(0.1390)	(0.0832)	(0.0853)	(0.0750)	(0.0794)
Bachelor's and/or Master's level of education	0.2780***	-0.0373	0.3194***	-0.0245	0.1996***	-0.0420
	(0.1039)	(0.1310)	(0.0752)	(0.0769)	(0.0667)	(0.0726)
Married	-0.3615***	-0.3422**	-0.3013***	-0.4441***	-0.3017***	-0.3413***
	(0.1196)	(0.1693)	(0.0891)	(0.0969)	(0.0841)	(0.0962)
Divorced	-0.1882	-0.2558	-0.1747	-0.4562***	-0.1256	-0.2871*
	(0.1546)	(0.2690)	(0.1130)	(0.1545)	(0.1072)	(0.1525)
Widowed	-0.3567**	-0.5115*	-0.2530**	-0.6083***	-0.3718***	-0.5400***
	(0.1612)	(0.3051)	(0.1229)	(0.1785)	(0.1165)	(0.1833)
Having children	0.1237	-0.0023	-0.0780	-0.0327	0.0028	-0.0351
	(0.1153)	(0.1634)	(0.0845)	(0.0912)	(0.0783)	(0.0928)
Internet use	0.1904**	0.4072***	0.1985***	0.2541***	0.2650***	0.4013***
	(0.0765)	(0.0920)	(0.0539)	(0.0584)	(0.0495)	(0.0530)
Living in a rural area	-0.1660**	0.2403***	-0.1145**	0.1626***	-0.1373***	0.0212
	(0.0648)	(0.0884)	(0.0470)	(0.0469)	(0.0446)	(0.0472)
Being employed	-0.1158	-0.1568*	-0.0282	0.0203	-0.1229**	-0.0892**
	(0.0761)	(0.0800)	(0.0591)	(0.0478)	(0.0536)	(0.0443)
Constant	-0.6582***	-0.0173	-0.8283***	-0.3379***	-0.4495***	0.3886**
	(0.1741)	(0.2164)	(0.0917)	(0.1009)	(0.1604)	(0.1613)
Observations	6,455	6,551	6,375	6,486	6,226	6,384
Wald test of exogeneity (χ^2)	22.2800	71.3100	42.4000	39.3300	26.5600	84.4600
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Less vulnerable countries are: Algeria, Jordan, Kuwait, Morocco and Tunisia. IV-probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

A.9: IV-probit regressions of Equation 3 by gender when less vulnerable countries are considered

