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**Should we stay or should we go?  
Irregular migration and duration of stay:  
the case of Moldovan migrants**

**Daniela Borodak and Ariane Tichit**

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## **Avertissement :**

Les commentaires et analyses développés n'engagent que leurs auteurs qui restent seuls responsables des erreurs et insuffisances.

**Abstract**

This paper analyses the link between irregular migration and duration of stay. Using household and regional development data from Moldova and running a duration model, we find that duration of migration is longer for illegal migrants than legal migrants. Further investigation demonstrates that this effect is driven by significantly higher migration costs. From a policy perspective, our findings on irregular migration are highly relevant since they question the outcome of restrictive migration policies. This paper, like an increasing number of migration literature papers converging on the same conclusions, contributes further arguments for redefining migration policy.

JEL Classification: F22, K42, J61, C41

Key Words: International migration; Duration model; Irregular migration; Moldova

## 1. Introduction

Over the last few decades, a number of developed countries have implemented political reforms designed to prevent or deter irregular migration while at the same time promoting regular temporary or permanent migration (IOM, 2004; EC, 2005). However, the fact that these attempts to control migration flows influence the migrant's behaviour in terms of decision to migrate and return, duration of stay and the number of trips remains to be ascertained (SOPEMI-OECD, 2008).

In this paper, we use a duration model to empirically investigate the effect of irregularity on the migrant's time spent abroad. Our paper ties into a vast literature on the duration of migration. As highlighted by Hill (1987) and Dustmann (2003), human capital-based theories imply that assimilation in the host country and migration decisions are correlated over time. It is therefore more appropriate to base migration analysis on a dynamic model that integrates the timing factor of migration trips. The best way to investigate the duration and likelihood of an event occurring is to use time-to-event data. However, there is only a limited number of empirical analyses of return migration decisions based on duration models or count data models (e.g. Lindstrom, 1996; Detang-Dessendre and Molho, 1999; Longva, 2001; Dustmann and Kirchkamp, 2002; Constant and Zimmermann, 2003; Constant and Zimmermann, 2011; Carrión-Flores, 2006; Bijwaard, 2010) due to the lack of reliable large-scale quantitative data.

We consider the case of migrants from Moldova. This country is of particular interest, because it experienced high levels of mass migration and ranks first place worldwide among top remittance-recipient countries due to one of the deepest and most prolonged economic recessions of all the transition countries (Ratha and al. 2007). Mid-2006 figures suggest that approximately a quarter of the economically-active population was occupied abroad: one in four migrants travel illegally to the host country, and one in three face illegal residence or employment status (Lucke et al., 2007). A large body of empirical research, using several microeconomic survey datasets collected in Moldova, has given key insight into the determinants governing migration decision, type of migration movements, and migrants' remittances.<sup>1</sup> However, there has been little research into the determinants of return migration and duration of labour migration from Moldova. The exceptions, which include Goerlich and Trebesch (2008), Pinger (2010)<sup>2</sup> and Borodak and Piracha (2011), suggest that temporary migrants represent a significant and growing share of Moldovan emigrants. According to Goerlich and Trebesch (2008), over 40% of Moldova's international migrants in 2004 were temporary, whereas Pinger (2010) suggests the figure for 2006 was closer to 70%. Pinger (2010) uses a definition of

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<sup>1</sup> List of available datasets and surveys on Moldovan migration: Moldovan Labor Force Survey (LFS) spanning 1999-2008; Moldovan Household Budget Survey (HBS) spanning 1998-2008; Survey data on remittance recipient households retrieving their money at banks 2007; Survey of members of Savings and Credit Associations 2007; Survey on potential and returning migrants, Moldova 2006; National representative household surveys: "CBS-AXA 2004", "CBS-AXA 2006" and "AMM 2003". Shortlist of empirical research on Moldovan migration: Avato, 2009; Goerlich and Trebesch, 2008; Mosneaga 2007; Orozco, 2008; Hagen-Zanker and Siegel, 2007; Lücke et al., 2007; Parsons et al., 2007; Pinger, 2007; Cuc et al., 2005; AMM-ILO, 2004; Ghencea and Gudumac, 2004; Pyshkina, 2002.

<sup>2</sup> Goerlich and Trebesch (2008) and Pinger (2010) propose empirical studies of temporary *versus* permanent migration based on the "CBS-AXA 2004" and "CBS-AXA 2006" datasets, respectively.

temporary migration that is based on incentives of the migrant rather than duration of migration. Borodak and Piracha (2011) focus on the determinants of return migration. Although all three of these studies shed light on the different forms of migration (seasonal, temporary, permanent, return), none of them have analyzed migration duration *per se*.

This paper's contribution to the literature is twofold. First, our work is one of the few studies to shed new light on the importance of legal status and costs of migration on migration duration. To our knowledge, there is only one other empirical study that uses a duration model to capture the effects of migrant legal status on duration of migration – Lindström (1996), using Mexican data – making our paper only the second contribution of this type in the literature. Second, it combines individual-level and regional-level determinants of migration duration, as we use a unique national household dataset on migration collected in 2006 in Moldova, complemented with regional development indicators from Roscovan and Galer (2006). Few studies analyzing migration issues in transition countries integrate inter-regional disparities in the home countries. Fidrmuc (2004) explores the link between migration and regional adjustment to idiosyncratic shock in the home countries, while Coulon and Piracha (2005) incorporated a regional development dimension into their study on the performance of return migrants.

The paper is organized as follows. Section 2 gives a short overview on the related literature. Section 3 describes the datasets and gives descriptive statistics in terms of personal, household and community characteristics. Section 4 reports the results of a duration model and goes on to analyze the determinants of migration duration and discuss the empirical findings. Section 5 concludes.

## **2. Framework for analysis**

Do irregular migrants return home sooner or later than their documented counterparts? Recent economic literature links the migrant's legal status to migration costs. The general idea is that irregular migrants face higher costs of migration, earn less money, face the risk of being evicted from the host country, and have fewer possibilities to re-enter the country, making them more prone to stay abroad for longer. Hill (1987) shows that theoretically higher costs will increase mean duration of stay. In the same vein, Djajic and Milbourne (1988) and Lindström (1996) reported empirical results implying that duration of migration will decrease if migration costs decline. The evolution of border control policies in the 2000s, generating higher costs for potential migrants, prompted Magris and Russo (2003, 2009) and Constant and Zimmermann (2011) to conclude that more restrictive destination-country migration policies create a longer optimal duration of migration. Reichert and Massey (1984) cite this mechanism to explain the longer migration durations of illegal Mexican migrants to the USA. For Reyes (2004), longer migration is due to higher migration costs, as it takes longer for immigrants to achieve their targeted level of income. The pattern may also be due to the fact that illegal Mexican migrants earn 30% less than their legal counterparts in the United States (see Ribera-Batiz, 1999). These arguments all lead into our main hypothesis:

*Hypothesis 1: Irregular migrants face higher migration costs and have longer duration of stay.*

In order to run an empirical test on this hypothesis, we need to consider the other potential determinants of a migrant's duration of stay, as highlighted in economic literature, i.e. the economic and social motivations that influence migrant decision at individual, household or regional levels.

