

Ivanova, Vera; Vakhitova, Hanna; Ushchev, Philip

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Occupational choice of migrants: does NEG tell something new?*

Vera Ivanova[†] Philip Ushchev[‡] Hanna Vakhitova[§]

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Very preliminary, please do not cite or circulate!

Abstract

We consider an empirical model in which individuals choose jointly their destination country and occupational choice. We plan to estimate this model using Ukrainian micro-data. The main results (to be yet obtained) will shed light on joint determinants of workers' migration decisions and their occupational choice in destination regions.

Keywords: labor migration; occupational choice; new economic geography

JEL Classification: J61, J62, R13

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[†]National Research University Higher School of Economics (Russia). Email: verunina@gmail.com

[‡]National Research University Higher School of Economics (Russia). Email: ph.ushchev@gmail.com

[§]Kyiv School of Economics. Email: vakhitova@kse.org.ua

1 Introduction

Migration becomes a global and widespread phenomenon reflecting a declining role of formal borders as well as a strong demand for flexible labor force. Probably, most governments would prefer to come up with additional employment opportunities at home for their fellow citizens. Nevertheless demographic, social and economic factors as well as weakening role of political borders play an increasingly stronger role in determining migration. It is estimated that nowadays more than 100 million individuals work in countries other than their country of birth. As a result, a growing number of both sending and receiving countries have to account for international labour migration when considering their national development and employment strategies.

Modern workers move not only between countries but also between industries and occupations. The existing literature suggests that these reallocations may have large impact on skills development of migrants. The applicability of skills and experience across countries may be limited due to the existing gap in technology between the sending and host countries, non-transferability of skills, language and institutional barriers. As a result, migrants may be forced to accept occupations that do not correspond to their previous qualification leading to the skills waste.

The specific factors behind worker's decision about the occupation in the migration-receiving country and its connection to the occupation workers possessed at home are understudied. A recent study by Commander, Nikolaychuk and Vikhrov (2013) emphasizes the importance of domestic factors. Particularly, they stress that individuals employed at home in occupations for which they are over-qualified are more likely to downshift abroad.

We develop and empirically test a model which brings together labor migration and occupational choice to build up a strong theoretical foundation for the empirical study of migrants' occupational choice. The objectives of our research are (i) to reveal the key-factors which shape the skill composition of migrants, and (ii) to figure out the main determinants of occupational choice of migrants in receiving countries. Wage differentials across countries, cost of migration and the real market potential of destination countries are allowed to have an impact on the occupational choice of migrants.

To the best of our knowledge, the current state of the art exhibits hardly any overlap between inter-regional labor mobility literature and studies of occupational choice. The former is essentially based on the New Economic Geography approach, developed in Krugman (1991) and Ottaviano et al. (2002). This framework allows for studying non-pecuniary determinants of labor mobility, such as taste heterogeneity (Tabuchi and Thisse, 2002) or migration costs (Tabuchi et al., 2014). Contrast to this, the latter mostly rests on rational expectations hypothesis and assumes workers care only about their income (Miller, 1984; Siow, 1984). The problem of migrants' potential skill mismatch with domestic firms, as

well as differences in migration costs between skilled and unskilled workers, are put aside in both kinds of models. Likewise, these issues are not considered in those empirical studies which focused on a link between labor mobility and regional-specific unemployment levels (Pissarides and Wadsworth, 1989; McCormick, 1997). The main novelty of our approach is that we consider the interplay of these various sets of factors within one model. Technically, this unification is implemented through using conditional logit framework, which has been extensively used for modeling both occupational choice (starting from Boskin, 1974) and inter-regional labor mobility (Tabuchi and Thisse, 2002; Crozet, 2004).

Our model is an extension of the approach used by Crozet (2004). There are $R+1$ regions. The economy of each region involves three sectors: agricultural sector, manufacturing sector, and services. There are three types of labor in each region: immobile labor (employed only by agricultural firms), and mobile labor employed only in manufacturing and services sectors. Furthermore, mobile labor breaks down into skilled and unskilled labor.

Following the theoretical model, individual data of migrants are supplemented with the regional-level data for Ukraine and destination countries on employment, wages, migration policy, trade costs and various demographic aggregates by skills. The occupational choice equation is derived from the model using a conditional logit model and is estimated with individual data on Ukrainian workers and regional-level data on employment, wages and trade costs.

We expect labour market characteristics of the receiving countries to play a dominant role in defining the occupational choice of the migrants.

The rest of the paper is organized as follows. Section 2 outlines the theoretical model. Section 3 focuses on the empirical strategy. Section 4 describes the data, while the main results are presented in Section 5. Section 6 concludes.

2 The Model

2.1 Basic setup

Our model, based on Krugman (1991), is a two-factor extension of the approach used by Crozet (2004). There are $R+1$ regions, $r = 0, 1, \dots, R$. The economy of each region involves three sectors: agricultural sector A , manufacturing sector M and non-manufacturing sector N . The latter is interpreted as services.

There are three types of labor in each region: immobile labor (employed only by agricultural firms), and mobile labor employed only in manufacturing and non-manufacturing sectors. Furthermore, mobile labor breaks down into skilled labor (S -type labor) and unskilled labor (or U -type labor). In what follows, we denote the total amount of labor of type $\theta \in \{S, U\}$ in sector $j \in \{M, N\}$ of region r as $L_{\theta r}^j$.

