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CHARACTERISTICS AND DETERMINANTS OF INTERNAL LABOR MOBILITY IN UKRAINE

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“In Search of Opportunities: How a More Mobile Workforce Can Propel
Ukraine’s Prosperity”

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1. Introduction

Over the past 20 years Ukraine experienced fundamental structural changes due to transition to a market economy and integration with the world. Transition reforms accompanied by the collapse of traditional trade and production links with the other republics of the former USSR and Comecon countries entailed asymmetric effects on regions, reflecting an uneven distribution of winners and losers from transition.

Geographical mobility of labor is one of the major mechanisms (alongside with capital mobility, wage and price flexibility, and institutional mechanisms for redistributing income across regions) in facilitating regional adjustment to idiosyncratic shocks.¹ The ability of workers to move freely from one geographical location to another inside the borders of their country, in pursuing the same occupation or changing occupations, is of particular importance for efficient matching of labor demand and supply and reducing structural unemployment.

Internal labor mobility may also contribute to economic growth and development of such sectors as agriculture, manufacturing, construction, coastal economies and services. For example, Sharpe et al. (2007) found that interprovincial migration in Canada played an increasing role in the local economy over the last years. Due to high migration from low-productivity eastern provinces to high-productivity western provinces Canada's economy received a huge boost in 2006: net output gains arising from interprovincial migration are estimated to be 0.074 per cent of GDP in constant 1997 prices and 0.137 per cent of GDP in current prices. The study provided evidence that interprovincial migration was responsible for 1.56 per cent of trend labor productivity growth in Canada over the 1987-2006 period and 6.23 per cent of actual labor productivity growth in 2006.

Taking into account that internal labor mobility is often far more important both in terms of the numbers of people involved and the resulting flow of remittances than international migration, especially in the countries with marked regional inequalities, mobility of workers across the country is critical for overcoming poverty, smoothing household consumption in the wake of unexpected shocks and facilitating regional human development (IOM, 2008; World Bank, 2008).

However, as it has been well documented in the literature on poverty (Brück T. et al. 2010; UNDP, 2008; WB, 2005; MDGs, 2003), Ukraine has not taken full advantage of labor mobility across the country for bringing down regional imbalances and existing spatial poverty traps, i.e. geographic "pockets" of poverty, disadvantage and marginalisation. Visible and concealed barriers to migration of workers and their families together with a lack of interest and political commitment to address existing migration-related challenges from the government's side are among the major factors accounting for low internal migration and its low effectiveness in adjusting regional shocks. Furthermore, there is a prevailing negative public perception of migration in Ukraine, reflecting the concerns of policymakers that sizeable movements of people within the country (as well as outside it) are largely irreversible, that they could damage the endowment of human capital and therefore competitiveness and subsequent development potential of the sending regions,² while exerting a consistent strain on local governments, public services and infrastructure (including transport, housing, maintenance of law and order, education, health and various welfare provisions) in the destination areas.

This paper seeks to fill gap in the literature on patterns of internal labor mobility in Ukraine, its main characteristics and potential for reducing persistent regional labor market disparities and imbalances in economic and human development. The next chapters of the paper are organized as follows:

- Chapter 2 evaluates the magnitude of disparities in regional labor market and socio-economic indicators over time, with a special focus on its potential impact on decision of individuals to migrate to another settlement;

¹ See http://www.europarl.europa.eu/workingpapers/econ/104/chap2_en.htm for a summary of adjustment mechanisms to asymmetric shocks. The main adjustment mechanisms which could potentially reduce regional disparities in unemployment, as identified by the theoretical and empirical literature, are also summarized in Paci et al. (2007).

² See for example, article 2 in the Resolution of the National Security and Defense Council of Ukraine On directions of the national migration policy in Ukraine and urgent measures to increase its effectiveness, approved by the Decree of the President of Ukraine N 657/2007 in July 2007.

- Chapter 3 provides an overview of the available data sources on internal labor mobility in Ukraine, quantifies internal migration based on aggregate administrative data, discusses its trends over time and compares it levels to those found in developed and transition economies. It also identifies the main characteristics of internal migrants based on aggregate data;
- Chapter 4 provides multivariate statistical analysis of the determinants of inter-regional migration in 2002-2010 based on administrative region-level data;
- Chapter 5 summarizes the findings of empirical studies on determinants of the migration decision of Ukrainians;
- Chapter 6 examines short-term labor migration including everyday commuting in 2005-2010 and measures its covariates using individual-level LFS data;
- Chapter 7 summarizes the main findings and concludes.

2. Evolution of regional disparities in labor market and socio-economic characteristics

There are significant inter-regional differences in Ukraine, as measured by the coefficient of variation (which normalizes the standard deviation by dividing through by the national average) and the ratio of the maximum to the minimum values (Table 2.1).³ As one could expect, regional disparities are more pronounced in a larger sample of regions with Kyiv and Sevastopol cities than in a smaller one, demonstrating that the capital city stands out against the other regions of Ukraine in economic and human development (see bold entries in Max/Min columns).

Table 2.1 also reveals that divergence in economic development measured by regional gross regional product (GRP) per capita and its annual growth rate in real terms as well as in some important social indicators (crime rate and air pollution measure) is generally more pronounced than in labor market characteristics (unemployment as well as employment and labor force participation rates not presented here) and wage indicators. GRP per capita levels ranged from 53.6 percent to about 345 percent (188.4 percent in the smaller sample of regions) of the national average in 2010, with the lowest level in Chernivtsi oblast and the highest one in Kyiv City (Dnipropetrovsk oblast in the smaller sample). The ratio between the highest and the lowest unemployment rate measured according to the ILO methodology did not exceed a factor of two in 2011. Divergence of regional wages was somewhat more pronounced in terms of the ratio of the maximum to the minimum value, reaching 2.1 in a large sample and 1.6 in a smaller one. On the other hand, the coefficient of variation which is a more useful statistic for measuring the degree of variation in data, shows larger regional dispersion of the unemployment rate than of nominal wages. Real wage growth rates indicate even more substantial differentiation of regions both in terms of the ratio of two extreme values and the coefficient of variation. Compared to the EU member states, regional disparities in Ukraine have been, on average, smaller than in many CEE countries and are rather comparable to those observed in more advanced economies (see, e.g., EC (2007), Table 2 and Figure 2; and Paci et al. (2007), Figure 2.3).

Another interesting finding from the data provided in Table 2.1 is that regional differences in housing and rental prices in the main regional cities (oblast centers, capital city of Crimean AR, Kyiv City, and Sevastopol City) which are presumably the most attractive places for potential migrants within each region are much larger than differences in income variables, particularly in wages. This suggests that economic returns from moving from one place to another within Ukraine are likely to be on average smaller than the costs of relocating and living in the new place, and only better off persons with greater innate abilities and motivation for personal achievement, less liquidity constraints and better access to mortgages can afford to migrate to the places with better employment opportunities and higher incomes (migration self-selection). Under such conditions, commuting and temporary labor migration seem to be more viable substitutes for permanent (residential) migration, particularly for lower skilled workers.

³ Regional statistics in Ukraine including migration statistics is provided for 27 administrative units: 24 oblasts, one Autonomous Republic (Crimean AR), and two cities with a special status – Kyiv and Sevastopol – which administratively are equivalent to oblasts. Table A.1 in Annex provides main characteristics of these regions grouped into five geographic macroregions, used later in our study.

Table 2.1. Regional disparities in selected labor market and socio-economic characteristics*

Characteristic	Year	Mean	Min	Max	Ratio of max to min	Coefficient of variation (%)	
						27 regions	25 regions
Unemployment rate (%)	2011	8.2	5.6	10.4	1.86	17.8	16.1
Average monthly gross wage (UAH)	2011	2358	1871	4012	2.14	18.9	13.5
Real wage growth rate (% yoy)	2011	7.6	2.8	13.3	4.75	31.9	29.3
Gross regional product per capita (UAH)	2010	20424	10939	70424	6.44	57.1	33.9
Growth rate of gross regional product per capita (% yoy)	2010	4.2	-0.1	13.5	135	87.7	88.1
Disposable per capita income (UAH)	2011	19858	14663	41817	2.85	25.3	13.4
Monthly household money expenditures (UAH)	2010	2731	2082	4276	2.05	16.5	9.6
Total local expenditures per capita (UAH)	2010	3463	2924	6248	2.14	17.1	6.1
Social local expenditures per capita (UAH)**	2010	2647	2263	3028	1.34	6.7	6.9
Life expectancy at birth (years)	2009 - 2010	70.5	68.7	73.7	1.07	1.9	1.8
Crime rate (number of registered crimes per 100,000 population)	2010	1001.7	419.0	1705.0	4.07	34.2	34.7
Emissions of air pollutants from stationary and mobile sources of pollution (kg per person)	2010	113.9	48.8	357.3	7.32	72.6	72.7
Share of population (6 years and over) with complete higher education (% based on HBS)	2011	18.9	11.5	38.8	3.37	33.9	19.3
Share of the labor force (25-70 years) with complete higher education (% based on LFS)	2010	25.0	15.2	56.2	3.70	29.7	15.0
Share of households living in rented housing (% based on HBS)	2011	2.5	0.4	6.1	15.25	49.7	44.3
Housing price at secondary market in the main regional city (UAH per sq.m)	2010	6823	5044	15071	2.99	31.3	20.2
Monthly rent payment for one bedroom apartment in the main regional city (UAH)	2010	1177.4	720	3512	4.88	49.4	30.4

Source: Expenditures of local governments per capita – author’s calculations based on the data of the Ministry of Finance on the structure of local expenditures published in the yearbook “Budget of Ukraine in 2010”, share of the labor force with complete higher education – author’s calculations based on the LFS data, housing and rental prices – author’s calculations based on the data base of the World Bank, the rest – State Statistics Service of Ukraine (various statistical yearbooks and web-page).