Looking at the economic factors, we focus in on wage differential effects. If we refer to the standard Harris and Todaro (1970) model, we can expect duration of migration to increase with wage differentials. Conversely, target income theory predicts duration migration to decrease with wage differentials: if migrants are pursuing a savings or income target, then the faster they reach it, the sooner they will come back (Hill, 1987; Lindström, 1996). Using micro-data for Germany, Dustmann (2003) expands on the hypothesis developed in Dustmann and Kirchkamp (2001) to empirically test the following hypothesis: optimal migration duration may decrease if the wage differential widens. As the target income theory provides the starting point for recent literature analyzing duration of migration, we adopt the same approach here. We then posit that:

*Hypothesis 2: Migrants reduce their migration duration in response to higher wages differentials between the destination and home countries.*

Since Berg (1961), the economics literature has considered regional development of the origin communities as a major determinant of duration of migration. However, Berg's hypothesis, implying that the level of "modernity" of the origin community reduces duration of migration, has been challenged in the empirical literature. Lindström (1996) shows that migration duration increases with higher investment opportunities in the home country, as it takes more time for the migrant to reach the target savings. Lindström suggests that immigrants from communities with better economic opportunities stay longer in the United States than immigrants from economically-poor communities because they are saving more money to invest back home. Migrants coming from less developed areas have lower income and savings targets, and so return sooner. Reyes (2001) reported the same pattern of results for Mexican migrants. Both these arguments lead to a positive relationship between economic dynamism of the migrant's origin region and duration of stay abroad.

*Hypothesis 3: Regional development in the home community has a positive impact on the migration duration.*

Looking at the social factors, we focus on family ties and network effects. Here, family ties are considered the link between the migrant and the family members who stay behind, whereas social networks represent the link to key knowledge and family members who have already experienced migration.

Inspired by descriptive literature dating from the 1970s on migrants from Mexico to the USA, Hill (1987) makes the assumption that migrants have an "exogenous" preference for their home country: Several case studies indicate that Mexican migrants "return home because of the presence of family members in Mexico, a dislike of the U.S. climate, and a preference for Mexican culture and

life-style". In the same vein, Dustmann and Kirchkamp (2001) explain preference for home country by an attachment to the family. Attachments to family and to institutions in the home country lower the psychological and monetary cost of the return and raise the costs of staying abroad.

Access to social, formal and informal networks shortens the duration of foreign trips by allowing migrants to diminish implicit or nonmonetary migration costs (Massey, 1990; Bauer and Gang, 1998; Zahniser, 1999; Palloni et al., 2001; Lindstrom and Lauster (2001); Cassarino 2004; Reyes, 2004; van Dalen et al. 2005). This leads into our fourth hypothesis:

*Hypothesis 4: Migrants with stronger family ties and larger social networks move for shorter duration spells.*

To test our different hypotheses, we need to combine two types of dataset: a microeconomic dataset capturing the individual and household characteristics of migrants, and a regional-scale dataset that we present in the next section.

### **3. Data description**

#### *3.1. Data sources*

We use two datasets: the first is a national representative household survey (CBS-AXA 2006), while the second is a set of indicators of regional development in Moldova developed by Roscovan and Galer (2006). These data enable us to integrate individual, household and community characteristics into the Moldovan migrant model of migration duration.

The national representative household survey was conducted in Moldova by private survey company CBS-AXA in July and August of 2006. The survey was commissioned by the International Organization for Migration (IOM) with the support of the Swedish International Development Agency (SIDA). The survey was designed to study the impact of migration and remittances on Moldovan households.<sup>3</sup> The data were collected from all 35 Moldovan regions. The total 3940 households, all randomly selected, generated a total sample of 14,068 people, including 3,722 (26.46%) aged between 16 and 65 with migration experience abroad. We define migrants as people who have worked and lived away from home for at least one month. Return migrants are defined as people who had returned home at the time the survey was led. As we had no information on why the migrants came home, we have to make the assumption that all returns are voluntary, and thus suppose that it was an optimal choice. Near 28% of total migrants in our sample are returnees. For those who were still abroad at the time of the survey, the questions were answered by members of the family. Starting from the original sample of 3,722 adult migrants, a screening selection for valid answers on migration duration and legal status led us to a final sample of 939 migrants. Descriptive statistics on the whole adult group, the sub-sample of migrants and the sample used in the econometric analysis are documented in the separate appendix. The figures show significant differences between the groups. Hence, the sub-sample for which there was information on

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<sup>3</sup> See cf. Lücke et al. (2007) for a more in-depth look at the survey.



both duration of migration and legal status is not representative of the adult migrant population. The results of our study cannot therefore be generalized to the Moldovan migrants.

The data on regional development in Moldova comes from Roscovan and Galer (2006). We use three summary indicators – i.e. economic, social and infrastructure development indexes – as proxies for level of regional development. A separate appendix to the paper documents the details on these data.

### 3.2. Dependent variable

Average duration of the migration spells is the dependent variable in this study. Of the 939 migrants (Table 1), 48% are seasonal migrants, i.e. migrants whose duration of stay is shorter than three months. 72.57% are migrants who were still abroad at the time of survey (censored migrants), and 27.43% are return migrants.<sup>4</sup>

**Table 1** Length of stay of Moldovan migrants (duration in months).

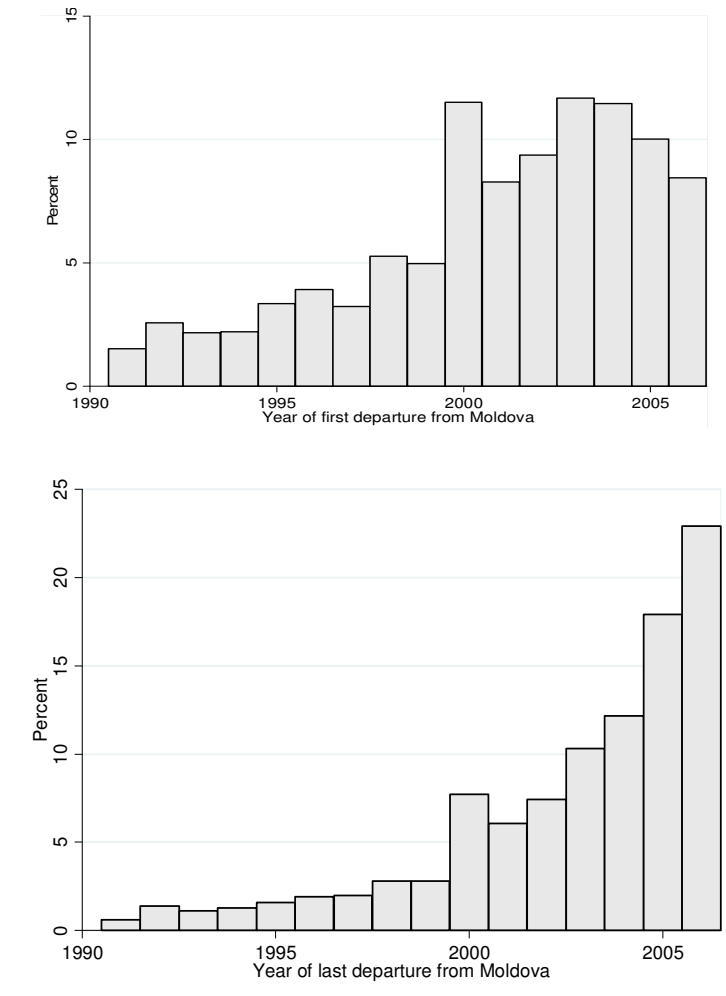
	<i>All</i>		<i>Legal experience</i>		<i>Illegal experience</i>	
	Mean	SD	Mean	SD	Mean	SD
<i>Duration</i>	19.96	33.64	20.23	36.40	19.02	23.84
return migrants	6.73	7.62	5.98	5.99	9.36	11.36
censored migrants	25.22	38.23	26.33	41.80	22.19	25.94
<i>Median duration</i>	6		5		10	
return migrants	4		3		5	
censored migrants	8		6		12	
<i>Number (%) of Observations</i>						
return migrants	267 (28.43)		208 (29.71)		59 (24.69)	
censored migrants	672 (72.57)		492 (70.29)		180 (75.31)	
<i>Number (%) by Duration</i>						
less than 12 months	695 (74.01)		537 (76.71)		158 (66.11)	
13 to 24 months	69 (07.35)		36 (05.14)		33 (13.81)	
more than 24 months	175 (18.64)		127 (18.14)		48 (20.08)	
All Migrants: Number (%) of observations	939 (100)		700 (74.54)		239 (25.45)	