So long as mobile labor is free to move between manufacturing and non-manufacturing, wages for both types of mobile labor w_r^θ in these two sectors are the same. but they can differ across regions because of spatial frictions).

Consumers. Consumers share identical preferences given by

$$\mathcal{U} \equiv M^\mu N^\nu A^{1-\mu-\nu}, \quad (1)$$

where A , M and N stand for consumption volumes of agricultural good, composite manufacturing good and composite non-manufacturing product, respectively. (Non-) manufacturing goods are assumed to be (non-) tradable. Therefore, M and N for a consumer residing in region r are given by

$$M \equiv \left[\sum_{r=0}^R \int_0^{n_r^M} (x_r^M(i))^{\rho_M} di \right]^{1/\rho_M}, \quad N \equiv \left[\int_0^{n_r^N} (x_r^N(i))^{\rho_N} di \right]^{1/\rho_N}$$

Each θ -type worker residing in region r seeks to maximize (1) subject to the budget constraint:

$$\sum_{s=0}^R \int_0^{n_s^M} p_{sr}^M(i) x_s^M(i) di + \int_0^{n_r^N} p_r^N(i) x_r^N(i) di + A \leq w_{\theta r}$$

Firms. Manufacturing and non-manufacturing firms share the same technology, fully specified by fixed skilled labor requirement $f > 0$ and constant marginal requirement of unskilled labor $c > 0$. In other words, firm's total cost of producing q units of output in region r is given by

$$C_r(q) \equiv w_{Sr}f + w_{Ur}cq$$

2.2 Equilibrium with a given number of firms

By an *equilibrium with a given number of firms* we understand an outcome when (i) all utilities and all profits are simultaneously maximized, (ii) all profits are zero because of free entry, and (iii) the markets of all types of final goods and labor clear.

Since consumers have CES preferences, while firms are involved into monopolistic competition, each firm charges a mill price given by

$$p_r^M = \frac{\sigma_M c w_{Ur}}{\sigma_M - 1}, \quad p_r^N = \frac{\sigma_N c w_{Ur}}{\sigma_N - 1}, \quad (2)$$

where $\sigma_j \equiv 1/(1 - \rho_j)$, $j \in \{M, N\}$, are the elasticities of substitution across varieties of (non-) manufacturing good.

Furthermore, transportation of one manufacturing good unit from region r to region s requires iceberg transportation costs $\tau_{rs} > 1$. Therefore, we have

$$p_{rs}^j = p_r^j \tau_{rs}. \quad j \in \{M, N\} \quad (3)$$

The number of firms in sector $j \in \{M, N\}$ of region $r = 0, 1, \dots, R$ is given by

$$n_r^j = \frac{L_{Sr}^j}{f}, \quad (4)$$

where L_{Sr}^j is the total number of skilled workers employed in sector j in region r .

The real wage of θ -type mobile worker in region r is given by

$$\omega_{\theta r} = \frac{w_{\theta r}}{P_{Mr}^\mu P_{Nr}^\nu}, \quad (5)$$

where P_{jr} are composite price indices for goods of sector $j \in \{M, N\}$ in region r :

$$P_r^M = \left[\sum_{s=0}^R \int_0^{n_s} (p_{sr}^M(i))^{1-\sigma_M} di \right]^{1/(1-\sigma_M)} \quad (6)$$

$$P_r^N = \left[\int_0^{n_r} (p_r^N(i))^{1-\sigma_N} di \right]^{1/(1-\sigma_N)} \quad (7)$$

Plugging (2)–(3) into (6)–(7) yields that

$$P_{Mr} = \left[\sum_{s=0}^R L_{Ms}^S (w_{Us} \tau_{sr})^{1-\sigma_M} \right]^{1/(1-\sigma_M)}, \quad (8)$$

$$P_{Nr} = (L_{Nr}^S)^{1/(1-\sigma_N)} w_{Ur}, \quad (9)$$

up to positive multiplicative constants.

2.3 Migration equation

The real wage $\omega_{\theta r}$, which is given by (5), shows (up to a multiplicative constant) the level of indirect utility associated with the consumer's utility maximization problem. However, as known from classical demand theory, the indirect utility is defined up to a monotone transformation. Thus, without loss of generality, we can use $\log \omega_{\theta r}$ as a measure for the indirect utility. This measure, however, does not account for at least three important features of labor migration.

1. Uncertainty. First, when someone changes location, finding a job in a new place

always suggests some uncertainty. To take this into account, we introduce the probability $\rho_{\theta r}(\mathbf{Z}^k)$ for a worker k to find a job of type θ in region r , which is a function of the worker's individual characteristics \mathbf{Z}^k . The expected real wage (in logs) then becomes $\log [\omega_{\theta r} \rho_{\theta r}(\mathbf{Z}^k)]$. This magnitude accounts for the expected wage differential before and after migration.

2. Migration costs. Second, migration is costly. Following Crozet (2004), we use a linear specification of migration costs:

$$T_r^k = d_r^k + \mathbf{a}' \mathbf{X}_r^k, \quad (10)$$

where d_r^k is the distance between the initial location of individual k and region r ; \mathbf{X}_r^k is a vector of non-pecuniary costs for a worker k to move to the country r (costs of migration from initial location of individual k to the region r), while \mathbf{a} is the vector of weights of each specific component of \mathbf{X}_r^k in T_r^k . To capture the impact of migration costs, we further modify our measure of indirect utility as follows: $\log [\omega_{\theta r} \rho_{\theta r}(\mathbf{Z}^k)] - \alpha \log T_r^k$. The coefficient $\alpha > 0$ shows the magnitude of the overall impact of migration costs on utility differential.