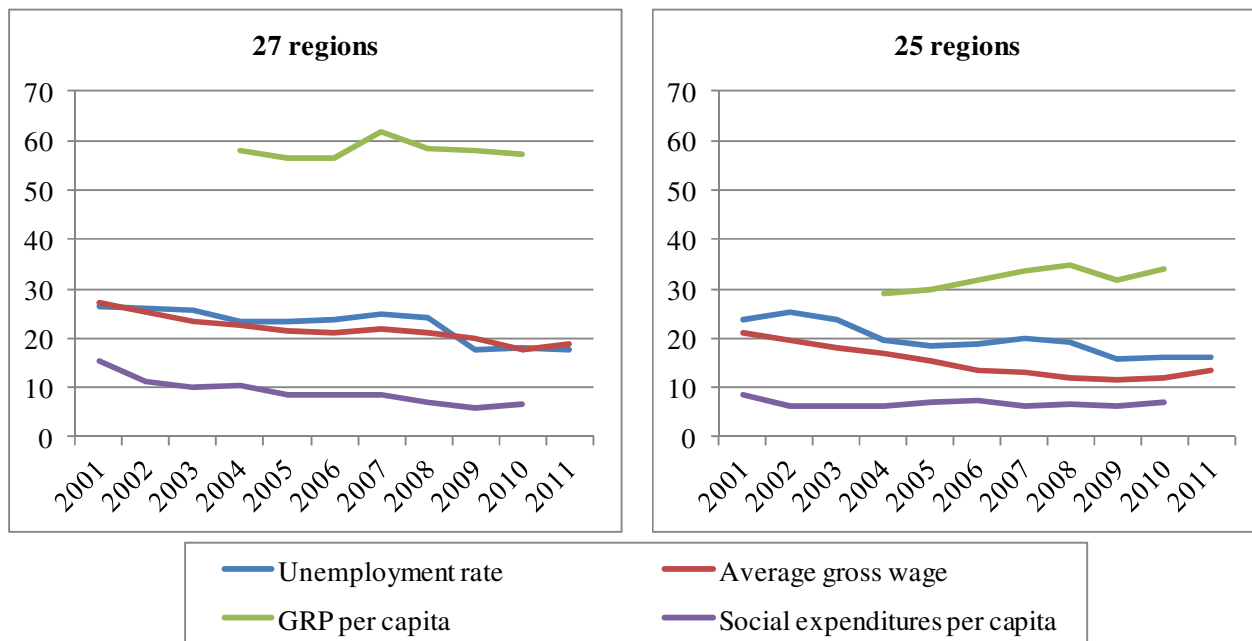
Note: * The sample of 25 regions does not include two cities with a special status (Kyiv and Sevastopol). The mean values are calculated as non-weighted means of regional-level values and therefore do not match with the national averages provided in macro-level statistics. Bold entries in Max/Min columns refer to Kyiv City. ** Social expenditures of local governments include expenditures on education, health care and social protection.

Figure 2.1 below depicts the evolution of regional disparities in regional unemployment rates, average gross wages, gross regional product per capita⁴ and local per capita social expenditures, measured by the coefficient of variation. Three out of the four characteristics displayed in this figure, namely unemployment rates, average wages, and local social expenditures per capita, show signs of gradual convergence between regions, particularly in a smaller sample without Kyiv and Sevastopol cities.

⁴ Statistics on gross regional product is available since 2004 only.

On the other hand, regional disparities in per capita gross regional product are much higher and increasing over time. According to the new economic geography models, regional income divergence can be explained not only by lasting differences between regions in their factor endowment, factor productivity, technologies, regional incentives and subsidies, and institutional capability, increasing returns to scale and transport costs, but also by the importance of centripetal (agglomerative) forces such as localized supply and demand networks, internal and external economies of scale, human capital spillovers and specialised infrastructure that lead to industrial clustering and agglomeration (see, e.g. Fujita et al. (1999), cited in EC (2007) and Paci et al. (2007)). In this environment, high labor and capital mobility from poorer to richer regions are likely to reinforce rather than reduce existing patterns of regional differentiation in terms economic development.

Figure 2.1. Coefficient of variation in regional unemployment rates, average gross wages, gross regional product per capita and local social expenditures per capita, 2001-2011



Note: See sources and a note to Table 2.1.

Despite decreasing regional labor market disparities over time, the rankings of regions in terms of economic and income indicators remained very stable throughout the last decade. Pearson’s correlation coefficients with previous year’s values (first-order autocorrelation) as well as correlation coefficients between values in 2010 and the earliest year in the sample approach 1 for both regional wages and GRP. A strong link between these two measures (correlation coefficient was 0.94 in 2010) suggests that higher wages are paid in richer regions. Although the recent economic crisis has exposed Ukraine to regional asymmetric shocks by affecting previously better-off regions more severely than others (Kupets, 2010) and therefore it might have resulted in the re-distribution of regions by their economic performance, our analysis reveals that regions showing better performance in 2001 tend to perform relatively better in 2009-2010, probably due to the safety margin accumulated in better times. However, this observation applies to the regional distribution of average wages and GRP in current UAH, i.e. nominal values, and it does not fit to the rankings of regions by the corresponding measures in real terms (i.e. annual real wage and GRP growth rates) which change from year to year inconsistently.

Regional unemployment rates were also highly correlated with previous year’s values, but their correlation with values of 2001 is quite modest (0.46). This suggests that there were some important changes in the regional distribution of unemployment rates that might signal about region-specific shocks and different labor market adjustment of regions to them.

Like in most countries, correlation between regional unemployment rates and average wages is found to be negative throughout the observed period indicating that workers employed in high unemployment areas earn on average less than identical workers living in the regions with low

unemployment. This provides tentative evidence for existence of the wage curve (see Blanchflower and Oswald, 1994) in Ukraine. The coefficient of variation between regional unemployment rates and average wages decreased from -0.73 in 2004 to -0.58 in 2010 but then increased to -0.65 in 2011.

Due to regional economic specialization and geographic concentration of manufacturing industries in Ukraine, its 27 regions may be well grouped into five geographic macroregions⁵ consisting of neighboring territories which also share similar strengths and weaknesses in terms of their economic and human development (see Table A.2 in Annex):

- *Kyiv City* is characterized by exceptionally high levels of economic and human development, even though it performs the worst in terms of social and environmental situation. High living standards and favorable employment opportunities, concentration of human capital, investment, production and overall prosperity in the capital city attract internal migrants from the rest of the country despite very high housing and rental prices. Nevertheless, 62.3 percent of gross interchange in 2010 occurred between Kyiv City and non-distant oblasts located in North and Center (Table 2.2);

Table 2.2. Gross interchange and net migration between macroregions, 2010

Destination region (j)	Kyiv City		Center and North		East		South		West	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net
Origin region (i)										
Kyiv City	–	–	48578	-2388	9608	-3196	6386	-772	13350	-2010
Center and North	48578	2388	47194	0	26937	-383	14811	769	15257	-1461
East	9608	3196	26937	383	58216	0	18262	1686	7012	-132
South	6386	772	14811	-769	18262	-1686	24292	0	6205	-717
West	13350	2010	15257	1461	7012	132	6205	717	52856	0
Total	77922	8366	152777	-1313	120035	-5133	69956	2400	94680	-4320

Source: Author's calculations based on State Statistics Service data on inter-regional migration flows in 2010.

Note: Gross interchange or turnover between two areas i and j is defined as the sum of a pair of streams $M_{ij}+M_{ji}$ (UN, 1970). Net migration between two areas i and j is defined as the difference between in-migration to area j (M_{ij}) and out-migration from it (M_{ji}).

- *Center and North* (consisting of Vinnytsia, Zhytomyr, Kyiv, Kirovohrad, Poltava, Sumy, Cherkasy and Chernihiv oblasts) with predominantly Ukrainian-speaking population and high share of agriculture in total employment. Despite proximity to the capital city and great potential in economic development, this macroregion lags behind in many aspects of labor market and human development. On the other hand, proximity to Kyiv City encourages many people to move to the capital region either with the officially registered change of residence or without it. This contributes to constant population losses in the macroregion even though they are slightly offset by net in-migration of population from Eastern and Western regions;
- *industrially developed and urbanized East* with predominantly Russian-speaking population (which consists of Dnipropetrovsk, Donetsk, Zaporizhia, Luhansk and Kharkiv oblasts) is the second richest macroregion of Ukraine after Kyiv City with rather favorable labor market performance but it lags behind the other macroregions in terms of demographic development, social situation, environment quality and per capita expenditures from local budgets. As a result, despite relatively high wages and low unemployment rates, East faced net population losses from migration interchange with all other macroregions except for less developed West in 2010;
- *South* (which includes Crimean AR and Sevastopol, Mykolayiv, Odesa and Kherson oblasts) with predominantly Russian-speaking population and rather diversified economy. The overall human and labor market development in this macroregion is more favorable than in the rest of the country (if leaving aside Kyiv City) but it is highly volatile because of the significant dependence on the

⁵ It is necessary to note that there is no officially adopted subdivision of Ukraine into macroregions, and therefore the number of regions, its names and content provided here may differ from the ones offered in other regional studies. According to an earlier author's analysis of regional statistics on human and economic development (Kupets, 2009), grouping of Ukrainian regions based on a cluster analysis seems to reflect regional disparities better (see Table A.2 in Annex).

season, weather conditions, and political situation (particularly in Crimean AR and Sevastopol). Favorable labor market performance accompanied by climatological and environmental amenities attract internal migrants not only from the regions belonging to the same macroregion but also and more importantly from other macroregions (about 65.3 percent of gross interchange in 2010);

- *agrarian and predominantly rural West* with Ukrainian-speaking population (which includes Volyn, Zakarpattia, Ivano-Frankivsk, Lviv, Rivne, Ternopil, Khmelnytskyi and Chernivtsi oblasts) exhibits the worst performance by economic, labor market and human capital characteristics but it performs fairly well in terms of demographic, social, and environmental situation. Weak labor market development, poor living conditions and material well-being of the local population encourage considerable out-migration of population, both within the boundaries of Ukraine and outside them. However, the bulk of inter-regional migration flows originating in the Western macroregion (about 56 percent of gross interchange in 2010) occurs between oblasts of the same macroregion.

These findings suggest that there are large and persistent regional disparities in unemployment, income and human development characteristics in Ukraine. Regions tend to be clustered into distinct groups of development and prosperity that impedes further convergence between the best performing and the most backward regions. Whether internal migration of population is instrumental in absorption of asymmetric shocks and facilitation of regional convergence in Ukraine is a subject of our further research. After a closer look at the magnitude and characteristics of internal migration in Ukraine in the next chapter, we will examine the responsiveness of inter-regional migration to regional differences in wages, unemployment rates and other important characteristics of regional economic and human development.

3. Data and stylized facts about internal migration in Ukraine

3.1. Data and definitions

According to the United Nations manual, *Methods of Measuring Internal Migration* (1970), “*migration* is defined as a move from one migration-defining area to another (or a move of some specified minimum distance) that was made during a given migration interval and that involved a change of residence. A *migrant* is a person who has changed his usual place of residence from one migration-defining area to another (or who moved some specified minimum distance) at least once during the migration interval... An *in-migrant* is a person who enters a migration-defining area by crossing its boundary from some point outside the area, but within the same country. He is to be distinguished from an “immigrant” who is an international migrant entering the area from a place outside the country... An *out-migrant* is a person who departs from a migration-defining area by crossing its boundary to a point outside it, but within the same country. He is to be distinguished from an “emigrant” who is an international migrant, departing to another country by crossing an international boundary”.