Source: CBS-AXA 2006 dataset and authors' calculations.

As Fig. 1 shows, the merging of late years of departure from Moldova into the survey (after 2000) partly explains the high percentage of unreturned migrants in the dataset.

**Fig. 1** Frequency of first and last departure from Moldova per year

<sup>4</sup> For migrants who did not report duration periods, we constructed this variable using the information available on each individual's time of migration, return, and number of trips.



If we divide the sample of movers into categories based on their length of stay abroad (Table 1), we find that 66% of those who had some experience of illegal migration and 76.7% of the others were abroad for less than a year. For those who were abroad less than two years (but more than one year), the proportion of migrants with undocumented migration experience is larger (13.8%) than the proportion of migrants with only legal experience (5%). However, these descriptive statistics are insufficient to capture the relationship between legal status and duration, as they include both migrants who had already returned to Moldova as well as migrants who had not yet finished their migration episode at the time of the survey. The duration model used in the next section corrects for this truncation bias and will allow us to conclude on the effect of legal status and other covariates on duration of stay abroad.

### 3.3. Covariates

In order to test our first hypothesis, three dummy variables are accessible through the CBS-AXA dataset to account for migrant legal status: illegal experience (25% of our sample), illegal entry in the destination country (21%), and illegal first job (26%). As these variables are highly correlated, we introduce them separately in the regressions and keep the most significant one. We also introduce a dummy variable that accounts for dual Romanian citizenship. Moldovan migrants holding a Romanian passport actually have visa-free travel rights to the EU for three months at a time. These profiles represent

3% of our sample, and the majority of them work in non-EU countries. In contrast, travel to Commonwealth of Independent States (CIS) countries is generally visa-free, and the frequency of illegal migration to this region is low. Only 25% of migrants working in CIS countries declared that they had illegal experience, whereas the proportion of migrants with illegal experience in EU countries reaches the 41% mark. Being irregular in the CIS or in the EU may well have different consequences. Therefore, in the empirical strategy, we introduce an interaction variable combining status and destination dummies to test this assumption.

As mentioned in section 2, legal status is part of migration costs. The CBS-AXA 2006 survey offers a direct measure of the migration costs in the dataset: total money spent to cover migration, and whether the migrant needed to borrow money. Unfortunately, these questions were not routinely informed for our sample of 939 migrants. This prompted us to deploy a two-step econometric estimation strategy. In step one, we run regressions on the subsample for which we have duration and legal status data (939 individuals), and in step two, we run estimations on the sub-sample of migrants for whom we also have costs and borrowing data (649 individuals). The statistics presented in Table 2 describe the link between legal status, migration costs, and borrowing needs.

**Table 2** Summary statistics on legal status, migration costs, and borrowing needs

	<i>Illegal migrants</i>	<i>Legal migrants</i>	<i>Total</i>
<b>Borrowers (Number of observations)</b>	<b>73</b>	<b>128</b>	<b>201</b>
Mean cost of migration, US \$	1669	958	1216
Median cost of migration, US \$	1500	150	300
Standard deviation	1480	1395	1463
<b>Non borrowers (Number of observations)</b>	<b>109</b>	<b>339</b>	<b>448</b>
Mean cost of migration, US \$	879	476	574
Median cost of migration, US \$	111	74	74
Standard deviation	1319	1100	1169
<b>All (Number of observations)</b>	<b>182</b>	<b>467</b>	<b>649</b>
Mean cost of migration, US \$	1196	608	773
Median cost of migration, US \$	290	80	100
Standard deviation	1435	1206	1301

Two main results emerge from this table. First, illegal migrants face two-fold higher migration costs than legal migrants (nearly 1200 US\$ for illegal migrants versus 600 US\$ for legal migrants). Second, a larger proportion of irregular migrants need to borrow to finance the trip to the destination country (almost 40% of illegal migrants are borrowers compared to only 27% of legal migrants). The combination of these facts implies that irregular migrants need to repay more for migration than legal migrants.

Table 3 gives the definitions and basic descriptive statistics of the other variables used in the analysis. To test hypothesis 2, we need data on wages in the host and home countries, but unfortunately, the dataset does not contain these variables. However, like Dustmann and Kirchkamp (2001), we do use a number of factors as proxies of the relative productivity of a particular migrant, i.e. gender, age at first migration trip, level of education, problems with host country language, destination, and type of location

abroad (rural or urban).<sup>5</sup> Level of education before emigration and age at first migration (mean migrant age is 31.65) should be positively related to the migrant's earnings potential. Conversely, women (38%) and migrants who do not speak the destination-country language (13%) are assumed to have a lower relative wage abroad. We also expect that migrants employed in an EU country (8%) would have a relatively higher wage abroad than a migrant working in a non-EU country. Migrants working in the CIS (36%) are assumed to have the lowest relative wages. Moreover, as documented in Lücke et al. (2007), wages are highly dependent on gender and location abroad. To capture this joint effect, we also introduce an interaction term between gender and destination. Furthermore, migrants working in town or cities (44%) in the destination country are also assumed to have higher earnings abroad. As Lindström (1996) suggests, compared with the agricultural sector, urban labour markets provide migrants with a greater variety of jobs. Three indicators relative to social, infrastructure and economic development (SDI, IDI and EDI) are used to test the potential impact of regional development of the origin community on the duration of migration (hypothesis 3). Since the levels of economic, social and infrastructural development are correlated, we introduce them separately in the regressions. This is achieved by generating dummy variables for each of these indicators, separating "depressed regions" from "developed regions" compared to the two main cities of Moldova.<sup>6</sup> We also introduce dummy variables for the geographical zones of Moldova (Center, North and South) to account for other differences between regions. Finally, we use four variables as proxies for family ties (hypothesis 4): proportion of dependents, and the migrant's position in the family unit (household head, spouse or child).