3. Individual heterogeneity. Finally, individual heterogeneity of tastes regarding residential locations, which stems from non-pecuniary reasons, also may play a considerable role in labor migration and identifying the desirable type of job. To allow for such heterogeneity, we introduce idiosyncratic shocks $\varepsilon_{\theta r}^k$, which capture individual heterogeneity of tastes regarding residential locations. In order to apply the logit model, we assume that $\varepsilon_{\theta r}^k$ are i.i.d. random variables distributed according to the law of extreme values of type 1.

Thus, our final measure of indirect utility, which individual k from region 0 gains migrating to region $r = 1, \dots, R$ to find a job of type $\theta \in \{S, U\}$, becomes

$$V_{\theta r}^k = \log [\omega_{\theta r} \rho_{\theta r}(\mathbf{Z}^k)] - \alpha \log T_r^k + \varepsilon_{\theta r}^k \quad (11)$$

In what follows, we specify the probability $\rho_{\theta r}(\mathbf{Z}^k)$ for a worker with characteristics \mathbf{Z}^k to find a job of type θ in region r by

$$\rho_{\theta r}(\mathbf{Z}^k) = E_{\theta r} \exp(\boldsymbol{\gamma}' \mathbf{Z}^k),$$

where $E_{\theta r}$ is an average employment rate in the country r for the job θ .

Plugging (5), (8) and (9) into (11), we obtain:

$$\begin{aligned} V_{\theta r}^k = & \log(w_{\theta r}) - \nu \log w_{U r} + \frac{\mu}{\sigma_M - 1} \log \left[\sum_{s=0}^R L_{M s}^S (w_{U s} \tau_{sr})^{1-\sigma_M} \right] + \\ & + \frac{\nu}{\sigma_N - 1} \log L_{N r}^S + \log \rho_{\theta r}(\mathbf{Z}^k) - \alpha \log \left(d_r^k + \mathbf{a}' \mathbf{X}_r^k \right) + \varepsilon_{\theta r}^k \end{aligned} \quad (12)$$

Several comments are in order. First, standard predictions of NEG still hold. For example, higher wages at the destination increase the probability of migration (at each level of skills).

Second, NEG also predicts that workers follow market potentials which indicate better market access in some regions. In our model, the market potential is captured by the third term of the right-hand side of (12).

Finally, one more key factor of migration is migration cost. Crozet (2004) finds that an increase in distance between regions by 1% decreases relative migration inflow from region i to region j by 1%. This effect is even reinforced if the regions do not share a common border. In a recent theoretical study by Tabuchi, Thisse and Zhu (2014), an even stronger result is obtained: introducing migration costs into a NEG framework *may be sufficient to kill the standard core-periphery outcome* found by Krugman (1991). To sum up, we expect migration costs to be significant determinants of individual migration decisions.

The probability that worker k chooses to seek a position of type θ in region r is then given by

$$\mathbb{P}_{\theta r}^k = \frac{\exp(V_{\theta r}^k)}{\sum_{s=1}^R [\exp(V_{U_s}^k) + \exp(V_{S_s}^k)]}. \quad (13)$$

3 Empirical Estimation

In order to estimate probabilities (13), we need proxies for variables in (12). Real market potential (RMP) of the country r can be taken as an empirical analog for the term $\sum_{s=0}^R L_{Ms}^S (w_{Us} \tau_{sr})^{1-\sigma_M}$. For the first stage, we use RMP computed in Mayer (2008).

Proxies for the distance d_r^k between the initial location of individual k and region r are as follows:

- simple distance between capitals (km),
- simple distance between most-populated cities (km),
- population-weighted distance.

We use GeoDist database for distances provided in CEPII web-site.

The empirically relevant counterpart of the utility function (12) for individual k migrating to region $r = 1, \dots, R$ for getting a job of type $\theta \in \{S, U\}$ can be written as follows:

$$\hat{V}_{\theta r}^k = \beta_1' \mathbf{D}_r + \beta_2' \mathbf{D}_{\theta r} + \beta_3 \log E_{\theta r} + \gamma' \mathbf{Z}_{\theta r}^k + \varepsilon_{\theta r}^k, \quad (14)$$

where:

\mathbf{D}_r is a vector of characteristics of the country of destination r (RMP, distance from Ukraine, common border with Ukraine, visa restrictions for Ukrainians, lexicostatistical dis-

tance¹ between the official language and Ukrainian etc.),

$\mathbf{D}_{\theta r}$ is a vector of characteristics of the country of destination r for the job θ (average wage for skilled and unskilled labor, total amount of skilled labor in non-manufacturing sector etc.),

$E_{\theta r}$ is an average employment rate (deviation from the mean) in the country r for the job θ ,

\mathbf{Z}^k is a vector of characteristics of worker k (age, gender, education, marital status, children, native language, profession or group of occupation before migration, wage, total number of trips, duration of stay abroad, etc.),

$\beta_1, \beta_2, \beta_3, \gamma$ – parameters to be estimated.

Dependent variable is

$$y_{\theta r}^k = \begin{cases} 1, & \text{if } k \text{ finds job of type } \theta \text{ in region } r \\ 0 & \text{otherwise} \end{cases}$$

We will estimate (14) using various discrete-choice econometric techniques.