The primary source of data on migration flows in Ukraine is administrative data on in-migration (inflows), out-migration (outflows) and net migration (inflows less outflows) based on registration of population by the place of permanent residence (previously known as *propiska*). According to the Law On Freedom of Movement and Free Choice of the Place of Residence in Ukraine (effective since January 2004), a citizen of Ukraine, as well as a foreigner or a stateless person who stays in Ukraine legally, shall register his/her place of residence during ten days after arrival at the new place of residence which is defined by the Law as an administrative-territorial unit where a person lives for at least 6 months during a year. To be registered, a person shall submit a written application, internal passport, the receipt of state duty payment or the document about exemption from it, and two copies of the filled form of deregistration from the previous place of residence. According to this Law, it shall be prohibited to require other documents in order to register the place of residence. However, according to the Civil Code of Ukraine, the place of residence is a place where a person permanently or predominantly lives as an owner, under the terms of the tenancy contract or under other statutory terms. Therefore, to be registered, a person should provide grounds for registration in this particular place (which should be recorded in the registration card), i.e. a proof of residence such as an authorization to occupy an apartment, a property certificate, a tenancy contract, or an alternative

document or he/she needs the agreement of the owner in case of private ownership or of all adults already registered in the residence in case of state/communal ownership.

Due to existing collisions in legal norms and few incentives to comply strictly with the rules of registration, not all individuals changing their place of residence are properly counted in official migration statistics. Furthermore, the year of registration of the new place of residence may significantly differ from the year of movement to the new territory. Employment-related migration which is usually not accompanied by the corresponding changes in the place of residence through the registration system also remains undocumented. On the other hand, population migration statistics reports movements of population which are not necessarily induced by the need of searching for an acceptable employment opportunity but rather related to other important life-cycle events such as start and completion of post-secondary studies, marriage and divorce, birth, aging, and leaving home of children, retirement, improvement of housing conditions, and the like.⁶ In many cases migration can be also involuntary and of the contracted type, such as job transfers in the public sector (the relocation of military personnel, civil servants, judges, prosecutors, management personnel of public enterprises) as well as in the private sector when “the individual migrates with a job in hand” (Greenwood, 1997). Therefore, official migration statistics should be interpreted with caution as it underestimates the true magnitude of workers’ flows but includes many types of migration that are not directly linked to traditional factors of labor migration such as income and employment differentials. This, however, is a typical problem of most migration studies in CEE countries, as population registers are the only reliable source of data on migration in these countries (Fidrmuc, 2004; Hazans, 2003a; Andrienko and Guriev, 2004; Bloze, 2009; Bunea, 2012).

Available migration statistics in Ukraine records all registered residential moves of population within the country during a given period of time (usually month or year) of the following types: (i) within the same administrative unit (intra-regional migration); (ii) between 27 administrative units (inter-regional migration); (iii) total internal migration (the sum of the former two).⁷ We will use administrative data on annual internal migration flows for the period 2002-2010 for which survey-based indicators (e.g. unemployment rate or household income) have been calculated with taking into account the structure of population according to the last population Census conducted in December 2001.

Taking into account the average size of Ukrainian regions (1698.9 thousand people in 2010), administrative division of Ukraine into 27 units as basic regions for the application of regional policies is consistent with the NUTS system⁸ and corresponds to its second level (NUTS-2). This allows us to compare regional indicators in Ukraine to those in the old and new EU member states.

Amongst the most frequently used indicators in the analysis of internal population migration based on administrative records are the following:

$$\begin{aligned}
 \text{In-migration_rate}_{i,t} &= \frac{\text{Inflows}_{i,t}}{\text{Population}_{i,t}} * 100\% \\
 \text{Out-migration_rate}_{i,t} &= \frac{\text{Outflows}_{i,t}}{\text{Population}_{i,t}} * 100\% \\
 \text{Net_migration_rate}_{i,t} &= \frac{\text{Inflows}_{i,t} - \text{Outflows}_{i,t}}{\text{Population}_{i,t}} * 100\% \\
 \text{Gross_migration_rate}_{i,t} &= \frac{\text{Inflows}_{i,t} + \text{Outflows}_{i,t}}{\text{Population}_{i,t}} * 100\%
 \end{aligned}
 \tag{1} - (4)$$

⁶ For example, according to the ULMS (2003, 2004 and 2007) the most frequently mentioned reasons for the change of residence were marriage or moving in with partner, moving in/out from parents or relatives, desire to change housing conditions, and starting studies.

⁷ Although population registers count migrations (events) rather than migrants (transitions), we use these terms interchangeably assuming that the share of multiple and return migration is negligible. See UN (1970) and Bell et al. (2002) for a summary of issues in regard to the definition, measurement and collection of data on migration.

⁸ NUTS (Nomenclature of Territorial Units for Statistics) is a standard developed, regulated by the EU and implemented in the EU member states.

where $Inflows_{i,t}$ and $Outflows_{i,t}$ stand for in-migration and out-migration to/from the region i during time period t (year in our study) respectively, and $Population_{i,t}$ is the average annual de facto population of the respective region i in time period t .⁹ Migration rates as well as other demographic indicators in Ukrainian statistics are measured in per mille (i.e. per 1,000 population in a given year) but we will use the measures of a percentage type for the sake of simplicity.

Eq. (1) and eq. (2) define gross in- and out-migration rates which may be seen as general measures of region's attraction or distraction respectively. Eq. (3) defines the net migration rate which may be used to identify the 'winners' and 'losers' in the context of inter-regional migration. Finally, the gross migration rate in eq. (4) measures the total migration intensity in the respective regions and helps identifying more and less dynamic regions in terms of migration.

Following Huber (2005), the country-level gross migration rate (or turnover rate) is the share of the population which has changed its place of residence inside the borders of a country within a year and can be defined as half of the sum of total internal outflows and inflows across all regions (division by two is necessary to avoid double counting):

$$Gross_migration_rate_t = \frac{1}{2} \frac{\sum_i (Inflows_{i,t} + Outflows_{i,t})}{\sum_i Population_{i,t}} * 100\% \quad (5)$$

The net migration rate at the country level (or the rate of redistribution due to migration according to UN(1970)) is the sum of net changes of like sign, which is the same as taking one half of the sum of all changes without regard to sign¹⁰:

$$Net_migration_rate_t = \frac{\sum_i Inflows_{i,t} - Outflows_{i,t}}{\sum_i Population_{i,t}} * 100\% = \frac{1}{2} \frac{\sum_i |Inflows_{i,t} - Outflows_{i,t}|}{\sum_i Population_{i,t}} * 100\% \quad (6)$$

Finally, an index which relates net migration to turnover and is called an 'effectiveness index' can be estimated as follows:

$$Effectiveness_index_t = \frac{Net_migration_rate_t}{Gross_migration_rate_t} * 100\% = \frac{\sum_i |Inflows_{i,t} - Outflows_{i,t}|}{\sum_i (Inflows_{i,t} + Outflows_{i,t})} * 100\% \quad (7)$$

If migration is completely effective (that is, migration is all in one direction), an effectiveness index takes value of 100%. A difference between 100% and the index shows a part of migration accounted for by churning flows when people move in and out of the same region. According to the literature reviewed by Huber (2005), these churning flows can be explained by: (i) heterogeneity of individual tastes and characteristics of regional demand for labor; (ii) different life-cycle positions of individuals (e.g. students migrating between their homes and place of education); (iii) endogenous wealth effects arising among ex-ante homogenous individuals; (iv) and the processes of stochastic matching and dynamic adjustment.

The other two data sources which contain migration-related information is the individual-level data from the Ukrainian Labor Force Survey (LFS) and the Ukrainian Longitudinal Monitoring Survey (ULMS). The former is used in our study for the analysis of the commuting behavior of the employed in 2008-2009. The latter is a rich panel data set which could enable a rigorous dynamic analysis of the migration behavior of individuals, their main motives and characteristics but because of its small sample of recent migrants which moved to another place of residence during the observed period

⁹ See Chapter VI in UN (1970) for an overview of migration rates, ratios and indices and the problems associated with their construction. Our formulas (1)-(3) agree with formulas (31)-(33) in UN (1970).

¹⁰ In order to compare regional-level gross and net migrations rates (estimated according to eq. 3 and 4) to those at the national level (eq. 5 and 6), either regional-level indicators need to be divided by two or county-level indicators need to be multiplied by two.

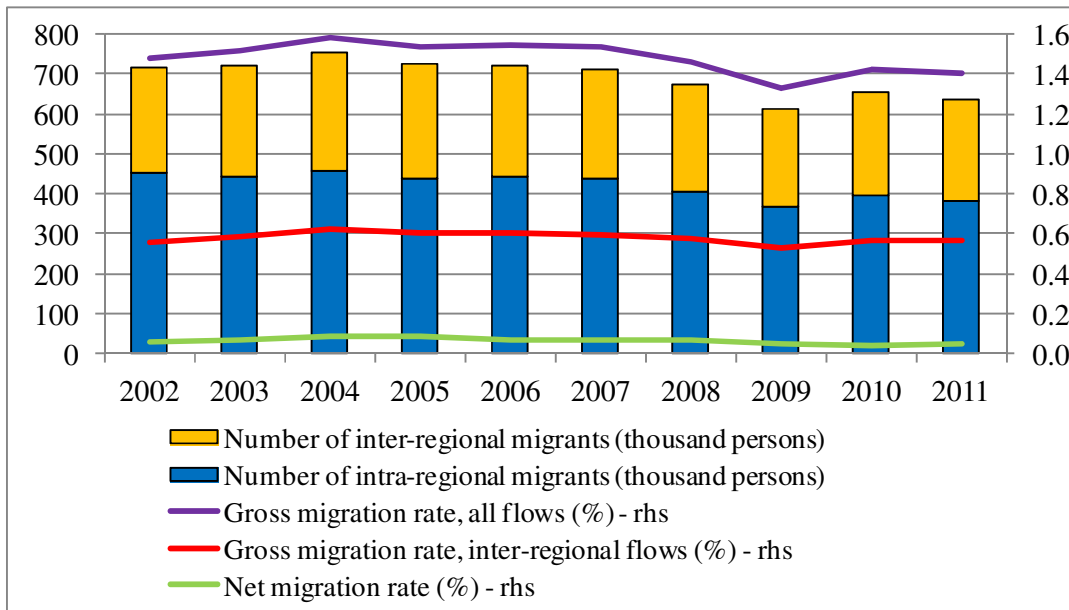
between the first and last waves of the survey in 2003 and 2007 respectively¹¹ we will not perform our own analysis but rather use existing empirical studies based on the ULMS.

Finally, an important and probably the most reliable source of data on population migration in most countries is the Population Census (UN, 1970; Bell, 2003). We will use the data from the last Census in Ukraine carried out in December 2001 to quantify the stock of internal migrants of all ages and of working age used as a proxy for the productive part of the whole migrant population. On the basis of the answer about the place of birth (the birth-place approach), *(lifetime) migrants* are defined as persons who were enumerated in a place different from the place where they were born (UN, 1970). *Recent migrants* are defined according to the duration-of-residence approach as lifetime migrants who moved to their destinations during 5 years and less prior to the census (i.e. during 1997-2001). A serious drawback of the Census data in Ukraine however is that they do not provide important information on migration patterns of population in the new Millennium.