**Table 3** Definitions of variables and their descriptive statistics.

<i>Variable</i>	<i>Definition</i>	<i>Mean</i>	<i>SD</i>
<b>Individual Characteristics</b>			
Gender	1 if the migrant is a woman, else 0	0.38	0.49
Age	Age at first migration trip	31.65	9.75
Primary	1 if the migrant has no or primary education, else 0	0.36	0.48
Tertiary	1 if the migrant has secondary or tertiary education, else 0	0.39	0.49
University	1 if the migrant has university education, else 0	0.19	0.40
Post-university	1 if the migrant has post-university education, else 0	0.05	0.23
Romanian	1 if the migrant has dual Romanian citizenship, else 0	0.03	0.16
<b>Household Characteristics</b>			
Dependents	Proportion of dependents in the household	0.20	0.20
Hh head	1 if the migrant is the household head, else 0	0.36	0.48
Hh hd's spouse	1 if the migrant is the household head's spouse, else 0	0.18	0.38
Hh hd's child	1 if the migrant is the household head's child, else 0	0.16	0.36
Hh wealth decline	1 if the household's subjective perception is that their wealth deteriorated between 1998 and 2006, else 0	0.35	0.48
<b>Social Capital</b>			
Other migrants	Number of other migrants in the household	1.95	1.60
Network	1 if the migrant received help from contacts abroad, else 0	0.62	0.49

<sup>5</sup> Dustmann and Kirchkamp (2001) use two proxies to account for the relative productivity of a particular migrant: education before emigration and occupational class upon arrival to the host country.

<sup>6</sup> See the separate appendix for more detailed information on these variables.

<b>Destination Country Characteristics</b>			
EU	1 if the migrant works in an EU country <sup>7</sup> , else 0	0.08	0.27
CIS	1 if the migrant works in the CIS <sup>8</sup> , else 0	0.37	0.48
Other	1 if the migrant works in other countries, else 0	0.55	0.50
Urban destination	1 if the migrant works in an urban location, else 0	0.45	0.50
<b>Home Country: Community and Regional Characteristics</b>			
Urban origin	1 if the migrant arrived from an urban location, else 0	0.30	0.46
Locality size	1 if the migrant arrived from a locality with more than 50000 inhabitants, else 0	0.11	0.31
North	1 if the migrant is arrived from the Northern region, else 0	0.28	0.45
Centre	1 if the migrant is arrived from the Central region, else 0	0.46	0.50
South	1 if the migrant is arrived from the Southern region, else 0	0.26	0.44
SDI	Social development index (min -1.63 and max 5)	0.63	1.83
IDI	Infrastructure development index (min -1.59 and max 1.3)	0.16	0.68
EDI	Economic development index (min -1.06 and max 2)	0.28	0.92
<b>Migration experience</b>		<b>Migration experience</b>	
Illegal exp.	1 if the migrant had illegal migration experience, else 0	0.25	0.44
Illegal entry	1 if the migrant gained illegal entry into the dest. country, else 0	0.21	0.41
Illegal f. job	1 if the migrant had an illegal first job in the dest. country, else 0	0.26	0.44
No language	1 if the migrant did not know the language of the destination country before migration, else 0	0.13	0.34
Observations	Observations	939	
Households	Households	762	

#### 4. Analysis

The duration models used in our analysis assume a baseline hazard function. This function corresponds to the hazard when all covariates are zero. Equation (1) depicts the effect of covariates on this hazard:

$$h(t) = h_0(t)\mu \quad \text{with} \quad \mu = \exp(\beta X) \quad (1)$$

The intercept term  $h_0$  serves to scale the baseline hazard,  $X$  is a vector of regression covariates. When  $x=0$ ,  $\mu=1$  and  $h(t)=h_0$ .

The corresponding survival function, i.e. the cumulated time before failure, is the following:

$$S(t) = \exp[-h_0(t)\mu] \quad (2)$$

In order to simplify the interpretation of the effects of the covariates on duration, the survival function (equation 2) is specified in accelerated failure time corresponding to a linear function between the natural logarithm of the survival time and the covariates:

$$\ln t = \beta x + z, \text{ or } t = \mu \exp(z) \quad (3)$$

where  $t$  is the survival time and  $z$  is the error with density  $f()$ . The distributional form of the error term determines the regression model. If we let  $f()$  be the normal density, the lognormal regression

<sup>7</sup> EU countries in the CBS-AXA survey include Austria, Belgium, the Czech Republic, France, Germany, Greece, Ireland, Italy, Poland, Portugal, Slovenia, Spain, and the United Kingdom.

<sup>8</sup> CIS countries in the CBS-AXA survey include Russia, Belarus, Ukraine, Kazakhstan, and Azerbaijan.

model is obtained. Similarly, if we let  $f()$  be the logistic density, the log-logistic regression is obtained. Setting  $f()$  equal to the extreme-value density yields both the exponential and the Weibull regression models.

From the accelerated failure time model, it is possible to calculate time ratios ( $\exp(\beta) = \frac{t_i}{t_j}$ )

which are quite similar to marginal effects and hence very convenient to interpret.<sup>9</sup> This is the presentation of the results we propose in Table 5. In model 1 for example, the time ratio for the gender dummy equals 1.43. This means that duration of migration is 43% longer for a woman than for a man.

Moreover, duration models allow the effect of the time already spent itself to have an effect on survival time. For example, we can think that when a migrant has already spent two years abroad, he/she is more prone to return. The Weibull function in particular allows this possibility. Its baseline hazard is shown through equation (4):

$$h_0(t) = pt^{p-1} \tag{4}$$

Hence, its hazard function is:

$$h(t) = pt^{p-1}\mu \tag{5}$$

and hence the corresponding survival is:

$$S(t) = \exp[-pt^{p-1}\mu] \tag{6}$$

In equation (6), when  $p > 1$ , the time already spent abroad decreases the duration, and when  $p < 1$ , the time already spent abroad increases the duration. The results of the Weibull model presented at the bottom of Table 5 show that in our sample, time already spent abroad decreases the duration of migration, as the estimated  $p$  parameter is greater than one.