4 Sources for data

4.1 Data on migrants

The data for the empirical analysis come from the first wave of the External Labor Migration survey (ELMS). The ELMS was conducted in April-May 2008 by the Ukrainian State Statistics Committee and the Ukrainian Center for Social Reform. The survey was operated as a supplement to two nationally representative surveys of non-institutional households, the Labor Force Survey (LFS) and the quarterly Household Budget Survey (HBS). The initial combined sample included more than 25 thousand households. Out of 48 thousand household members of working age 1381 respondents reported to be abroad for employment reason at least once between 2005 and the date of the interview.

We dropped observations about migrants who do not provide information about type of the job abroad. Also we remove observations on the following countries: Cyprus, Estonia, Latvia, Norway, Romania, Belarus because of lack of the national statistical data. So, the final dataset consists of information about 1153 migrants.

¹Lexicostatistical distances from official language of the country r to Ukrainian are based on Dyen et al. (1992), who computed lexicostatistical percentage for pairs of languages which mean the share of similar words in the two languages. We take the difference between one and the percentage and use it as a lexicostatistical distance (variable *langdist*). There is no data for non-Indoeuropean languages in Dyen et al. (1992), so we take *langdist* for languages Turkish, Norwegian, Hebrew, Maltese, Romanian, Hungarian, Estonian to be equal to 0.9 because the mentioned languages are not Indoeuropean ones.

4.2 Geographical variables

We use CEPII dataset for real market potentials and distances from Ukraine to destination regions. We use two measures of distances: (i) geodesic distances from Kyiv to capital cities of destination regions, (ii) population weighted geodesic distances (see Head and Mayer, 2002). In order to construct a measure of migration cost, we use contiguity dummies, showing whether Ukraine has a common border with a destination country or not.

4.3 Labor data by countries of destination

4.3.1 Employment rates by educational level

Employment rates by highest level of education attained are provided by Eurostat for EU countries (“Employment and unemployment”, Labour Force Survey) and by HSE for Russia. We calculate the employment rate for skilled persons as a share of employees of age 20-64 years with first and second stage of tertiary education (levels 5 and 6) in the total population of the country with the same educational level and the same age. The share of employees with lower educational level (levels 0-4) is considered as an employment rate for unskilled workers.

4.3.2 Sector specific wages by educational level

Following Parteka (2012), we use data from EU KLEMS (March 2008 Release) for EU countries for calculating sector specific wages per hour of θ categories of workers in 2005:

$$w_{\theta,ir} = \frac{Lab_{\theta,ir} \cdot LAB_{ir}}{h_{\theta,ir} \cdot H_{ir}}$$

where i – sector, r – country, LAB is the value of total labor compensation in a given sector, H – the number of total hours worked by persons engaged in the same sector, Lab_{θ} – the share of labor compensation of a given θ category of workers within a sector in total labor compensation, h_{θ} – the share of hours worked by θ category of workers expressed as a share of total hours worked in that sector. We distinguish skilled and unskilled workers as persons with and without university education, so we take high-skilled persons for S and medium-skilled and low-skilled for U .

Average monthly sector specific wages by educational level for Russia are provided by the Russian Statistical Agency. We calculate hourly sectoral wages by dividing monthly earnings by the average number of working hours per month.

Nominal variables are expressed in national currencies, thus we use bilateral exchange rates (average or standardised measure) provided by the European Central Bank to report all wages into constant terms (euro).

So, we calculate sectoral wages (per hour worked) by the skill level and sectors (Appendix 1).

4.3.3 Total amount of skilled labor in non-manufacturing sector

The vector $\mathbf{D}_{\theta r}$ in (14) contains total amount of skilled labor in non-manufacturing sector.

EU KLEMS doesn't provide the total amount of skilled labor in non-manufacturing sector. We calculate it as follows.

1. We find the *total hours worked by high-skilled persons engaged in non-manufacturing sectors* which is calculated as follows:

$$H_{S,NonMnf,r} = H_{S,Total,r} - H_{S,Mnf,r} - H_{S,Agro,r}$$

where $H_{S,Total,r}$ - total hours worked by skilled workers engaged in total industries, calculated as the total hours worked by persons engaged (H_EMP) multiplied by hours worked by high-skilled persons engaged (share in total hours) (H_HS); $H_{S,Mnf,r}$ - total hours worked by skilled workers engaged in manufacturing; $H_{S,Agro,r}$ - total hours worked by skilled workers engaged in agriculture, hunting, forestry and fishing.

2. Then, we calculate an average annual amount of hours worked for all the persons engaged \bar{H}_r (EMP/H_EMP).

3. Under the assumption that the annual amount of hours worked is common for all the sectors and types of labor, we find the total amount of skilled labor in non-manufacturing sector as a ratio: $H_{S,NonMnf,r}/\bar{H}_r$.

Russian statistical agency provides the total amount of labor by sectors and shares of workers by sectors and the highest level of education attained, so we can easily calculate the total amount of skilled labor in non-manufacturing sector.

5 Estimation results

At the first stage we estimated alternative-specific conditional logit (reference country is Russia). We get a negative and significant coefficient for geographical distances between Ukraine and destination countries, that is migrants are less likely to find a job in a country that is further away from Ukraine. Skilled migrants are more likely to choose countries with high wages, whilst unskilled migrants go to countries with low wages.