3.2. Internal migration in Ukraine: dynamics and international comparison

In 2011, 637,713 persons were internal migrants in Ukraine based on their official place of residence, which constitute about 1.4 percent of the total country population. This figure indicates a decrease of about 2.3 percent from the previous year which recorded 652,639 internal migrants. Despite some increase in 2010, gross migration rate remains below its pre-crisis levels in 2004-2007 (Figure 3.1). This trend might be attributed to liquidity constraints faced by potential migrants and housing market imperfections accentuated by the economic and financial crisis in 2008-2009. Besides, decreasing number of youth and declining real household incomes that could be used for investment in children’s education contribute to a decrease in the number of high school graduates moving to another settlement to pursue studies in higher educational institutions. Finally, it is also possible that population react on falling inter-regional economic differences but increasing migration costs by changing their permanent places of residence less frequently.

Figure 3.1. Internal migration in Ukraine, 2002-2011



Source: State Statistics Service of Ukraine (numbers) and author’s calculations (rates according to eq. (5) and (6)).

As Figure 3.1 shows, of the total migrants within Ukraine, about 60-61 percent are migrants within the same administrative region (i.e. intra-regional migrants) whereas the rest 39-40 percent move from one

¹¹ For example, in the last wave conducted in 2007 which is based on the sample of the first wave, 494 individuals (7.29% of all respondents) reported about the change in residence since the previous interview in April-June 2004. However, the bulk of these changes are movements within the same settlement (mainly because of marriage, divorce, etc.). If we look at the number of persons who changed residence since 2004 and whose settlement was different from their place of birth, we have only 218 cases. The reason for this small number of cases is that it is difficult or impossible to trace sampled households that moved to another settlement. Besides, these households did not want to put up with the effort of being interviewed repeatedly, and so the panel attrition was very high.

region to another (i.e. inter-regional migrants). If we take into account only inter-regional flows, gross migration rate decreases to less than 0.6 percent of population in 2007-2011.

In 2002-2011, after reaching its peak value of 0.086 percent in 2004 net migration rate decreased to 0.046 percent of the population in 2011. As a result, an effectiveness index of inter-regional migration declined from 13.8 percent in 2004 to 8.2 percent in 2011. This implies that the importance of churning flows which usually contribute little to the narrowing of regional disparities has considerably increased since 2004.

Comparison of inter-regional migration rates in Ukraine and selected EU countries provided in Table 3.1 reveals that despite having a larger number of regions Ukraine has lower inter-regional migration than in most Western European countries which are characterized by less flexible labor markets and population than Australia, Canada, New Zealand and the US.¹² Meanwhile, Ukrainian migration rates are largely comparable to those found in more advanced transition economies which joined the EU, for example, the Czech Republic and Estonia, and are somewhat higher than in Poland and Slovakia. The stylized fact of low and falling migration rates in the face of large regional disparities in terms of regional income and unemployment rates in the new EU member states has been repeatedly documented in the literature (see, among many others, Huber, 2005; Fidrmuc, 2004; EC, 2007). The same trend seems to hold true in Ukraine.

Table 3.1. Indicators of inter-regional migration in Ukraine and selected EU countries

Country	Regional disaggregation	Number of regions	Average population (thousand)	Gross migration rate (%)	Net migration rate (%)	Effectiveness index of inter-regional migration (%)
Ukraine (2002)	eq. to NUTS II	27	1794.7	0.55	0.060	10.86
Ukraine (2011)	eq. to NUTS II	27	1692.8	0.57	0.046	8.20
Austria (1999)	NUTS II	9	898.1	0.93	0.054	5.79
Belgium (1999)	NUTS II	11	928.5	1.28	0.086	6.73
Denmark (1999)	NUTS III	15	354.6	3.41	0.095	2.77
Spain (1999)	NUTS II	17	2316.6	0.76	0.099	12.96
Netherlands (1999)	NUTS II	12	1313.4	1.69	0.063	3.75
Sweden (1999)	NUTS II	6	1048.8	1.87	0.182	9.75
Czech Republic (1999)	NUTS II	8	1286.2	0.50	0.063	12.61
Estonia(1999)	NUTS III	5	275.8	0.53	0.024	4.64
Hungary (1999)	NUTS II	7	1441.7	1.32	0.054	4.11
Poland (1999)	NUTS II	16	2415.8	0.29	0.033	11.20
Romania (1999)	NUTS II	8	2811.1	1.23	0.013	1.09
Slovenia (1999)	NUTS III	12	164.9	0.30	0.021	7.15
Slovakia (2000)	NUTS II	4	1348.4	0.22	0.023	10.25

Source: Ukraine – author’s calculations based on administrative data on inter-regional flows, EU countries – Huber (2005), Tables 1 and 2.

According to the last population Census in 2001, the total stock of internal lifetime migrants defined on the basis of the birth-place approach numbered 12,783,899 people, or 26.5 percent of the total de facto population. The number of internal migrants of working age (15 to 64 years inclusive in the UN definition) who were more likely to move for employment-related reasons than their older counterparts was estimated about 10,256,286 people, or 30.8 percent of working-age population. As of December 2001, less than 3 percent (7 percent) of working-age population, including those born abroad, lived at their current place of residence for up to one (five) year(s). At the same time, about 69.4 percent of individuals aged 15-64 years lived at their current place of residence for 12 years and more, i.e. they changed their place of residence before Ukraine gained its independence in 1991. This finding supports the view that migration intensity of working age individuals has significantly decreased since the collapse of the Soviet Union.

¹² The main difficulties of international comparisons of internal migration rates are discussed in Greenwood (1997) and Bell et al. (2002).

Table 3.2. Internal migration of working age population in Ukraine and selected transition countries

Country and year of survey (ranked by share of migrants)	Internal migrants* (% of working age population)	Recent migrants** (<=5 years, % of total working age population)	Recent migrants** (% of internal migrants)
Bosnia & Herzegovina 2001	52.5	12.8	24.5
Azerbaijan 1995	33.2	19.4	58.4
Ukraine 2001***	30.8	7	22.6
Armenia 1999	24.5	22.4	91.7
Albania 2005	23.9	4.1	17.3
Kyrgyz Republic 1997	16.2	4.7	29.2
Romania 1994	15.1	1.9	12.8
Croatia 2004	14.7	1.2	8.0
Bulgaria 2001	14.3	1.4	10.0
Tajikistan 2003	9.9	1.5	15.7
Kazakhstan 1996	9.3	1.4	14.7

Source: Ukraine – author’s calculations based on Census data, other countries – WB (2008, Table 5.3).

Note: *An internal migrant is defined as an individual who is not living in the same district in which s/he was born. This definition does not count returnees as migrants, that is, persons who have moved away from their place of birth in the past, but have returned by the time of the survey. ** A recent migrant is a person who migrated at most five years prior to the census. *** Conventional age brackets (15-64 years) are used for the working age population rather than those according to the Ukrainian legislation (15-54 years for women and 15-59 for men). Estimates for recent internal migrants in Ukraine are very rough as they include foreign-born persons because of data limitations, namely statistics on the composition of migrants by duration of living in the current place of residence without distinguishing between persons born in Ukraine and abroad. Taking into account large inflows of people from the former Soviet Union republics in the 1990-s and before, these numbers are likely to be significantly overestimated. For comparison, the share of recent migrants in the total stock of working age migrants including foreign-born persons was 16.8 per cent.

If we believe data offered in the World Development Report 2009 and our estimations for Ukraine (Table 3.2), Ukraine compares favorably with other transition economies in terms of the total share of internal migrants in working age population but it lags behind in proportion of recent migrants compared to some countries experiencing ethnic and war conflicts (such as Bosnia and Herzegovina, Armenia, Azerbaijan, the Kyrgyz Republic) that forced many people to move to other parts of their countries. But this cross-country comparison is provisional and is subject to later alteration as it does not control for the average size and the number of geographic units which are likely to impact the number of internal migrants recorded in each country.

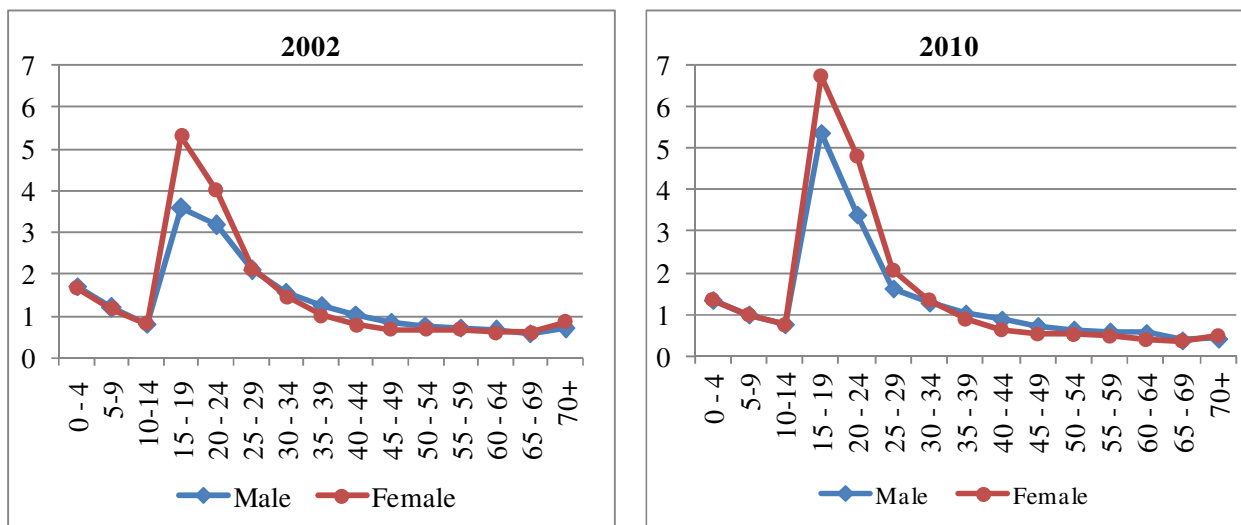
3.3. Internal migration by age, sex and urban/ rural divide¹³

Age. Figures 3.2 and 3.3 depicting gross internal migration rates by age groups reveal that the peak propensity occurs in the 15-19-year-old age group. In 2010, the gross migration rate peaked at 6 percent in the 15-19-year-old age group, fell to 4.1 percent for the 20-24-year-old group and then declined steadily, with a slight upturn after 70 years. Migration propensity is also relatively high for children under five years old that reflects their migration with parents, who are typically in the age groups with high mobility. These patterns are long-standing in Ukraine, and in general are similar to those found in many other countries. The major difference between migration age profiles in Ukraine and developed economies (see, e.g. Etzo (2008) for Italy, Bell et al. (2002) for Great Britain and Australia, Kupiszewski et al. (2000) for Switzerland, Greenwood (1997) for the US) however is that annual internal migration propensity peaks at younger age in Ukraine than in the developed world.¹⁴ Besides, unlike the developed countries, there are no signs of consumption-led retirement migration in Ukraine.

Figure 3.2. Gross internal migration rates by age and sex (%), 2002 vs. 2010

¹³ Due to data limitations this subsection refers to total internal migration, i.e. both intra- and inter-regional migration.