Furthermore, we suspected that our sample contained unobserved heterogeneity: as time goes by, most returning individuals will disappear from the dataset, leaving a more homogeneous population comprising only those who are less likely to return home. The way to correct for this kind of heterogeneity is to introduce, at the level of an observation or group of observations, an unobservable multiplicative effect,  $\alpha$ , on the hazard function, known as a “frailty effect”, such that:

$$S(t | \alpha) = \{S(t)\}^\alpha \tag{7}$$

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<sup>9</sup> Quoting Jenkins (2005), note that:  $\beta_k = \frac{\partial \ln t}{\partial X_k}$  with  $t = \mu \exp(z)$ . Therefore, if two persons  $i$  and  $j$  are identical in all but the  $k^{\text{th}}$

characteristics, i.e.  $X_{im} = X_{jm}$  for all  $m \in \{1, \dots, K\}$ , and have the same  $z$ , then  $\frac{t_i}{t_j} = \exp[\beta_k (X_{ik} - X_{jk})]$ . If, in addition,  $X_{ik} -$

$X_{jk} = 1$ , i.e. there is a one unit change in  $X_k$  ceteris paribus, then  $\exp(\beta) = \frac{t_i}{t_j}$ .

where  $S(t)$  is the survivor function. Since  $\alpha$  is unobservable, we have to suppose that it follows a parametric distribution. Two functions are commonly used: the Gamma and the inverse Gaussian.

As reported in Table 4, we estimate the model with all available distributions (Exponential, Weibull, Gompertz, Log-normal, Log-logistic and Cox) and test corrections for heterogeneity using Gamma and inverse Gaussian functions at individual level and household level. The most powerful model, with lower BIC and AIC values, is a Weibull model with a Gamma distribution for unobserved household heterogeneity.

**Table 4.** Comparison of models for migration duration: Moldovan migrants, 2006

	<i>Inverse Gaussian distribution</i>		<i>Gamma distribution</i>	
	AIC	BIC	AIC	BIC
<b>Models with correction for unobserved household heterogeneity</b>				
Weibull	1293.985	1376.346	1259.856	1342.218
Exponential	1333.565	1411.082	1328.886	1406.403
Log-logistic	1270.713	1353.075	1268.723	1351.085
Log-normal	1316.46	1398.822	1314.411	1396.773
Gompertz	1315.841	1398.203	1315.626	1397.988
Cox	-----a	-----a	-----a	-----a
<b>Models with correction for unobserved individual heterogeneity</b>				
Weibull	-----a	-----a	1289.829	1372.191
Exponential	1341.262	1418.779	1337.943	1415.46
Log-logistic	1286.183	1368.545	1284.534	1366.896
Log-normal	1326.034	1408.396	1325.832	1408.194
Gompertz	1316.186	1398.548	1316.186	1398.548
Cox	-----a	-----a	-----a	-----a

Note: <sup>a</sup> Model unable to achieve convergence

Table 5 contains the results of the duration model estimations. Model 1 contains all potentially influential covariates. Model 2 includes only the significant variables and is used to generate the predictions and conclusions. Models 3 and 4 test for alternative proxies for irregular migration. Model 5 takes into account the potential effect of being an irregular migrant in an EU country. Models 6 to 8 introduce migration costs variables and are therefore estimated on a reduced sample (according to valid available data on migration costs).

**Table 5.** Time ratio estimates for duration regression models using Weibull distribution with Gamma correction for unobserved household heterogeneity.<sup>10</sup>

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>	<i>Model 7</i>	<i>Model 8</i>
	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>
<b>Individual Characteristics</b>								
Gender	1.43** (2.35)	1.34** (2.20)	1.31** (2.07)	1.28* (1.90)	1.37** (2.37)	1.42** (2.24)	1.35* (1.92)	1.37** (1.99)
Age	1.03 (0.91)							
Age squared	1.00 (-1.42)							
Tertiary	1.10 (0.83)							
University	1.06 (0.38)							
Post-university	1.26 (0.94)							
Romanian	2.79** (2.21)	2.58** (2.02)	2.49** (1.99)	2.41* (1.90)	2.61** (2.02)	2.30* (1.79)	2.26* (1.81)	2.15* (1.71)
<b>Household Characteristics</b>								
Dependents	0.44*** (-3.06)	0.55** (-2.46)	0.56** (-2.49)	0.54*** (-2.68)	0.53*** (-2.64)	0.63* (-1.71)	0.74 (-1.14)	0.76 (-1.05)
Hh head	0.05*** (-11.54)	0.04*** (-12.90)	0.04*** (-13.23)	0.05*** (-12.58)	0.04*** (-12.98)	0.06*** (-10.46)	0.08*** (-7.95)	0.08*** (-7.69)
Hh hd's spouse	0.05*** (-13.25)	0.05*** (-13.70)	0.05*** (-13.91)	0.06*** (-13.05)	0.05*** (-13.71)	0.07*** (-10.59)	0.08*** (-8.47)	0.09*** (-8.16)
Hh hd's child	0.06*** (-12.74)	0.06*** (-12.71)	0.06*** (-12.93)	0.07*** (-12.13)	0.06*** (-12.73)	0.09*** (-9.25)	0.11*** (-7.33)	0.12*** (-6.92)
Hh wealth decline	1.31** (2.33)	1.35*** (2.64)	1.37*** (2.79)	1.38*** (2.87)	1.33** (2.46)	1.76*** (4.33)	1.65*** (3.85)	1.67*** (3.93)
<b>Social capital</b>								
Other migrants	1.07 (1.25)							
Network	1.05							