*** TBD

Regressor	(1)				
log WageSk	0.651**				
	[0.292]				
log WageUnsk	-1.222***				
	[0.270]				
log Distance	-2.686***				
	[0.189]				
Reference country: Russia					
	(2)	(3)	(4)	(5)	(6)
	Austria	Belgium	Czech Rep	Denmark	France
Age	-0.288	0.0367	0.00338	-0.110	0.00539
	[0.237]	[0.0333]	[0.00930]	[0.129]	[0.0569]
Constant	1.242	-3.256**	-1.720***	-0.985	-2.671
	[5.099]	[1.418]	[0.408]	[3.644]	[2.201]
	(7)	(8)	(9)	(10)	(11)
	Germany	Greece	Hungary	Ireland	Italy
Age	-0.0131	0.0506	0.000135	0.0535	0.0340***
	[0.0352]	[0.0372]	[0.0155]	[0.108]	[0.00892]
Constant	-2.994**	-5.045***	-4.881***	-5.105	-0.437
	[1.330]	[1.588]	[0.658]	[4.645]	[0.415]
	(12)	(13)	(14)	(15)	(16)
	Netherl.	Poland	Portugal	Slovakia	Spain
Age	-0.0998	0.0152	-0.00943	-0.0381	0.0228
	[0.0883]	[0.0113]	[0.0169]	[0.101]	[0.0181]
Constant	-0.0805	-3.755***	0.908	-6.310*	-0.326
	[2.556]	[0.495]	[0.694]	[3.397]	[0.772]

Observations 18,448

Log likelihood -1713.291

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

6 Concluding Remarks

To be completed

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Appendix 1. List of sectors

AtB Agriculture, Hunting, Forestry and Fishing

C Mining and Quarrying

D Total Manufacturing

E Electricity, Gas and Water Supply

F Construction

G Wholesale and Retail Trade

H Hotels and Restaurants

I Transport and Storage and Communication

K Real Estate, Renting and Business Activities

M Education

N Health and Social Work

O Other Community, Social and Personal Services

P Private Households with Employed Persons

TOT Total Industries

Appendix 2. List of countries

Austria

Belarus

Belgium

Cyprus

Czech Republic

Germany

Denmark

Estonia

France

Greece

Hungary

Ireland

Italy

Latvia

Netherlands

Norway

Poland

Portugal

Romania
Russia
Slovakia
Spain

Appendix 3. Descriptive statistics for the dataset

A.3.1. Descriptive statistics for migrants

Our dataset includes 1153 labour migrants, 372 women and 781 men. The average age of migrants is 37 years (38 years for women and 37 – for men), the youngest labor migrant is 15 years old, the oldest – 59.

Migrants by marital status

Marrital status	Women	Men	All
married	219	511	730
unmarried	73	217	290
separated	56	41	97
widowers	22	8	30
children under 18 years who are not married	2	4	6
Total	372	781	1153

Migrants by region of origin

Region	Women	Men	All
crimia	3	12	15
vinnytsia region	10	27	37
volyn region	17	36	53
dnipropetrovsk region	4	3	7
donetsk region	5	13	18
zhytomyr region	0	8	8
zakarpatska region	50	223	273
zaporizzia region	5	6	11
ivano-frankivsk region	54	49	103
kyiv region	1	2	3
kirovohrad region	0	4	4
luhansk region	12	25	37
lviv region	40	83	123
mykolaiv region	5	9	14
odessa region	3	8	11
poltava region	4	8	12
rivne region	8	22	30
sumy region	2	17	19
ternopil region	35	64	99
kharkiv region	7	22	29
kherson region	4	20	24
khmelnytsky region	14	25	39
cherkasy region	9	11	20
chernivtsi region	76	78	154
chernihiv region	1	5	6
kyiv	3	1	4
Total	372	781	1153

Migrants by country of destination

Country	Women	Men	All
Austria	0	1	1
Belgium	2	8	10
Czech Republic	45	127	172
Denmark	0	1	1
France	1	2	3
Germany	6	2	8
Greece	4	4	8
Hungary	13	32	45
Ireland	0	1	1
Italy	138	66	204
Netherlands	2	0	2
Poland	50	52	102
Portugal	15	22	37
Russia	79	446	525
Slovakia	1	0	1
Spain	16	17	33
Total	372	781	1153

Migrants by educational level

The highest level of education obtained	Women	Men	All
tertiary	59	54	113
post secondary non-tertiary	72	87	159
upper secondary	197	539	736
lower secondary and primary	44	101	145
Total	372	781	1153

Migrants by region of origin and type of area

Region	Urban	Rural	All
crimia	6	9	15
vinnytsia region	9	28	37
volyn region	25	28	53
dnipropetrovsk region	4	3	7
donetsk region	17	1	18
zhytomyr region	2	6	8
zakarpatska region	27	246	273
zaporizzia region	5	6	11
ivano-frankivsk region	12	91	103
kyiv region	1	2	3
kirovohrad region	1	3	4
luhansk region	19	18	37
lviv region	30	93	123
mykolaiv region	7	7	14
odessa region	5	6	11
poltava region	6	6	12
rivne region	13	17	30
sumy region	4	15	19
ternopil region	17	82	99
kharkiv region	14	15	29
kherson region	1	23	24
khmelnytsky region	12	27	39
cherkasy region	9	11	20
chernivtsi region	32	122	154
chernihiv region	2	4	6
kyiv	4	0	4
Total	284	869	1153