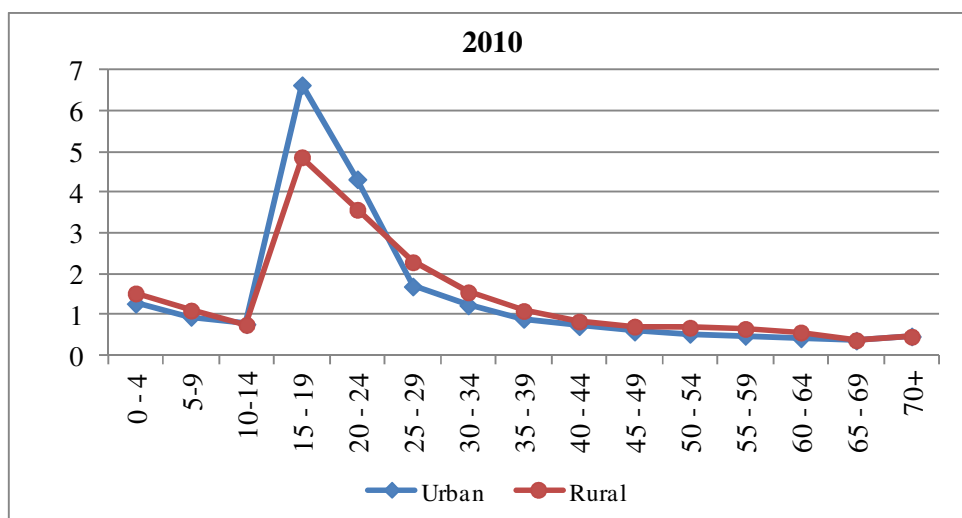
¹⁴ Available evidence on internal migration in Russia (<http://demoscope.ru/weekly/2005/0185/analit01.php>) suggests that migration age profiles, particularly for intra-regional migration, are largely comparable to those observed in Ukraine but gender differences in Russia appear to be much more pronounced than in Ukraine.



Source: State Statistics Service of Ukraine, author's calculations.

Note: The gross migration rates show the number of all documented migrants within Ukraine in 2002 and 2010 relative to the average annual *de jure* population for each sex and five-year age group. The starting point was data on total and international migration inflows and outflows by sex and five-year age groups from which we calculated gross internal migration flows and then gross migration rates by age and sex according to eq.(5).

Figure 3.3. Gross internal migration rates by age and urban/rural divide (%), 2010



Source: State Statistics Service of Ukraine, author's calculations.

Note: The gross migration rates show the number of all of all documented migrants within Ukraine in 2010 relative to the average annual *de jure* population for each population group (urban vs. rural) and five-year age group. The starting point was data on total and international migration inflows and outflows by sex, five-year age groups and urban/ rural divide from which we calculated gross internal migration flows for both sexes and then gross migration rates by age and urban/ rural divide according to eq.(5). Data on migration flows by age and urban/ rural divide with distinguishing between international and internal flows were not available before 2008.

Unlike the other age groups, propensity of youth (15 to 24 years according to the UN definition) to migrate within the country increased between 2002 and 2009 (Figure 3.2). People in their late teens and early twenties move for education, employment and family reasons (to leave parents' home and start families) and therefore play an important role in both the inter-regional and rural to urban migration turnover. However, the primary reason for officially registered migration of teens is education.¹⁵ After completing their studies some of them come back to their home regions but many

¹⁵ Many young people certainly can also have labor market reasons for migration but these employment-related moves are most likely to be unregistered as young people can hardly afford to buy an apartment or find alternative ways of being officially registered in the new place of residence. Other important motives for migration of young people are family reasons. As suggested by Hazans (2004), traditionally strong family links sustained between relatives living in different parts of the country make the typical 'travel-to-find-a-spouse-area' larger than one would otherwise expect, and contribute to inter-regional migration which is not necessarily related to labor market differentials in expected way.

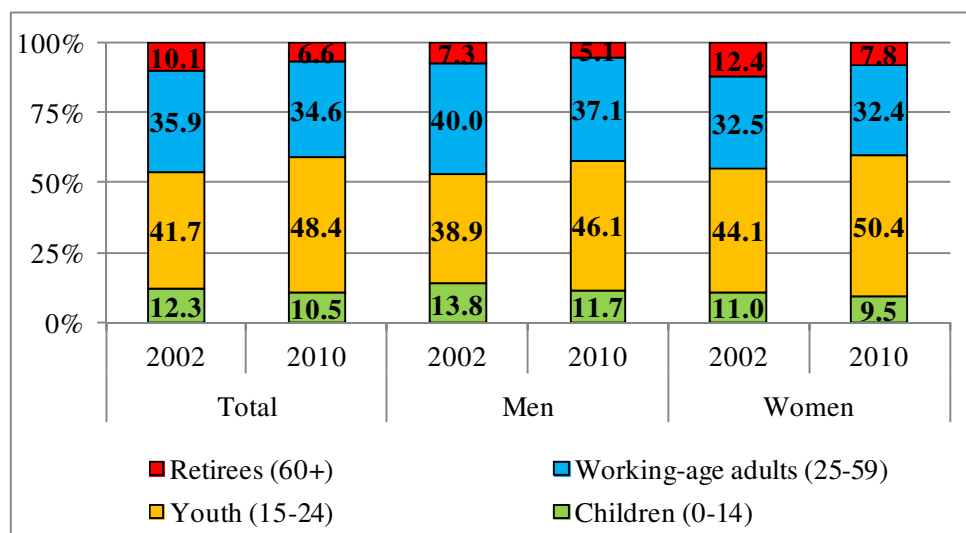
find employment and stay in the host towns and cities that are more attractive not only to study but also to work. Given this, migration to study can be often seen as a first step in labor migration. Unfortunately, there is no data on the share of young people moving to study and then staying to work there but we can draw some conclusions from the official migration statistics regions for two age cohorts (15-19 and 20-24 years).

The latest available statistics on age profiles of migration by regions in 2007 (Table A.3 in Annex) reveals that teens in pursuit of post-secondary and tertiary education went predominantly to such education centers as Kyiv, Kharkiv, Dnipropetrovsk, Odesa, Lviv, Chernivtsi and Sevastopol. Although net inflows of teens (15-19 years) to these regions were accompanied by net outflows of their older counterparts (20-24 years), the number of graduates moving back to their home regions or to some other regions of employment was significantly smaller than the number of incoming teens moving to study. Odesa oblast was the only exception as it experienced net migration gains in all age groups. As a result, all regions attracting more teens initially had net gains of youth population as a whole (see column 6 in Table A.3). The pattern in most other regions was completely the opposite, with net migration outflows of teens, net migration inflows of young people aged 20-24 years, and resulting net losses of youth population. Kirovohrad, Rivne, and Ternopil oblasts had net losses in all age groups. Surprisingly, Donetsk region which is ranked second in terms of the number of higher educational institutions (but not in terms of the number of students per 10,000 people) did not attract more teens from the other regions than it lost. Therefore, there were more important factors than the availability of higher educational institutions which had affected decision of young people to out-migrate from this region.

As Figures 3.2 and 3.3 also show, females and urban young people under 30 years have a higher propensity to migrate than their male and rural counterparts. On the other hand, men and rural population appear to have higher propensity of changing their official place of residence in older age when internal migration is more likely to be motivated by labor market reasons rather than by education or marriage. This suggests that rural adult males are more mobile and reactive to employment opportunities outside their settlements, and thus have a higher potential to ease inefficiencies due to the regional disparities within Ukraine.

Not surprisingly, age groups belonging to the working age category in Ukraine (15-24 and 25-59) prevail in migrant flows, making up together 82.9 per cent of total internal migrant flows in 2010 (see Figure 3.4). A worrisome development is that despite huge regional disparities and urban-rural differences, the number of internal migrants of working age decreased from 557,128 people in 2002 and 541,297 people in 2011. Furthermore, decreasing number and share of working-age adults (aged between 25 and 59) along with increasing number and share of youth implies that young migrants primarily motivated by education motives have crowded out those who at least hypothetically could move for labor market reasons. This finding might also suggest however that migration of working-age adults has not declined and even increased but for housing-related reasons it became more informal (i.e. without change of the place of registration) and therefore it is concealed from the official migration statistics.

Figure 3.4. Composition of (gross) internal migration by age group and sex (%), 2002 vs. 2010



Source: State Statistics Service of Ukraine, author's calculations.

Sex. More than half of all internal migrants in Ukraine (53.7 percent in 2010) are female. This may in part be explained by the higher share of females in total population (53.9 percent in 2010) but also by their higher enrollment rates in higher educational institutions that results in more education-motivated migration among women. This argument is supported by higher migration intensity of young females shown in Figure 3.2 as well as by higher and increasing share of youth in total internal migration among women presented in Figure 3.4.

There are also considerable gender differences in the age composition of gross migration in rural and urban areas. In the same way as in the total population, gross migration in urban areas is dominated by youth aged 15 to 24 (49.4 percent among urban male migrants and 53 percent among urban female migrants in 2010), followed by working-age adults (35.4 percent and 31.4 percent respectively). The similar pattern but with lower share of young people (44.5 percent) and higher share of older working-age migrants (34.5 percent) is observed among rural female migrants. At the same time, gross internal migration among rural male is comprised of slightly more adult workers (40.7 percent) than of youth (38.6 percent).

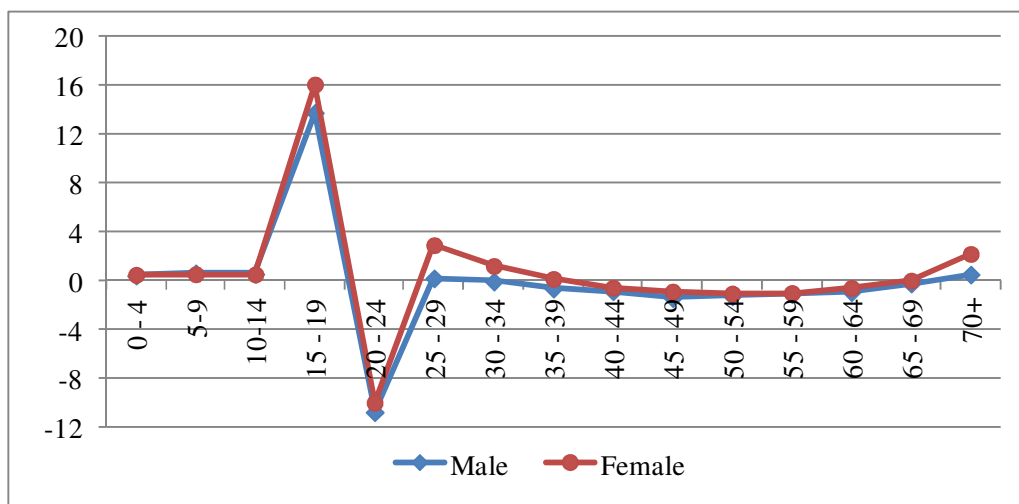
Rural-urban migration. Overall, urban areas gain population through internal migration from both intra- and inter-regional migration, even though these net gains in 2011 has significantly reduced over the last years - from 52.8 thousand people in 2005 to just 9.6 thousand people in 2011 (see Table A.4 in Annex). If migration from rural to urban areas is labor-related, it is considered to be an important part of the urbanization process and is often viewed as the labor market adjustment to the structural shifts from agriculture to manufacturing and services (Lall et al., 2007; Harris and Todaro, 1970). Population statistics suggests that despite continuous net gains of urban population from in-migration of rural inhabitants the degree of urbanization is fairly low in Ukraine: the share of population living in urban areas increased by about 1.2 percentage points over the whole period of independence, from 66.9 percent in 1992 to 68.1 in 2010.¹⁶ This finding lets support to the view that rural to urban migration in Ukraine as well as immigration to urban areas from abroad (at least according to officially recorded migration data) is not enough to offset substantial losses of urban population due to natural decrease (see Table A.4 in Annex). Continuous population decline in urban areas may impair the long-term development potential of both sending and receiving communities, bringing into question the availability of critical human resources for long-term economic and social development and fiscal sustainability of local governments.