$$^{10} \beta = \frac{T_i}{T_j}$$



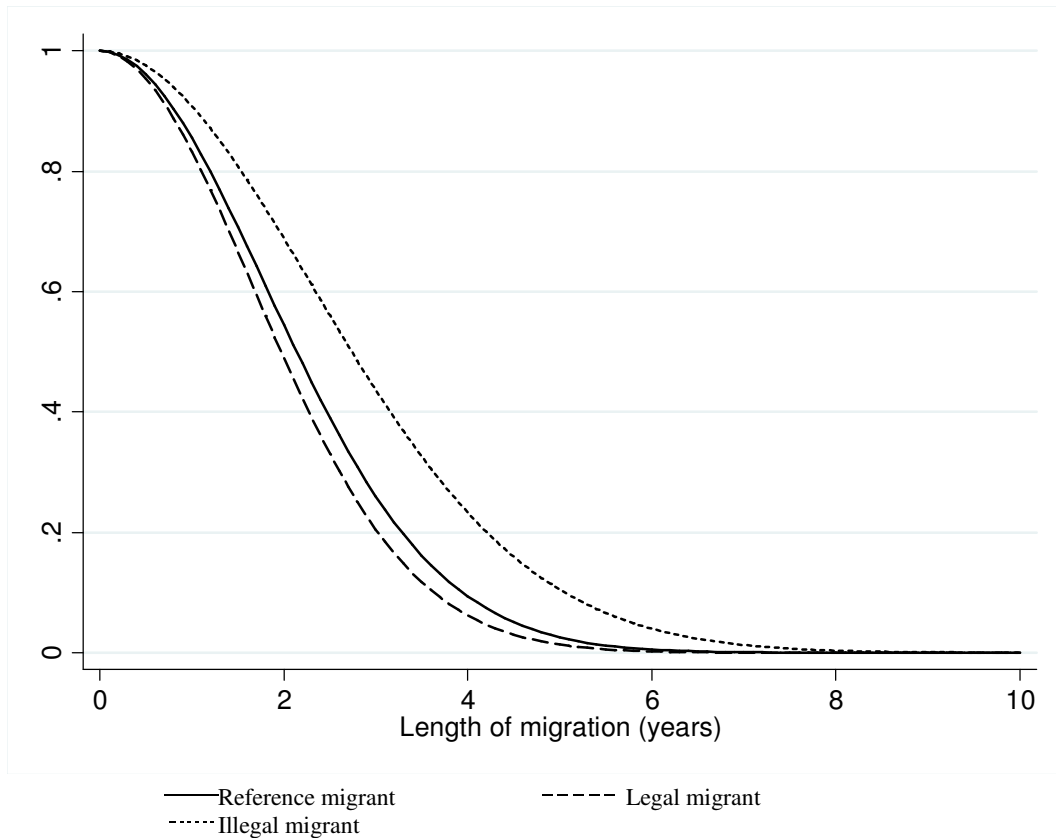
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>	<i>Model 7</i>	<i>Model 8</i>
	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>
	(0.43)							
<b>Destination Country Characteristics</b>								
EU	1.93** (2.02)	1.88*** (2.64)	1.94*** (2.80)	1.97*** (2.88)	1.48 (1.44)	2.49*** (3.55)	1.69* (1.94)	1.75** (2.06)
CIS	0.96 (-0.16)	0.90 (-0.61)	0.89 (-0.70)	0.95 (-0.28)	0.93 (-0.40)	0.53*** (-2.72)	0.58** (-2.35)	0.56** (-2.49)
Urban destination	0.88 (-0.57)							
<b>Home Country: Community and Regional Characteristics</b>								
Urban origin	1.23 (1.48)							
Locality size	1.37 (1.27)							
Centre	0.94 (-0.45)							
South	0.83 (-1.30)	0.79* (-1.86)	0.78** (-1.99)	0.83 (-1.60)	0.80* (-1.76)	0.80* (-1.71)	0.82 (-1.59)	0.80* (-1.74)
Socially depressed regions	1.31* (1.68)	1.20 (1.64)	1.21* (1.76)	1.24** (2.03)	1.21* (1.75)	1.09 (0.75)	1.10 (0.85)	1.08 (0.67)
Socially developed regions	0.91 (-0.59)							
<b>Migration experience</b>								
Illegal exp.	1.37** (2.35)	1.37** (2.40)			1.26* (1.66)	1.29* (1.88)	1.19 (1.26)	1.17 (1.16)
Illegal entry			1.31** (2.01)					
Illegal f. job				1.03 (0.25)				
No language	1.42* (1.87)	1.43* (1.90)	1.46** (2.11)	1.65*** (2.81)	1.47** (2.06)	1.23 (1.11)	1.11 (0.53)	1.11 (0.56)
EU*Gender	0.74 (-0.80)							
CIS*Gender	0.58** (-2.33)	0.64** (-2.11)	0.66* (-1.95)	0.67** (-1.97)	0.61** (-2.29)	0.53*** (-2.72)	0.58** (-2.35)	0.56** (-2.49)

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>	<i>Model 7</i>	<i>Model 8</i>
	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>	<i>Time Ratio (t)</i>
Illeg.status x UE					2.12*			
					(1.78)			
Costs of migration							1.00***	1.00**
							(4.19)	(2.49)
Borrower							0.86	0.76**
							(-1.34)	(-2.02)
Costs x borrower								1.00*
								(1.69)
Constant	93.90***	153.80***	151.74***	130.34***	151.70***	98.67***	72.90***	71.70***
	(7.37)	(20.27)	(20.89)	(19.27)	(20.34)	(15.93)	(11.74)	(11.29)
Number of obs.	935	939	955	937	939	649	649	649
Number of households	759	762	771	757	762	547	547	547
Number of failures (%)	267 (28.43)	267 (28.43)	273 (28.59)	275 (29.35)	267 (28.43)	210 (32.36)	210 (32.36)	210 (32.36)
P	1.91***	1.94***	1.98***	2.04***	1.97***	1.93***	2.00***	2.02***
	(8.47)	(8.67)	(9.36)	(9.16)	(8.75)	(7.56)	(6.95)	(6.88)
Theta	1.99***	2.29***	2.36***	2.49***	2.34***	1.65**	1.70*	1.75*
	(3.24)	(4.14)	(4.63)	(4.66)	(4.29)	(1.99)	(1.75)	(1.82)
chi <sup>2</sup>	235.04***	212.66***	222.19***	209.51***	215.89***	146.41***	167.43***	170.39***
AIC	1262.55	1259.86	1277.07	1270.96	1258.63	931.43	914.40	913.44
BIC	1407.77	1342.22	1359.72	1353.29	1345.84	1007.51	999.44	1002.95

Notes: \* prob. <0.01; \*\* prob. <0.005; \*\*\* prob. <0.001

The estimated  $p$  value shows a negative dependency of duration of stay with time already spent abroad.<sup>11</sup> Figure 2 shows that it is extremely unlikely a typical Moldovan will spend more than six years in the host country.

**Figure 2.** Weibull survival regression with Gamma household heterogeneity



In Figure 2, the solid line (derived by centering all of the continuous and dummy covariates on their respective means) represents the length of migration experienced by a typical migrant. The survival decreases rapidly over the first three years before flattening out abruptly at around the four-years mark to reach roughly zero thereafter. The predicted model thus concludes that a very small proportion of Moldovan migrants should stay abroad after four years of migration, even if the maximal observed duration in our sample is 15 years.

In Figure 2, the dashed line above the survival plot for a typical migrant is the estimated survival for illegal migrants. The graph highlights how illegal status in the foreign country increases the duration of the optimal stay.

<sup>11</sup> For a definition of  $p$  see above, equations (4), (5) and (6).

**Table 6.** Predicted mean and median durations at covariate sample means for return/censored and legal/illegal migrants

<i>All</i>	<i>All</i>	<i>Return migrants</i>	<i>Censored migrants</i>
Nb. Obs.	939	267	672
Predicted mean duration (months)	60.46	13.70	79.04
Predicted median duration(months)	57.12	12.94	74.68
<b>Legal migrants</b>			
Nb. Obs.	700	208	492
Predicted mean duration (months)	52.84	12.97	69.70
Predicted median duration (months)	49.92	12.25	65.85
<b>Illegal migrants</b>			
Nb. Obs.	239	59	180
Predicted mean duration (months)	82.78	16.28	104.58
Predicted median duration (months)	78.21	15.39	98.81

An interesting outcome of the duration models is the prediction of potential length of migration for censored observations (72% of migrants in model 2). According to Table 1, the uncompleted mean migration duration is 25 months (i.e. just over 2 years). Model 2 predicts that the real duration for this subpopulation should be about 5 years. The contrast is equally striking between illegal and legal migrants. While documented migrants have a predicted mean duration of nearly 4½ years, illegal migrants are likely to spend nearly seven years abroad. If illegal status is a proxy for more expensive migration costs, lower earnings or lower net benefits of migration, then it can explain this result. We test this hypothesis in the second part of the econometric analysis (Models 6 to 8 of Table 5). We now turn to the interpretation of the results on the whole sample.