Migrants by sector of occupation before migration

Sector	Women	Men	All
agriculture	40	93	133
fisheries	1	4	5
mining	3	11	14
processing industry	20	63	83
production and distribution of electricity gas and water	1	11	12
construction	31	175	206
wholesale and retail trade	37	14	51
the activities of hotels and restaurants	11	0	11
the activities of transport and communications	4	22	26
financial activities	1	0	1
transactions in real estate	2	5	7
public administration	10	5	15
education	23	19	42
health protection	19	7	26
accordance public utilities and individual service	7	3	10
household activities	2	1	3
non-employed before employment abroad	160	348	508
Total	372	781	1153

Migrants by sector of occupation in migration

Sector	Women	Men	All
AtB - AGRICULTURE, HUNTING, FORESTRY AND FISHING	39	50	89
C - MINING AND QUARRYING	1	6	7
D - TOTAL MANUFACTURING	16	40	56
E - ELECTRICITY, GAS AND WATER SUPPLY	1	2	3
F - CONSTRUCTION	76	587	663
G - WHOLESALE AND RETAIL TRADE	38	22	60
H - HOTELS AND RESTAURANTS	16	5	21
I - TRANSPORT AND STORAGE AND COMMUNICATION	1	21	22
K - REAL ESTATE, RENTING AND BUSINESS ACTIVITIES	4	7	11
M - EDUCATION	2	0	2
N - HEALTH AND SOCIAL WORK	6	0	6
O - OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICES	7	6	13
P - PRIVATE HOUSEHOLDS WITH EMPLOYED PERSONS	164	34	198
undefined/TOTAL	1	1	2
Total	372	781	1153

Migrants by occupation before migration

Occupation group before migration	Women	Men	All
White collar	60	54	114
Blue collar	110	292	402
Unskilled	42	87	129
Non-employed or occupation unknown	160	348	508
Total	372	781	1153

Migrants by occupation abroad

Occupation group abroad	Women	Men	All
White collar	16	17	33
Blue collar	176	490	666
Unskilled	179	273	452
Non-employed or occupation unknown	1	1	2
Total	372	781	1153

A.3.2. Descriptive statistics by countries

Migrants (who are included into the final dataset) worked in 16 countries: Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Russia, Slovakia, Spain.

The most popular country was Russia (almost 46% of migrants worked there), the second popular country - Italy (18%), the third - the Czech Republic (15%), see Fig.1.

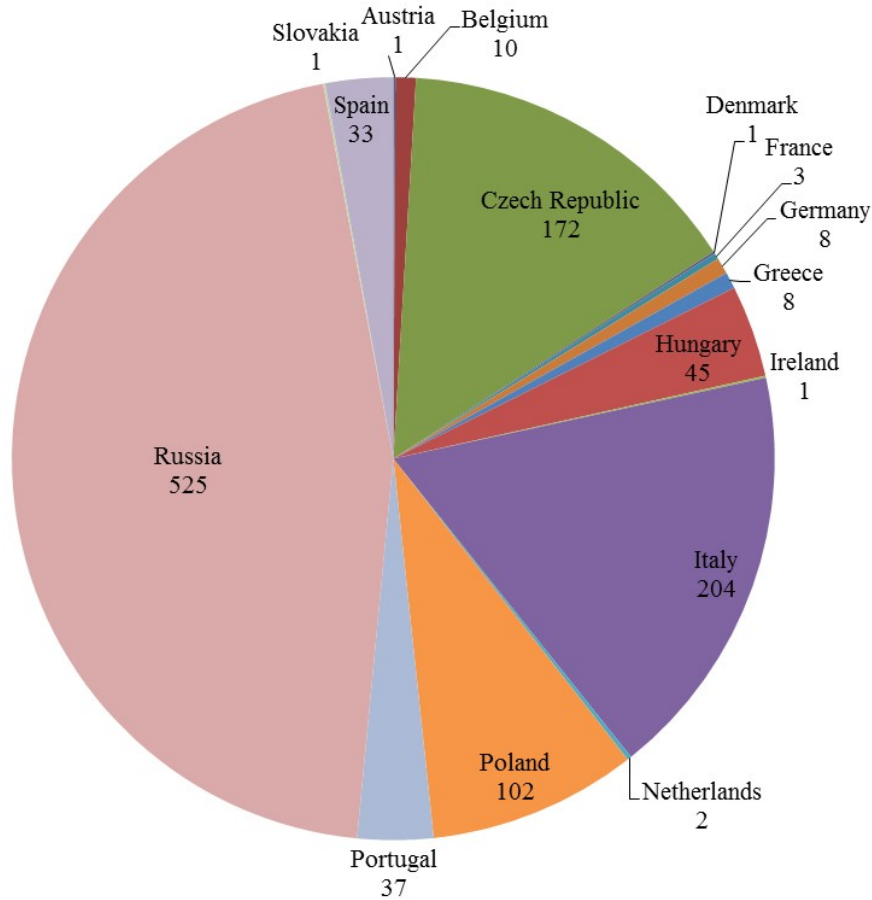


Figure 1: Migrants' distribution across countries, number of persons.

The country with the highest market potential in 2005 is ____, the lowest market potential was in ____

According to the lexicostatistical distance between official languages, the most common country for migrants is Slovakia, the most uncommon is the Netherlands.

The nearest (geographically) countries for the migrants are Poland, Russia, Hungary and Slovakia, the distance from Ukraine is less than 1000 km; the farthest country is Portugal (Fig. 2).