Moving to urban areas is often a common feature among young adults who have strong incentives to leave rural areas in pursuit of post-secondary education and/ or search for job opportunities that either are not available in rural economies with a relatively non-diverse industrial and occupational mix or offer lower rewards to available human capital than in cities. Figure 3.5 shows that net migration to

¹⁶ According to the World Development Indicators data for 2010, the share of urban population in Ukraine was lower than in Belarus (74.3 percent), Russia (72.8 percent) and Hungary (68.3 percent) but it far exceeded the one in Poland (61.2 percent), Slovak Republic (56.8 percent), Romania (54.6 percent), and Moldova (41.2 percent).

urban areas in Ukraine has been not in complete accord with what would be expected: although there were net gains to cities and towns from out-migration of rural inhabitants equal to 29,916 people aged 15-19 years, 4,446 people aged between 25 and 34 years and 3,388 children under 15 years, the rural areas gained 20,662 young people (aged 20-24 years) and 9,738 people of ages between 35 and 69 years. Net inflows of rural inhabitants aged 70 and over, particularly women, into urban areas can be attributed to their reunification with children who live in urban areas. Anecdotal evidence suggests that this occurs predominantly at the outset of a serious illness of the elderly family member previously living in the countryside or after his/her spouse's death.

Figure 3.5. Net internal migration to urban areas by age group and sex (thousand persons), 2010



Source: State Statistics Service of Ukraine, author's calculations.

Sizeable out-migration of young people aged 20-24 years from urban areas may be a sign of non-assimilation of migrants with rural origins to the urban labor market after graduation from educational institutions and forced return to their home places.¹⁷ Return migration of young and well-educated people to rural areas may bring the positive “brain gain” effect to the origin areas. But if initial out-migration of teens is positively selective and return migration is negatively selective in terms of education and skills (i.e. the average quality of migrants is superior to the average quality of non-migrants whereas the average quality of returning migrants is inferior to the quality of the initial out-migrant stock) such migration can reinforce stagnation and limit subsequent development potential of rural areas by depriving sending regions of critically needed human capital through the “brain drain”.

Net migration losses of older urban population of working age (between 35 and 59 years) point to prevailing counterurbanization in the family ages explained by the following factors. First, increasing food and utility prices and worsening employment opportunities in urban areas and the preference for the ‘rural idyll’ are likely to encourage return migration of rural-born adult workers. Second, flows of high-income earners and their families from apartments in big cities to own houses in surrounding rural municipalities which have been observed recently (so called suburbanization) are further facilitated by increased rural accessibility owing to a rapid development of transport, telecommunication and social infrastructures in suburban areas. Such migration (as well as emerging out-migration of relatively worse-off urban workers to rural areas for the reasons of cheaper housing) which occurs without changing of workplace is obviously not associated with income or unemployment disparities between rural and urban areas.

3.4. Patterns of inter-regional migration

Inter-regional migration rates in 2002-2011. Figure A.1 in Annex depicts the evolution of inter-regional migration rates in 2002-2011 calculated according to eq. (1)-(4) for all 27 regions. It reveals that in most cases, in-migration from other regions approximately matches out-migration to other

¹⁷ Some of these migration flows may be fake, however, as many graduates are likely to keep working in the place of education but they are forced to change the official (i.e. registered) place of residence from the students' hostel to their parents' home.

regions, resulting in about zero net migration rates. But some places, such as Kyiv City, Kharkiv oblast and Sevastopol City, have consistently gained population through internal migration. Over the whole period covered by our study (2002-2011), the region with the biggest net gains from internal migration was Kyiv City, which received 195,046 more people than it lost (7.5 percent of de facto population according to the last Census in December 2001). Although Kyiv City still keeps its leading position as a net receiver of internal migrants (both registered and unregistered), it became relatively less attractive for officially registered migrants from the rest of Ukraine since 2004, as documented by decreasing net migration rate from 1.1 percent in 2004 to 0.3 percent in 2011 (see Figure A.1 in Annex for Kyiv City). Due to these changes, Kyiv City lost its first position in terms of net migration rate in 2010 and 2011, being inferior to Sevastopol in 2010 and Kyiv oblast in 2011.

The second region in terms of absolute population gains from internal migration is Kharkiv oblast, with overall net gains from internal migration of 34,746 people in 2002-2011 (1.2 percent of de facto population in December 2001). Like Kyiv city, this region experienced a decrease in net migration rate since 2004 (see Figure A.1 in Annex for Kharkiv oblast). It also becomes less attractive compared to other regions as it moved down from the third position in the ranking of regions by net internal migration rate in 2004-2007 to the sixth position in 2009-2010 and the ninth position in 2011.¹⁸ Given that Kharkiv oblast is an important education center in Ukraine, negative demographic trends which have been already mentioned before among potential factors of reduced migration intensity within Ukraine may partly explain this trend.

The third region in terms of absolute population gains from internal migration is Sevastopol City, with net gains of 15,761 people (4.2 percent) over 2002-2011.

In total, there are only 8 regions in Ukraine which received more people from internal migration than lost during 2002-2011. In addition to the above mentioned regions, these include Kyiv oblast (+15,374 people / 0.8 percent), Odesa oblast (+7,706 people / 0.3 percent), Crimean AR (+6,357 people / 0.3 percent), Dnipropetrovsk oblast (+6,058 people / 0.2 percent), and Chernivtsi oblast (+2,733 people / 0.3 percent).

All other regions were predominantly net losers in terms of inter-regional migration throughout 2002-2011. The region with the biggest net losses was Kirovohrad oblast, which lost 36,357 more people from inter-regional migration than it received, or about 3.2 percent of de facto population in December 2001. Furthermore, this oblast has the highest annual rate of negative net internal migration, even though net losses decreased from 0.5 percent of population in 2005 to 0.16 percent in 2011. Other regions that lost significant share of population through internal migration are Luhansk oblast (-33,854 people / 1.3 percent), Kherson oblast (-25,753 people in 2002-2011 / 2.2 percent of population in December 2001), Sumy oblast (-21,457 people / 1.7 percent), Zhytomyr oblast (-18,350 people / 1.3 percent), and Khmelnytskyi oblast (-17,978 people / 1.3 percent).

The map in Figure 3.6 below shows that 9 administrative units (6 oblasts, 2 cities with a special status and Crimean AR) which experienced net population gains from inter-regional migration in 2011 (colored green) are located in different geographic parts of Ukraine. This suggests that attractive regions in terms of internal migration are not concentrated in certain areas, e.g. in the industrially developed East or more diversified economies with developed agriculture and the services sector in the South and the West. Furthermore, only Kyiv City, Kyiv oblast and Odesa oblast can be considered the economic centers of the respective geographic macroregions when the share of each region in Ukraine's GDP and population is used as the basis (Table A.1 in Annex). Hence, economic reasons are not the only reasons for population migration in Ukraine.

Figure 3.6. The map of Ukraine by administrative units and net inter-regional migration rate in 2011 (% of regional population)*

¹⁸ Pryimak et al. (2007) used push and pull migration model and calculated an indicator of region's attractiveness for internal migrants as a sum of attractiveness indicators for migrants from all other regions of Ukraine to some particular region. The most attractive regions were Kyiv City, Kharkiv and Kyiv oblasts, while the least attractive regions are Kherson (South), Cherkasy (Center) and Ternopil (West) oblasts.



Source: State Statistics Service of Ukraine, author's calculations.

Note: * Regions with net gains from inter-regional migration are colored green; regions with net migration losses of more than 0.10% are colored blue; the other regions are colored orange.

Analysis of Figure A.1 in Annex also reveals that the evolution of gross migration rates across regions is largely in line with the country-level gross inter-regional migration rate (presented in Figure 3.1 above), with recovering migration intensity in 2010 after a fall in 2008-2009 due to the recent economic crisis. The most dynamic regions are Kyiv City (gross migration rate defined according to eq. (4) was 2.9 percent 2011), Kyiv oblast (2.3 percent), and Sevastopol City (1.7 percent), whereas the least dynamic regions are Lviv oblast (0.7 percent), Donetsk oblast (0.6 percent) and Zakarpattia oblast (0.5 percent).

Pair-wise internal migration across regions. According to our analysis of administrative statistics on pair-wise migration flows between all 27 regions in 2010,¹⁹ inter-regional migration predominantly occurs between regions which share the same land borders or are very close to each other.²⁰ As columns 2 and 4 of Table A.5 in Annex show, the capital city of Kyiv is the only non-neighboring administrative unit frequently mentioned among the three most popular origin and destination regions (Kharkiv oblast is also mentioned but only for Crimean AR). Overall, Kyiv City has received and sent the major share of all registered inter-regional migrants in Ukraine in 2010 (16.7 and 13.5 percent, respectively). Kyiv oblast is the second largest receiving and sending region (the corresponding shares of oblast in total flows are 7.6 and 6 percent).²¹ Kharkiv oblast goes the third in terms of the number of in- and out-migrants from/to the other regions of Ukraine (6.7 and 6.2 percent of all flows, respectively).

In 2010, the share of flows between neighboring regions amounted to 56.8 percent of all inter-regional migration flows in Ukraine (compared to 56.7 percent in 2009 and 55.6 percent in 2008). Across

¹⁹ This statistics is publicly available (i.e. published in demographic yearbooks) only since 2008. This limits our analysis of mobility patterns over time. However, we believe that the main patterns found in 2008-2010 are largely common to all previous years covered in our study.