	F Willingness to migrate irregularly	M Willingness to migrate irregularly	F Willingness to migrate irregularly	M Willingness to migrate irregularly	F Willingness to migrate irregularly	M Willingness to migrate irregularly
Climate change as:						
the biggest environmental challenge	-7.8182***	-5.3566***	-	-	-	-
	(2.9367)	(1.9457)				
the first priority of the United Nations	-	-	-1.2752	2.8081***	-	-
			(0.9066)	(0.8905)		
more efforts by national government	-	-	-	-	-0.7942**	-0.5676**
					(0.3416)	(0.2546)
Mobility potentials						
Local networks	0.2091	0.1502	0.1815	0.0483	0.2525**	0.1899**
	(0.1751)	(0.1025)	(0.1200)	(0.0870)	(0.1253)	(0.0825)
Sexual violence	0.1175	0.1154*	0.1707***	0.2058***	0.2195***	0.1981***
	(0.0780)	(0.0625)	(0.0519)	(0.0472)	(0.0528)	(0.0442)
Local networks and sexual violence	-0.0914	0.2004	0.3354**	0.1840	0.4153***	0.3352***
	(0.2839)	(0.1543)	(0.1505)	(0.1253)	(0.1561)	(0.1149)
Socio-economic characteristics						
Age (less than 24 years old)	0.2392*	0.4351***	0.1972**	0.5042***	0.2007**	0.4745***
	(0.1305)	(0.1036)	(0.0912)	(0.0855)	(0.0927)	(0.0791)
Age (between 25 and 34 years old)	0.4017***	0.6657***	0.3938***	0.5945***	0.3781***	0.5930***
	(0.1009)	(0.0951)	(0.0736)	(0.0745)	(0.0761)	(0.0705)
Age (between 35 and 44 years old)	0.4576***	0.5749***	0.3851***	0.5667***	0.3540***	0.5270***
	(0.1029)	(0.0836)	(0.0737)	(0.0685)	(0.0760)	(0.0646)
Preparatory level of education	0.0421	-0.0236	-0.0214	-0.0362	-0.0761	-0.0796
	(0.1178)	(0.0870)	(0.0804)	(0.0698)	(0.0831)	(0.0656)
Secondary level of education	0.1181	-0.3523***	0.0101	-0.3775***	0.0076	-0.3076***
	(0.1200)	(0.0813)	(0.0768)	(0.0679)	(0.0764)	(0.0632)
Mid-level diploma level of education	0.1811	-0.3483***	0.0894	-0.4877***	0.0754	-0.3391***
	(0.1427)	(0.1002)	(0.0958)	(0.0901)	(0.0928)	(0.0771)
Bachelor's and/or Master's level of education	-0.0859	-0.5265***	-0.1805**	-0.7227***	-0.2097**	-0.5486***
	(0.1311)	(0.0953)	(0.0886)	(0.0825)	(0.0858)	(0.0719)
Married	-0.3553**	-0.3211***	-0.3288***	-0.2287**	-0.2832***	-0.3041***
	(0.1475)	(0.1208)	(0.1020)	(0.1006)	(0.1046)	(0.0921)
Divorced	-0.0105	-0.1396	0.0321	-0.0416	0.0748	-0.1308
	(0.1850)	(0.1918)	(0.1204)	(0.1607)	(0.1244)	(0.1463)
Widowed	-0.3044	-0.6960***	-0.2467*	-0.6598***	-0.2782*	-0.6550***
	(0.2019)	(0.2559)	(0.1459)	(0.2227)	(0.1494)	(0.2157)
Having children	0.0571	-0.1434	-0.0854	-0.1922**	-0.0918	-0.1521*
	(0.1435)	(0.1187)	(0.0989)	(0.0969)	(0.0984)	(0.0912)
Internet use	-0.1193	0.1127*	-0.0178	0.2025***	0.0095	0.1186**
	(0.0963)	(0.0674)	(0.0622)	(0.0626)	(0.0615)	(0.0526)
Living in a rural area	-0.1579*	0.1586**	-0.1031*	0.0361	-0.1372**	0.0658
	(0.0808)	(0.0646)	(0.0552)	(0.0488)	(0.0570)	(0.0451)
Being employed	-0.1061	-0.2005***	-0.0842	-0.2413***	-0.1386**	-0.1841***
	(0.0958)	(0.0574)	(0.0707)	(0.0500)	(0.0701)	(0.0431)
Constant	-0.9527***	-0.5773***	-1.3573***	-1.0513***	-1.0238***	-0.6277***
	(0.2238)	(0.1574)	(0.1067)	(0.1077)	(0.2056)	(0.1605)
Observations	6,467	6,566	6,387	6,501	6,234	6,399
Wald test of exogeneity (χ^2)	12.9600	13.5600	1.4800	14.2500	3.5800	3.9400
	0.0000	0.0000	0.2235	0.0000	0.0585	0.0471

Notes: Less vulnerable countries are: Algeria, Jordan, Kuwait, Morocco and Tunisia. IV-probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

A.10: IV-probit regressions of Equation 3 by gender when agrarian countries are considered