Model 1 rejects the influence of some potential factors. Individual characteristics such as age at first migration and education level do not have an effect on time spent abroad. Similarly, established networks have no effect on length of migration stay. Looking at destination country-focused characteristics, CIS and urban areas do not attract migrants for longer durations than other areas. Concluding on non-significant variables, migrants from the centre of Moldova and from urban regions do not seem to show singular patterns of migration behaviour. On the other hand, most of the foreseeable factors do have an influence on time spent abroad.

Model 2 contains only significant covariates and includes a dummy variable accounting for illegal migration experience in the destination country (hypothesis 1). Model 3 contains a dummy for illegal entry into the destination country and Model 4 considers the impact of a first illegal job on duration of stay. Each of these potential indicators of illegality increases the time spent abroad.<sup>12</sup> The most significant indicator of illegality is the dummy for illegal experience. We therefore choose to keep this variable for the remainder of the analysis. Model 2 is therefore our reference estimation. It shows that migration duration is 1.37 times higher for an illegal migrant than their legal counterpart. This result is consistent with Magris and Russo's (2009) and Reichert and Massey's (1984) conclusions, but runs counter to Pinger's (2010) and Lindström's (1996) findings. Pinger's (2010)

<sup>12</sup> A candidate fourth indicator could have been lack of a residence permit. We opted to ignore this variable as we suspected potential endogeneity with duration of migration: most of the destination countries require people to have been living in the country for a given period before they can apply for a residence permit.

empirical study on the determinants of temporary and permanent migration uses the same “CBS-AXA 2006” dataset as used in this paper. However, Pinger uses a standard probit model to compare permanent *versus* temporary migration. Our work, which is based on duration of migration and which uses a parametric estimation, diverges from Pinger to demonstrate that being undocumented increases time spent abroad. The potential lower wage and/or higher migration costs for illegal migrants can partly explain this result. As irregularity can have a higher effect in the EU countries, we introduce an interaction variable combining illegality and EU dummy in Model 5. The results show that the migration duration for irregular migrants is even longer when they go to EU countries.

Extending the investigation into the link between undocumented migrants and migration expenditures, Models 7 and 8 show the results after introducing migration costs and borrowing needs into the initial regression. Migration costs are highly significant and, as expected, the effect of legal status vanishes when costs are introduced into the model. Of course, to be sure that this result is not due to the reduced size of the sample, we re-ran the initial model without the costs on the sub-sample for which we have migration expenditure data (Model 6). The time ratio of the indicator on illegal experience (1.29) is close to that obtained on the whole sample (1.37) and is significant at a 10% risk rather than at a 5% risk. Therefore, the disappearance of the illegal status effect in Model 7 is not attributable to the reduction of sample size but to the fact that migration costs were introduced into the regression. The last test we run is to infer whether there are differences in the impact of migration expenditures between borrowers and non-borrowers. Model 8 thus includes an interaction covariate between migrant costs and migrant borrowers. The results show a slightly larger impact of migration costs for borrowers, but higher migration costs still drive longer duration of stay for non-borrowers.<sup>13</sup> Hence, illegal migrants come back to Moldova later than legal migrants, in part because they face higher migration costs.<sup>14</sup>

From a purely statistical standpoint, Görlich and Trebesch (2008) also observed that undocumented migrants tend to concentrate in the seasonal-migrant sample. We ran regressions including a dummy variable for seasonal migrants. This factor proved significant and exerted a negative influence on duration without changing any of the other results. As we suspected this factor showed potential endogeneity since the questionnaire defined a seasonal migrant as any person having spent less than 3 consecutive months abroad, we removed it from the model. We also ran the model on the subsample of non-seasonal migrants. The main results were not different from the principal model, and only certain control variables were no longer significant.<sup>15</sup>

Concerning the effect of factors used as proxies for wages differentials (hypothesis 2), we find that women stay longer abroad. In order to further explore the gender dimension, we introduce an

<sup>13</sup> The precise values of the coefficients for costs are 1.000318 in Model 7 and 1.00224 in Model 8. The precise value of the coefficient for costs x borrower in Model 8 is 1.000225.

<sup>14</sup> Illegal status could also be perceived as a proxy for lower expected wage abroad. Nevertheless, as documented further on, we introduce a number of other variables that can influence potential earnings in order to clear legal status for this likely influence.

<sup>15</sup> These results are available upon request.

interaction term between destinations and gender. Women going to CIS countries come back sooner, whereas there is no particular effect for women going to EU. Migrants who do not know the destination country's language stay longer. If gender (in particular women in CIS) and mastery of the foreign language were negatively correlated to expected wage, then these results would conclude in favour of the target income theory.

Next, we analyze the push and pull factors of the migrant's region of origin (hypothesis 3). The dataset offers three potential indicators of regional development, i.e. economic, infrastructural and social indexes. We introduced these indicators separately into Model 1 (results not shown). Only the dummy variable for socially-depressed regions was significant and subsequently kept in the analysis. The results show that Moldovan migrants from socially-depressed regions spend more time abroad. Echoing Lindström (1996) and Reyes (2001), we find that a region with better social development acts as a pull factor and prompts migrants to come back sooner if they can expect a better way of life in their home region.

Finally, we examine the influence of family ties on duration of stay (hypothesis 4). In contrast with Görlisch and Trebesch (2008), we find very strong effects of household composition on the migrant's duration of stay. The household head, their spouse or their child spend dramatically less time abroad. For example, a household head migrant or their spouse would stay only one month in the destination country where a typical migrant sharing otherwise identical characteristics is expected to spend two years in the same place. Similarly, an increasing proportion of dependent members in the family decreases the migrant's duration of stay. Focusing on the influence of the family's economic situation, Model 2 shows that belonging to a household that has experienced a decline in its perceived level of income between 1998, i.e. immediately after the Russian financial crisis, and the 2006 survey increases the migrant's duration of stay. This is almost certainly due to the dependency of this type of family on remittances.

## **5. Conclusion**

This paper investigates the factors driving migrant decisions on migration duration abroad. We focus on the effect of the migrant's legal status. We run a duration model using a Moldovan micro-survey carried out in 2006 and complemented with regional development data from Roscovan and Galer (2006). The estimations show that irregular migrants spend significantly longer periods abroad. Further investigation demonstrates that this effect is driven by significantly higher migration costs. From a policy perspective, our findings on irregular migration may well be highly relevant, as they question the outcome of restrictive migration policies. Our findings suggest that extending effective duration of stay compared to optimal migration duration reduces the potential circularity of migration episodes. The net result is that restrictive migration policies generate stocks of unmotivated illegal migrants in the host countries, which is ultimately the reverse effect of the stated policy goals. This

paper, like an increasing number of migration literature papers converging on the same conclusions (Constant and Zimmermann (2011) and Magris and Russo (2009) are good examples) contributes to further arguments for redefining migration policy.