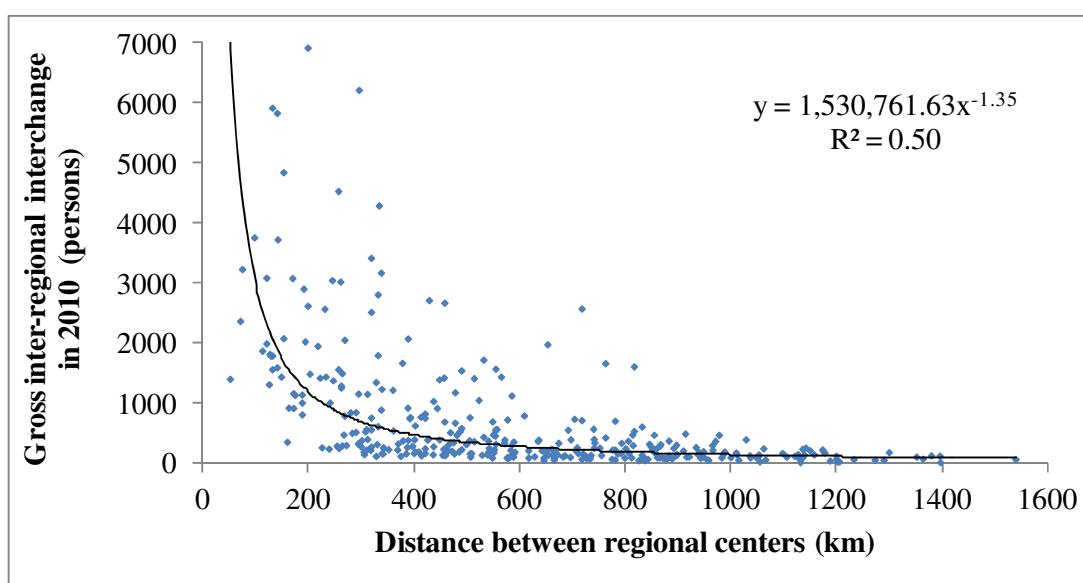
²⁰ These are mainly regions that share a maritime boundary e.g. Odesa and Kherson oblasts, or the Crimean AR (and Sevastopol City as its geographical part), Zaporizhia and Donetsk oblasts.

²¹ According to Dragunova and Maidanik (2009), 36 percent of the total number of administrative raions in Kyiv oblast experienced positive net migration in 2003-2007 due to large inflows of migrants from the other regions of Ukraine, predominantly from Kyiv City and neighboring oblasts. Overall, Kyiv oblast gains in migration interchange with other oblasts but it loses in migration interchange with Kyiv City.

regions, this share varied from 23 percent for Crimean AR as a receiving region to 78 percent for Kyiv oblast as a sending region (see Table A.5). 18 regions out of 27 have larger share of people coming from the neighboring regions compared to the share of those who find destination in these neighboring regions. The opposite pattern is however observed in Kyiv City and the oblasts adjacent to it (Kyiv, Zhytomyr, Vinnytsia, Cherkasy, Chernihiv, and Poltava oblasts) in the same way as in the Crimean AR and Sevastopol City.

These findings support the view that distance is a very important spatial factor which affects migration decision in Ukraine, and this is in line with theoretical expectations and empirical evidence (see e.g. EC, 2007; Greenwood, 1997). Distance proxies migration costs, including out-of-pocket money costs of moving, opportunity costs, information costs (including general information about the destination state, available jobs and housing, etc.), and the psychic costs of moving and leaving relatives and friends in the place of origin. High migration costs tend to lock low-wage workers and the unemployed in the depressed regions and thus prevent them from escaping to the regions with higher wages and/or better employment opportunities. Figure 3.7 reveals that distance is a significant but not the only factor determining gross interchange between the regions.

Figure 3.7. Gross interchange between regions vs. distance, 2010



Note: The number of pairs of regions shown in the graph is equal to 350 (26*27/2 to exclude symmetric pairs and minus one outlier pair "Kyiv City-Kyiv oblast").

The other reasons why Ukrainians are more likely to move to nearby places rather than to remote regions which have more attractive economic conditions (i.e. higher income levels, lower unemployment rates, and higher rates of employment growth) include the following:

- important cultural, religious, linguistic and political (at the level of local governments) differences between certain parts of Ukraine. In particular, they limit migration interchange between western and south-eastern oblasts (see Table 2.2 above). Traditions of localism and familism, which are particularly strong in the Western part of Ukraine, also dampen long-distance permanent migration;
- structural factors such as restructuring of the national economy and economic specialization of Ukrainian regions inherited from the Soviet Union but greatly supported by regional and industrial policies during Ukraine's independence. They cause serious mismatch between skills demanded in the regions where new jobs are created and available skills among workers living in lagging areas with negligible job creation. Lack of easily transferable skills and generally low skill premiums prevent workers from migration to long-distance regions. A fairly low coverage of the adult population by vocational training (including those provided by the Public Employment Service²²)

²² In 2010, 203,259 thousand persons, or 11 per cent of the jobless persons who stayed in the PES register over a year, participated in vocational training scheme.

and unreadiness of the majority of adults to any significant changes in their life, including professional and territorial mobility, also negatively affect the propensity of potential migrants to choose remote but richer regions. This suggests that younger persons without region-specific skills and on-the-job training are most likely to change their location radically but their decision about the destination place seems to be mainly driven by education-related reasons even though decisions about the place of education and potential workplace could be taken simultaneously;

- significant differences in housing and living costs between less and more prosperous regions which are often not adequately compensated by wage premium and fringe benefits due to wage and labor market rigidities. This is particularly relevant for public sector employees and those employed in industries covered by the General collective bargaining agreement which regulates wages and bonuses making them virtually uniform all over the country without taking into account regional disparities in prices and living costs;
- spatial differences in topological, climatological, and environmental amenities relevant to consumption and the availability of public goods which may be more important in migration decisions of Ukrainians than traditional disequilibrium-type forces, specifically relative wages and employment opportunities.

We will test these hypotheses in the next chapter after a brief review of the theoretical and empirical literature on determinants of inter-regional migration.

4. Determinants of inter-regional migration: evidence from the analysis of administrative data

4.1. Literature review

4.1.1. Theoretical considerations

Despite the array of theories and conceptual frameworks of migration that have flourished since Ravenstein’s laws of migration in the end of the 19-th century (see Table 4.1 for some of them),²³ their contribution to our knowledge of the main forces driving internal migration is still limited because theorising about migration has taken the form of generally unconnected theories and models rather than a cumulative sequence of contributions, and in most cases they are more appropriate with regard to international rather than internal migration.

Greenwood (1997) distinguishes between two broad theoretical perspectives with regard to economic models of labor migration: (1) the disequilibrium perspective and (2) the equilibrium perspective. Although two approaches assume that spatial variations in expected utility underlie migration decisions and therefore they belong to the same class of push-pull models described schematically by Lee (1966), the differences between these approaches arise from the source of variations and their persistence. The most popular among economists disequilibrium approach is based on micro-level neoclassical economic theory. Assuming that differentials in wages and employment conditions between regions represent potential for individual utility gains that can be arbitrated by migration, these disequilibrium forces are considered to be the most influential factors of migration in the pull-push framework.

Proponents of the second approach assume that households and firms are in proximate equilibrium at any point in time and therefore spatial variations in wages and prices do not generally reflect opportunities for utility gains that can be arbitrated through migration. Only those non-compensating regional differentials that remain after controlling for amenity differentials across regions should represent utility differentials that would induce migration. The implication of these two perspectives for empirical analysis is that a properly specified migration equation should include regional wage or income variables, unemployment rate (as a proxy for employment opportunities), regional rent level, and various regional amenities that nest disequilibrium and equilibrium forces in the same model.

Table 4.1. A summary of (internal) migration theories

Author	Theoretical	Key ideas
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²³ Detailed review of some of the theories is presented in Greenwood (1997) and Etzo (2008).

	approach	
Ravenstein (1876-1889)	General laws of migration	<p>The majority of migrants move only a short distance.</p> <p>There is a process of absorption, whereby people immediately surrounding a rapidly growing town move into it and the gaps they leave are filled by migrants from more distant areas.</p> <p>The process of dispersion is the inverse of the process of absorption and exhibits similar features.</p> <p>Each main current of migration produces a compensating countercurrent.</p> <p>Long-distance migrants tend to move to the great centers of commerce or industry.</p> <p>Rural people have a higher propensity to migrate than urban people.</p> <p>Women have a higher propensity to migrate than men within the county of their birth, but males more frequently venture beyond that county boundary.</p> <p>Economic factors are the major determinants of migration.</p>
Stouffer (1940)	Theory of intervening opportunities	The number of persons going a given distance is directly proportional to the number of opportunities at that distance and inversely proportional to the number of intervening opportunities. These intervening opportunities may persuade a migrant to settle in a place in the route rather than proceeding to the originally planned destination.
Zipf (1946)	P_1P_2/D hypothesis, size-distance (gravitational) theory	The number of persons that move between any two communities whose populations are P_1 and P_2 and which are separated by the distance, D , is proportionate to the ratio, $P_1 * P_2 / D$, subject to the effect of modifying factors.
Tiebout (1956)	Voting with feet (Tiebout hypothesis)	Given that individuals have differing personal valuations on local public goods and services and varying ability to pay the attendant taxes, individuals will move from one local community to another until they find the one which maximizes their personal utility.
Lee (1966)	“Push-pull” theory of migration	Four groups of factors which influence the process of migration: 1) factors associated with the area of origin, 2) factors associated with the area of destination, 3) intervening obstacles, 4) personal factors. In every area there are factors which hold people within the area or attract people to it (pull), and there are others which tend to repel them (push). There are also other factors to which people are essentially indifferent. However, the factors that hold and attract or repel people as rational actors are not precisely understood. Intervening obstacles (such as distance or legal restrictions) may prevent migration from taking place, or may reduce the number of migrants. Migrants responding primarily to pull factors at destination tend to be positively selected whereas migrants responding primarily to push factors at origin tend to be negatively selected.
Todaro (1969) Sjaastad (1962)	Disequilibrium approach: neoclassical economic theory, with human capital approach	<p>Spatial differences in (real) wages, earnings, income and employment probabilities reflect opportunities for individual utility gains that can be realized through migration. Therefore, economic factors are the most influential of the push-pull factors.</p> <p>The potential migrant will select that locality at which the real value of the expected net benefit that accrues to him from migration is the greatest.</p>
Hart (1975)	Disequilibrium approach: Keynesian economic theory	<p>Taking into account that money is not only a medium of exchange but also a medium of saving, potential migrants are also attracted to high nominal wage regions (in contrast to neoclassical economic theory that hypothesized migration to high real wage regions only).</p> <p>Intentions to return to the origin region or to send remittances increase the importance of the nominal wage level compared to the real wage level.</p>
Research started after Harris and Todaro (1970)	Segmented or dual labor market theory	Migration stems from intrinsic labor demand in a segmented local labor market, not from rational choice decisions by individuals; from pull factors rather than push factors. Migrant workers are needed as labor supply into secondary sector jobs.
Stark and Bloom (1985)	New economics of labor migration	<p>Spatial economic imbalances enable people to make rational choices in order to maximize their utility, but individuals do not make these choices independently. A wider social entity such as a household or even community must be considered as well.</p> <p>Migration can be viewed as a strategy to diversify risks by a household that has insufficient income.</p>

		Relative deprivation is an important determinant of migration: a person who is more relatively deprived can be expected to have a stronger incentive to migrate than a person who is less relatively deprived. Migration can be interpreted as a process of innovation adoption and diffusion.
Jackman and Savouri (1992)	Job-matching theory	Labor migration as a special case of job-matching (i.e. hiring) is viewed as the consequence of successful job search rather than as a pre-condition for it. A higher rate of out-migration from regions of high unemployment is explained by the fact that unemployed people are more likely to migrate because they are more active in job search.
Papers by Graves cited in Greenwood (1997)	Equilibrium approach	Equilibrium prevails so that spatial differences in wages are compensating differentials and therefore do not reflect opportunities for utility gains. Only those non-compensating regional differentials that remain after controlling for amenity differentials across regions should represent utility differentials that would induce migration.
Hsieh and Liu (1983)	Quality of life approach	Individual's satisfaction with his living place is determined not only by economic factors but also by the quality of all other aspects of his life, including political, environmental, health and education, and social factors. If the quality of all aspects of life in region <i>i</i> is relatively poorer than in other regions, a net out-flow of population from region <i>i</i> to other regions is expected.