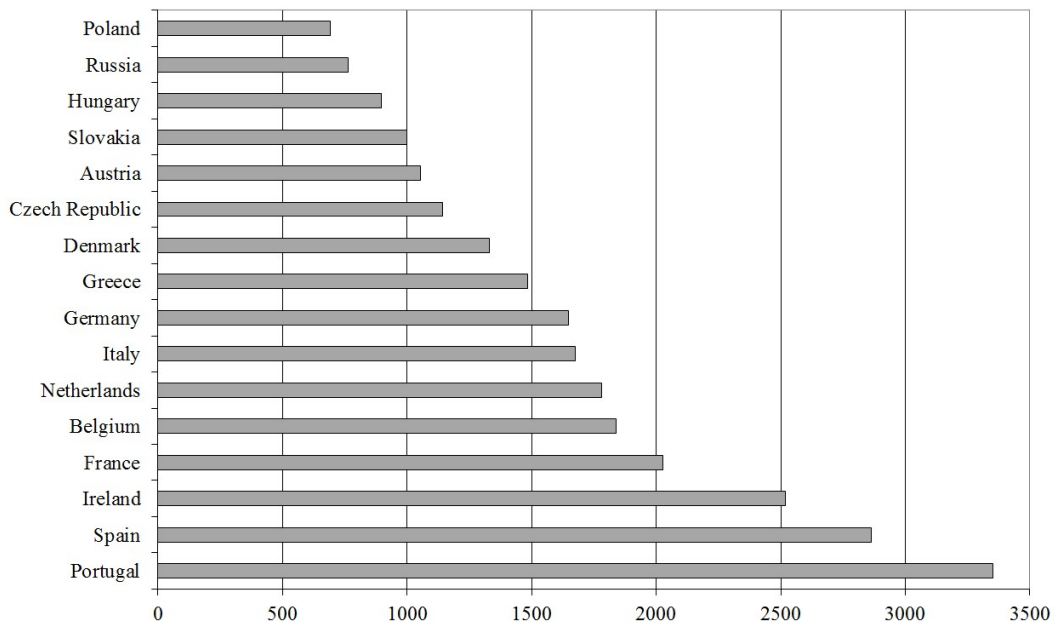


Figure 2: Distance from Ukraine to the most important cities/agglomerations of the countries, km.

The highest GDP per capita in 2005 was is Ireland. The lowest GDP per capita was displayed in Poland (Fig. 3).

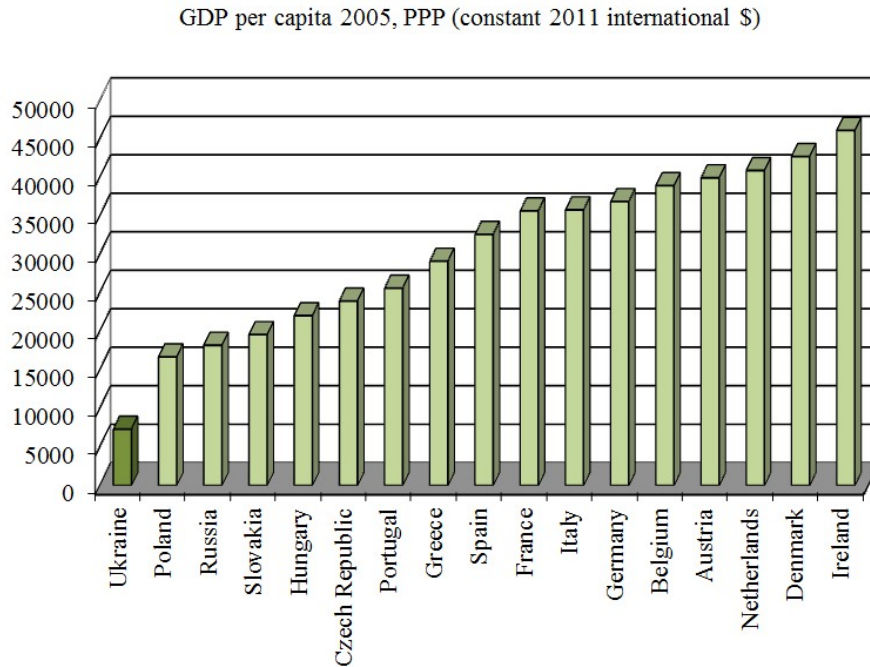


Figure 3: GDP per capita, 2005, PPP (constant 2011 international \$)

The diagram for the unemployment rate in 2005 for male and female labor force is shown in Fig. 4 and Fig. 5.