	F Willingness to migrate irregularly	M Willingness to migrate irregularly	F Willingness to migrate irregularly	M Willingness to migrate irregularly	F Willingness to migrate irregularly	M Willingness to migrate irregularly
Climate change as:						
the biggest environmental challenge	35.9306***	-27.6566***	-	-	-	-
	(10.0805)	(7.1698)				
the first priority of the United Nations	-	-	23.1507***	17.5626***	-	-
			(4.5224)	(2.8604)		
more efforts by national government	-	-	-	-	-5.1890***	-4.8810***
					(0.8125)	(0.4827)
Mobility potentials						
Local networks	-0.1508	0.3037	-0.1660	-0.3967**	0.4243**	0.1616
	(0.4581)	(0.2592)	(0.3024)	(0.2014)	(0.2037)	(0.1429)
Sexual violence	0.0751	-0.1435	0.6542***	0.2036	0.1290	-0.0153
	(0.2303)	(0.2134)	(0.1920)	(0.1469)	(0.1135)	(0.1152)
Local networks and sexual violence	1.2504*	-0.2032	0.0068	0.2733	0.6722**	0.5417**
	(0.7103)	(0.5045)	(0.4319)	(0.3380)	(0.3025)	(0.2555)
Socio-economic characteristics						
Age (less than 24 years old)	-0.2652	0.9726***	-0.2021	-0.0667	0.3140	1.4573***
	(0.3965)	(0.3484)	(0.2711)	(0.2565)	(0.1973)	(0.2069)
Age (between 25 and 34 years old)	-0.0924	1.2966***	-0.1141	-0.2629	0.4000**	0.9572***
	(0.3054)	(0.3387)	(0.2153)	(0.2153)	(0.1595)	(0.1547)
Age (between 35 and 44 years old)	-0.3066	0.4375*	0.1529	0.1071	0.1503	0.4324***
	(0.3185)	(0.2242)	(0.2113)	(0.1720)	(0.1555)	(0.1316)
Preparatory level of education	-0.4491	0.1730	-0.1840	0.2694	-0.3225*	-0.1075
	(0.3504)	(0.2625)	(0.2362)	(0.1949)	(0.1778)	(0.1523)
Secondary level of education	-0.6170*	-0.1042	-0.0782	0.1157	-0.0194	-0.0291
	(0.3238)	(0.2224)	(0.2020)	(0.1725)	(0.1479)	(0.1305)
Mid-level diploma level of education	-1.4282**	0.6659*	-0.1981	-0.3746	0.0944	-0.2232
	(0.6071)	(0.3429)	(0.2932)	(0.2278)	(0.2023)	(0.1716)
Bachelor's and/or Master's level of education	-0.6942*	0.2528	0.2353	0.0961	0.2532	0.2375
	(0.4183)	(0.2580)	(0.2445)	(0.1868)	(0.1731)	(0.1456)
Married	-0.1386	-0.6735*	-0.8829***	-0.6760***	-0.6203***	-0.4658**
	(0.4248)	(0.3477)	(0.2985)	(0.2543)	(0.2042)	(0.1951)
Divorced	-0.0410	1.2866**	-0.0030	-0.2692	-0.3000	-0.5637*
	(0.5063)	(0.6215)	(0.3348)	(0.3691)	(0.2423)	(0.2887)
Widowed	-0.8459	-1.8520**	-1.0436**	-1.2816**	-0.4463	-0.6218
	(0.6031)	(0.7197)	(0.4356)	(0.5016)	(0.3076)	(0.4032)
Having children	-1.0110**	0.6689*	0.1720	-0.0204	0.2157	0.2994
	(0.4235)	(0.3817)	(0.2625)	(0.2368)	(0.1938)	(0.1871)
Internet use	0.8112***	0.0330	0.3675**	0.4660***	0.3817***	0.4074***
	(0.2682)	(0.1820)	(0.1620)	(0.1388)	(0.1160)	(0.1043)
Living in a rural area	0.4581*	-0.4655**	0.1272	0.0124	-0.4960***	-0.2896***
	(0.2520)	(0.1982)	(0.1503)	(0.1174)	(0.1283)	(0.0954)
Being employed	-0.1802	-0.1652	0.3663*	-0.2076	-0.0126	0.0742
	(0.2840)	(0.1805)	(0.1905)	(0.1340)	(0.1309)	(0.1044)
Constant	-2.7008***	-0.2739	-2.6489***	-1.7524***	0.8245*	0.6809***
	(0.5218)	(0.3898)	(0.3611)	(0.2527)	(0.4237)	(0.2554)
Observations	4,337	4,442	4,057	4,259	4,061	4,255
Wald test of exogeneity (χ^2)	59.6600	103.3800	83.4500	147.8200	69.0300	218.4000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Agrarian countries are: Egypt, Mauritania, Morocco and Sudan. IV-probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.

A.11: IV-probit regressions of Equation 3 by gender when more vulnerable countries are considered