The estimated duration model goes on to highlight certain characteristic features of migrant choices. First, the more time the migrant has already spent abroad, the more prone he/she is to come back. Migrants presenting an unfinished migration duration spell at the time of the survey post a mean stay abroad of two years and seven months. According to our results, they are likely to return home after five more years abroad. Family composition exerts a strong pull effect on the migrant: the duration of stay of a household head is just 4% that of a typical migrant. The same scale of effect holds true for the household head's spouse or child, as well as for the proportion of dependents in the family. However, we did not find any influence of networks on duration decisions. This refutes the findings of other studies on Moldovan migrants, including Görlich and Trebesch (2008), who, conversely to our study, found no evidence of influence of family ties yet a significant impact of networks.

We introduce a number of proxy variables capable of influencing the wage differential between home and host country. Only gender increases time spent abroad, while neither age at first migration nor education exert any influence on duration of stay. Migration duration is 30% longer for women than men, except for women migrating out to the former Russian Republics, where migration duration will be 40% shorter than for men migrating to the same destination). These differences are explained by the fact that women hold different types of jobs to men in different destinations. Certain regional characteristics of the origin country play a significant role in the migrant's decision. Moldovan emigrants from poorer regions, like Mexican emigrants –as documented by Linström (1996) – spend shorter spells abroad. These results may be due to the fact that income target and investment opportunities are lower for migrants from less-developed regions of the origin country.

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## Separate appendix to the paper

Table 1a. Selected sample characteristics

	Entire sample (active population)	Non-migrants sample	difference	Migrants sample	Migrants without available duration information	difference	Migrants with available duration information
N	10555	6.833		3722	2.787		935
Gender	0.53	0.53	0.01	0.52	0.51	0.13***	0.38
Primary	0.36	0.37	0.01	0.36	0.30	-0.06**	0.36
Tertiary	0.31	0.29	-0.05***	0.34	0.34	-0.05*	0.39
University	0.21	0.21	-0.01	0.22	0.26	0.07**	0.19
Post-university	0.11	0.13	0.05***	0.08	0.10	0.05***	0.05
Romanian	0.04	0.04	0.00	0.04	0.04	0.01	0.03
Dependents	0.16	0.15	-0.03***	0.18	0.16	-0.03**	0.20
Hh head	0.29	0.35	0.16***	0.19	0.11	-0.25***	0.36
Hh hd's spouse	0.29	0.32	0.07***	0.25	0.12	-0.06**	0.18
Hh hd's child	0.18	0.18	-0.01	0.19	0.14	-0.02	0.16
Hh wealth decline	0.31	0.29	-0.06***	0.35	0.28	-0.07**	0.35
Other migrants	0.89	0.15	-2.10***	2.24	1.57	-0.37***	1.94
Network	0.11	0.01	-0.31***	0.32	0.57	-0.04	0.62
Urban origin	0.36	0.39	0.08***	0.31	0.32	0.02	0.30
Locality size	0.20	0.24	0.11***	0.13	0.15	0.04*	0.11
North	0.27	0.26	-0.03**	0.29	0.29	0.01	0.28
Centre	0.53	0.55	0.07***	0.48	0.44	-0.02	0.46
South	0.20	0.19	-0.04***	0.23	0.27	0.01	0.26
ecoq1	0.21	0.19	-0.06***	0.25	0.24	-0.03	0.27
ecoq2	0.22	0.21	-0.03**	0.24	0.23	0.01	0.22
ecoq3	0.26	0.26	-0.01	0.27	0.27	0.01	0.27
ecoq4	0.31	0.34	0.10***	0.24	0.26	0.02	0.24
socioq1	0.22	0.20	-0.03**	0.23	0.21	-0.03	0.24

socioq2	0.26	0.25	-0.04***	0.29	0.30	0.01	0.29
socioq3	0.16	0.16	-0.03***	0.18	0.20	0.01	0.19
socioq4	0.36	0.40	0.10***	0.30	0.30	0.02	0.28
infraql	0.21	0.19	-0.04***	0.23	0.23	0.00	0.23
infraq2	0.25	0.25	-0.01	0.26	0.25	-0.02	0.27
infraq3	0.18	0.16	-0.07***	0.23	0.22	-0.03	0.25
infraq4	0.36	0.40	0.12***	0.28	0.30	0.04*	0.26
Age at first migration					31.64	-0.01	31.65
EU					0.08	-0.00	0.08
CIS					0.14	-0.23***	0.37
Other					0.79	0.23***	0.56
Urban destination					0.32	0.02	0.30
Illegal exp.					0.25	-0.00	0.25
Illegal entry					0.21	0.00	0.21
Illegal first job					0.27	0.02	0.26
Language not spoken					0.17	0.04*	0.13

### Details on regional development data

The dataset on regional development in Moldova used in this paper comes from Roscovan and Galer (2006), who constructed three summary indicators: the economic, social and infrastructure development indexes. The social development index (SDI) combines measures of: 1) number of physicians per 10000 inhabitants; 2) number of hospital beds per 10000 inhabitants; 3) number of infant deaths per 1000 live births; 4) number of students per teacher. The infrastructure development index (IDI) includes: 1) number of cars in private ownership per 1000 inhabitants; 2) dwelling stock per inhabitant; 3) public passenger transportation; 4) number of telephones per 100 inhabitants; 5) length of public roads per inhabitant; 6) length of water piping per inhabitant; 7) length of sewerage system per inhabitant. The economic development index (EDI), which we use to test hypothesis 2b, encompasses: 1) average nominal monthly salary per employee; 2) volume of industrial and agricultural production per inhabitant; 3) volume of services per inhabitant; 4) number of SMEs per inhabitant; 5) rate of urbanization.

All three indexes are normalized. The zero value of each index corresponds to the average national level of development. A positive (negative) value for each index corresponds to a region with higher (lower) level of development than the national average. The economic indicator ranges from -1.06 to 2, the social development index from -1.62 to 5, and the infrastructure development index from -1.59 to 1.3. For all three indicators, the highest possible value indicates the maximum development level (reference level), corresponding to the Chisinau (capital of Moldova) region and the Balti region. These indexes are correlated: coefficients of correlation are 69% between EDI and SDI, 77% between EDI and IDI, and 63% between SDI and IDI.

**Table 2a:** Distribution of the Moldovan administrative-territorial units stratified by level of development for each summary indicator, 2004.

<i>Indexes</i>	Mean	SD	Min	Max	Nbr of obs.
<i>Economic development index</i>	0.06	0.78	-1.06	2.0	35
<i>Social development index</i>	0.26	1.34	-1.63	5.0	35
<i>Infrastructure development index</i>	0.04	0.67	-1.59	1.3	35

Source: Roscovan and Galer (2006).

For the econometric analysis, we classified the 35 administrative-territorial units according to level of development. A region is considered as depressed if it scores below zero on one of the corresponding indexes (zero being the average national level). It is considered as developed if the index is higher than zero and different from the reference level, corresponding to the two principal city regions of Moldova. We hence generate three dummies for each index according to this classification.

**Table 3a.** Distribution of regional development indexes in the regression sample on duration of migration (939 individuals)

	<i>Economic development index</i>	<i>Social development index</i>	<i>Infrastructure development index</i>
<i>Level of development</i>	Freq.%	Freq.%	Freq.%
developed regions	27	19	25
depressed regions	49	53	49
reference region	24	28	26
Total	100	100	100