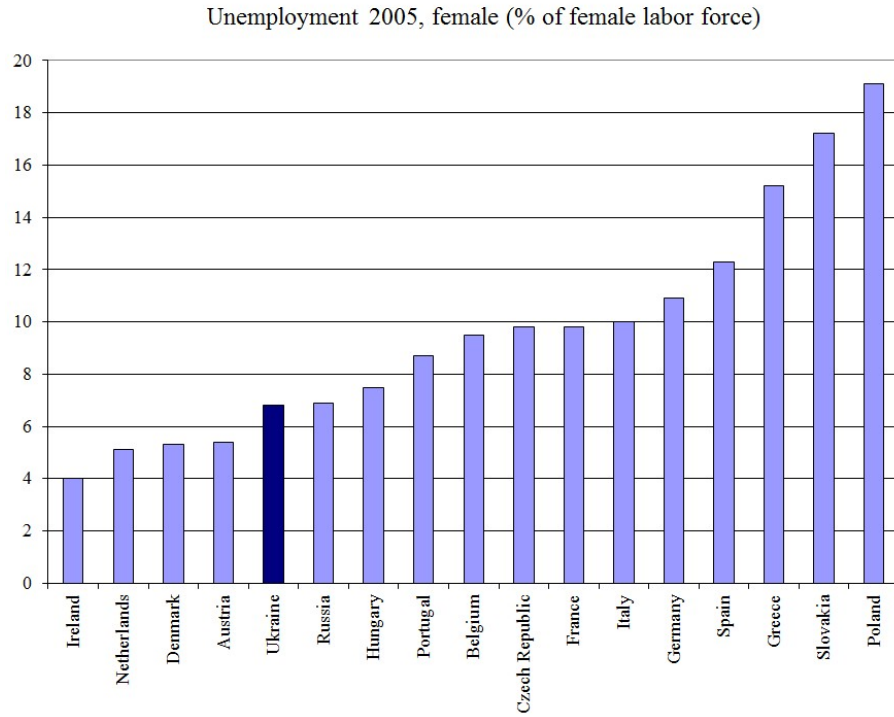


Figure 4: Unemployment 2005, female (% of female labor force), modeled ILO estimate. Source for data: The Worldbank.

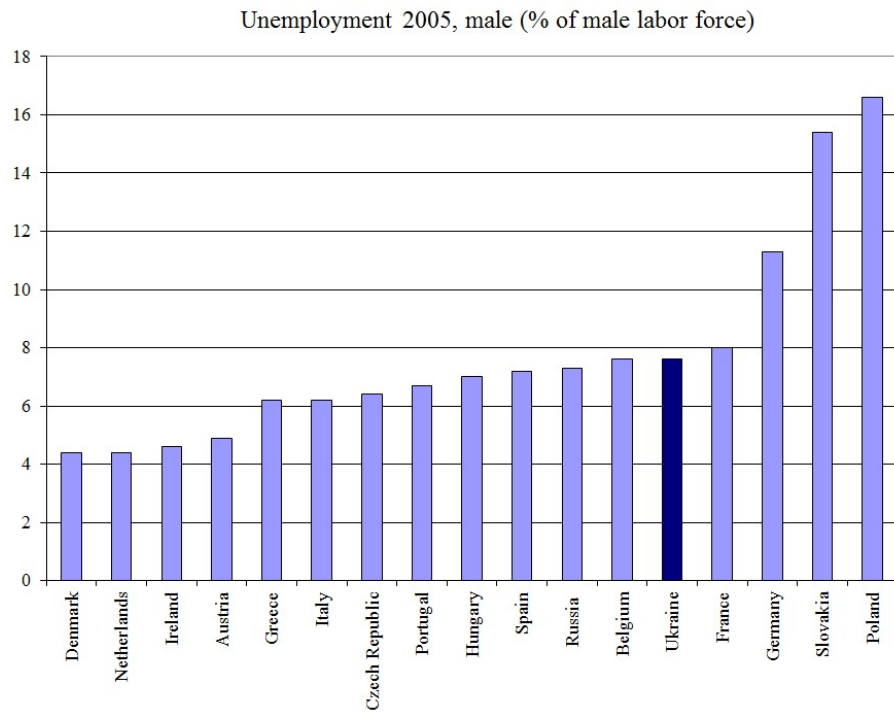


Figure 5: Unemployment 2005, male (% of male labor force), modeled ILO estimate. Source for data: The Worldbank.

Skilled-unskilled wage ratio by countries is shown in Fig. 6. The highest level of skilled-

unskilled wage gap was in Portugal, high-skilled workers were paid almost three times more than less educated employees. Also the gap is twice bigger in Germany, Czech Republic and Hungary. We observe the lowest returns to education in Russia.

The highest (respectively, lowest) average sectoral wage for both skilled and unskilled migrant workers was paid in Poland, in the sector “Private households with employed persons” (respectively, in Russia, in education).

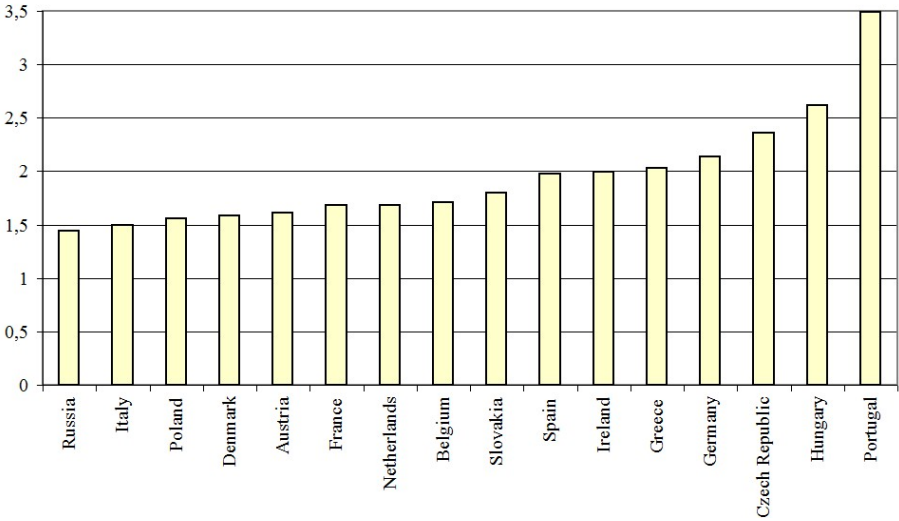


Figure 6: Skilled-unskilled wage ratio, 2005.