	F Willingness to migrate irregularly	M Willingness to migrate irregularly	F Willingness to migrate irregularly	M Willingness to migrate irregularly	F Willingness to migrate irregularly	M Willingness to migrate irregularly
Climate change as:						
the biggest environmental challenge	5.5370***	-2.0983	-	-	-	-
	(1.8165)	(1.3743)				
the first priority of the United Nations	-	-	27.8965***	38.4247***	-	-
			(7.5408)	(10.4510)		
more efforts by national government	-	-	-	-	-3.9563***	-4.2250***
					(0.7377)	(0.5097)
Mobility potentials						
Local networks	0.4182***	0.2108**	0.4858	-0.1896	0.6414***	-0.0795
	(0.1439)	(0.0874)	(0.3136)	(0.3626)	(0.2380)	(0.1700)
Sexual violence	0.2302***	0.1983***	0.5671***	0.3201	0.4270***	0.2489**
	(0.0746)	(0.0621)	(0.1663)	(0.2249)	(0.1121)	(0.1052)
Local networks and sexual violence	0.3822**	0.4570***	0.5048	0.8409	0.8730***	0.7066***
	(0.1825)	(0.1314)	(0.4001)	(0.5599)	(0.3191)	(0.2666)
Socio-economic characteristics						
Age (less than 24 years old)	0.3210**	0.4105***	0.0706	-0.3242	0.5033***	1.1597***
	(0.1259)	(0.1010)	(0.2540)	(0.4301)	(0.1874)	(0.1977)
Age (between 25 and 34 years old)	0.0936	0.3158***	0.0445	-0.2431	0.3243**	0.8185***
	(0.1038)	(0.0834)	(0.1927)	(0.3265)	(0.1477)	(0.1458)
Age (between 35 and 44 years old)	-0.0040	0.2219***	0.0552	-0.1415	0.1403	0.4160***
	(0.1110)	(0.0793)	(0.1976)	(0.2860)	(0.1526)	(0.1312)
Preparatory level of education	-0.0894	0.1232	0.0481	0.4082	-0.0884	-0.1121
	(0.1551)	(0.1052)	(0.2634)	(0.3644)	(0.1891)	(0.1645)
Secondary level of education	0.0798	0.0864	0.1941	0.4786	-0.0430	-0.0456
	(0.1176)	(0.0873)	(0.2086)	(0.3135)	(0.1538)	(0.1351)
Mid-level diploma level of education	0.0323	0.1611*	0.2500	-0.0084	0.0254	-0.0569
	(0.1403)	(0.0970)	(0.2647)	(0.3446)	(0.2117)	(0.1790)
Bachelor's and/or Master's level of education	0.1861	0.2975***	0.3388	0.3209	0.3328**	0.2094
	(0.1229)	(0.0876)	(0.2262)	(0.3058)	(0.1671)	(0.1455)
Married	0.1894	-0.2135**	0.0226	-0.4209	-0.2302	-0.5754***
	(0.1203)	(0.1011)	(0.2504)	(0.3982)	(0.1855)	(0.1892)
Divorced	0.4841***	0.0693	0.7474**	-0.7393	0.2466	-0.5381*
	(0.1576)	(0.1801)	(0.3365)	(0.6987)	(0.2395)	(0.3119)
Widowed	0.2986	-0.6392*	0.0748	-0.9907	0.1311	-0.6438
	(0.2045)	(0.3586)	(0.3838)	(0.8515)	(0.2852)	(0.4643)
Having children	-0.3150***	-0.2365**	-0.1763	-0.0777	-0.0204	0.2743
	(0.1129)	(0.1008)	(0.2314)	(0.3739)	(0.1696)	(0.1811)
Internet use	0.3497***	-0.0272	0.4009**	0.7594***	0.4355***	0.2291**
	(0.0918)	(0.0645)	(0.1605)	(0.2848)	(0.1170)	(0.1048)
Living in a rural area	0.0409	0.0698	-0.3004*	-0.1925	-0.2032*	-0.0344
	(0.0773)	(0.0540)	(0.1690)	(0.2027)	(0.1222)	(0.0955)
Being employed	0.1160	0.0241	0.1265	0.0210	-0.0194	0.1567
	(0.0804)	(0.0591)	(0.1580)	(0.2172)	(0.1281)	(0.1055)
Constant	-2.3734***	-1.4051***	-3.1257***	-2.8613***	-0.3863	0.2180
	(0.1635)	(0.1177)	(0.3549)	(0.5214)	(0.4054)	(0.2890)
Observations	5,538	5,752	5,217	5,539	4,118	4,290
Wald test of exogeneity (χ^2)	10.7700	6.6400	51.4100	216.7400	50.2300	163.2000
	0.0010	0.0100	0.0000	0.0000	0.0000	0.0000

Notes: More vulnerable countries are: Egypt, Iraq, Lebanon, Libya, Mauritania and Sudan. IV-probit estimates with the inclusion of individual fixed effects. Standard errors are reported in brackets. A *, ** and *** refers to 10, 5 and 1 per cent significant value, respectively. First stage probit regressions are available upon request to the author.