Source: Author's compilation.

In addition to the first group of theories belonging to the “push-pull” approach and hypothesizing that migration results from various spatial social and economic differences encouraging people to move from less to more attractive areas, there is a second theoretical approach to migration – known as “gravitational” or “size-distance” theory. According to it and in line with Zipf’s “ P_1P_2/D hypothesis” (Zipf, 1946), total migration flows can be largely explained by the cost of movement measured by the distance and the number of persons in each region available to move. The implication for empirical analysis of the determinants of inter-regional migration is that to the extent possible an empirical model should also include measures derived from this “size-distance” approach, particularly the population size and the easiest transportation distance.

Therefore, the different factors that are likely to determine inter-regional migration flows can be classified in three main categories: 1) labor market and economic variables as disequilibrium forces; 2) amenity (environmental) variables as equilibrium forces; and 3) gravity variables.

4.1.2. Empirical studies in transition countries

While the literature on determinants of internal migration in developed countries such as US and Western Europe is excessive and growing (see reviews in Greenwood, 1997; and Etzo, 2008), there is little and inconsistent evidence on internal migration in transition economies. The scant literature in the region stems largely from the lack of reliable migration statistics for most of the transition economies. Several empirical studies of internal migration in transition countries covered by our survey (Table 4.2)²⁴ use administrative regional-level information on population migration: Andrienko and Guriev (2004) analyze bilateral migration flows in Russia in the gravity model framework, whereas the other studies use aggregate flows to and out of regions and look at the typical covariates of migration flows at the regional level such as local unemployment rates, wage disparities, some demographic indicators (mortality, marriage, and divorce rates), and characteristics of the housing market.

Table 4.2. Summary of selected empirical studies of inter-regional mobility in transition countries

Author	Country (period)	Dependent variable(s)	Independent variables	Main findings
Andrienko	Russia (1992-	Bilateral	Gravity, economic,	Gravity variables have expected signs.

²⁴ Extended survey of the literature on internal migration in the EU8 countries, including earlier studies using descriptive statistics and micro-level studies using household surveys is provided in Paci et al. (2007).

and Guriev (2004)	1999)	migration flow in a given year (log)	demographic, infrastructure, amenity variables in origin and destination regions	<p>Unemployment is an important determinant of migration but its effect is significant only in the origin region (OLS regression with between effects).</p> <p>Higher income both in the origin and destination regions discourages migration. But in several specification of the model with fixed-effect is it found that rising income may increase rather than decrease migration outflow. The authors argue about existing liquidity constraints to migration as an explanation for the latter finding.</p> <p>Education in the origin region significantly increases outflows from the region.</p> <p>Geographical and demographical variables also play an important role, e.g. people do not tend to leave regions with access to the sea and the largest rivers. The demographic and ethnic structure of the population is very significant in all specifications.</p> <p>Small business privatization, approximated by the share of privatized firms in trade and services, seems to encourage both migration inflows and outflows.</p>
Fidrmuc (2004)	Czech Republic (1992-1998), Slovakia (1992-1996), Hungary (1994-1998), Poland (1992-1997)	Gross inflow and outflow rates and net inflow rate as a percentage of the region's end-year population	Unemployment rate (lagged), wage ratio(lagged), population density (log), year dummies, district fixed or random effects	<p>Unemployment tends to have the correct sign in the regressions with net migration but it is significant only in the regressions for the Czech Republic and Slovakia. Unemployment discourages gross inflow but does not affect outflow significantly in the Czech Republic and Slovakia, although the coefficient has the correct positive sign. For Poland, unemployment discourages not only inflow but also outflow.</p> <p>Average wage ratio does not significantly affect net migration in 3 countries whereas in Poland the coefficient has the wrong (negative) sign.</p> <p>Wages are positively correlated with gross inflow and outflow rates in the Czech Republic and Poland, but they do not affect gross migration significantly in Slovakia.</p>
Hazans (2003a)	Latvia (1993-2001)	Gross inflow and outflow rates and net inflow rate per 1000 population	Unemployment rate, gross monthly wage (log), population density (log), mortality rate, marriage rate, divorce rate (all variables are lagged one year) + year dummies	<p>High unemployment significantly encourage outflows and inflows in the late transition (1997-1999).</p> <p>High wages significantly encourage gross and net inflows, and the size of this effect has almost doubled in the late transition compared to the whole period.</p> <p>Demographic variables are also important determinants of regional migration flows (e.g. divorce rate is positively correlated with outflows, while marriage rate is positively correlated with gross and net inflows).</p>
Bloze (2009)	Lithuania (2001-2008)	Gross inflow and outflow rates and net inflow rate per 1000 population	Unemployment rate, wage ratio, marriage rate, divorce rate, cities/suburbs, new dwellings, share of private ownership (housing), housing space per capita, year dummies	<p>Unemployment has a significant negative impact on net inflows and positive impact on gross outflows, while the impact is insignificant in the case of inflows.</p> <p>The wage effect is statistically significant and positive in all three cases. The positive sign of wage in case of outflows may be related to urban-suburban movements.</p> <p>The coefficients for marriage and divorce rates are not significant.</p> <p>Housing variables are significant determinants of net inflows and gross outflows.</p>
Bunea (2012)	Romania (2004-2008)	Ratio in-migrants / out-migrants	Population of each county, real GDP per capita, registered	<p>In the GMM model there are only two significant factors – population and the amenity index.</p> <p>Apart from the amenity index significance,</p>

			unemployment rate OR employment rate, private dwelling rate, university graduates per 1,000 inhabitants, degree of urbanization, amenities index (public sewerage and gas distribution pipes +drinking water supply network + urban green spaces area) OR density of public roads, infant mortality, population density, crime rate.	results also reveal the importance of the social network theory (as shown by significant lagged migration ratio).
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Source: Author's compilation

There is some evidence that regional wage and unemployment differentials have played a role in explaining aggregate migration flows in transition economies but their effects are found to be smaller than in developed EU countries. Furthermore, internal migration flows do not always strongly respond to regional economic conditions in the expected manner, e.g. high regional unemployment rates discourage migration outflows but higher relative wages do not encourage more inflows. Fidrmuc (2004) concludes that the potential of migration to cushion the adverse effects of asymmetric shocks in transition economies and to eliminate interregional differences in unemployment rates and earnings is very small yet.

4.1.3. Empirical studies in Ukraine

All existing studies examining the factors of inter-regional migration in Ukraine that used simple correlation analysis find expected patterns of population migration, with people moving predominantly from poorer and job-scarce regions with worse public good provision, social environment and housing supply to the ones that are richer and more prosperous in terms of employment prospects, public goods and infrastructure.

For example, ETF study (2009) documents that important factors of officially registered inter-regional migration in Ukraine are gross regional product per capita (as a proxy for economic activity in the region), average wages, social environment (in terms of social security, social-psychological climate and risk of disease), living standards (living conditions, transport, housing, etc) and the number of post-secondary educational institutions.

Regional differences in local budget expenditures per capita are also important in determining inter-regional migration flows (Korchynskiy and Kolodiy, 2008). The correlation between local budget expenditures per capita (as a percentage of the national average) and net migration rate is strong and increasing: the coefficient of correlation increased from 0.79 in 2000 to 0.86 in 2006 if local budget expenditures in the same year are used, and from 0.38 in 2000 to 0.84 in 2006 if local budget expenditures are lagged one year. The correlation between regional average wages (as a percentage of the national average) and net migration is also strong but weaker than the previous one: in 2006 the corresponding coefficients of correlation are 0.79 (wages in the same year) and 0.78 (wages lagged one year).

The World Bank Poverty Assessment in Ukraine (WB, 2005) points to significant positive correlation between the share of urban population in the region and net internal migration rate. This implies that internal migration occurs primarily from rural, and therefore relatively worse off regions, to a large densely populated urban areas formed by the growth and coalescence of individual towns or cities in which employment opportunities are concentrated. These migration patterns suggest a strong correlation between poverty and households' allocation of labor resources.

Total migration flows of rural population between Ukrainian regions are found to be related to the share of urban population in the region and its proximity to Kyiv City (IDSS, p. 173-179). There is also evidence of increasing migration flows between adjacent regions and growing distance of

migration moves. Strong and increasing correlation between employment losses in agriculture and migration outflows from rural areas (both within the region and between regions) is revealed.

According to Dragunova and Maidanik (2009), the most important factors of migration within Kyiv oblast are the number of registered vacancies in the local labor market and the level of wages while the factors of migration out of Kyiv oblast and to Kyiv City is the unemployment rate and the number of new completed dwellings.

The only study of the determinants of inter-regional migration in Ukraine based on official statistics which uses multivariate econometric analysis is Martynenko (2004). The author finds that net inter-regional migration in 1990-1995 was largely attributed to the differences in wages and the unemployment rate, while various social factors (including the number of doctors/beds in hospitals, life expectancy, the crime rate, the number of tertiary educational institutions, the volume of paid services to population, and an indicator of housing supply measured as an average living area in square meters per person) and the distance between the centers of regions seemed to be less important or insignificant.

The situation has changed in the late 1990-s – early 2000-s as with better adaptation to the market economy population became more oriented to maximization of their own utility, taking into account all possible factors. Consequently, many factors which were significant before became insignificant (e.g. the registered unemployment rate and housing supply), some previously insignificant indicators became significant with expected sign (e.g. the crime rate) while the direction of influence of some important variables changed to the opposite (e.g. from positive to negative for average wages and from negative to positive for the number of tertiary educational institutions). The results for education and crime rate are in line with previous findings based on univariate analysis and theoretical arguments but insignificant effect of the unemployment rate, the urban share and housing supply and the negative correlation between wages and internal migration rates are largely unexpected. The author points these discrepancies to statistical/ measurement problems of dependent and explanatory variables and to the omission of such important indicator as the cost of migration.

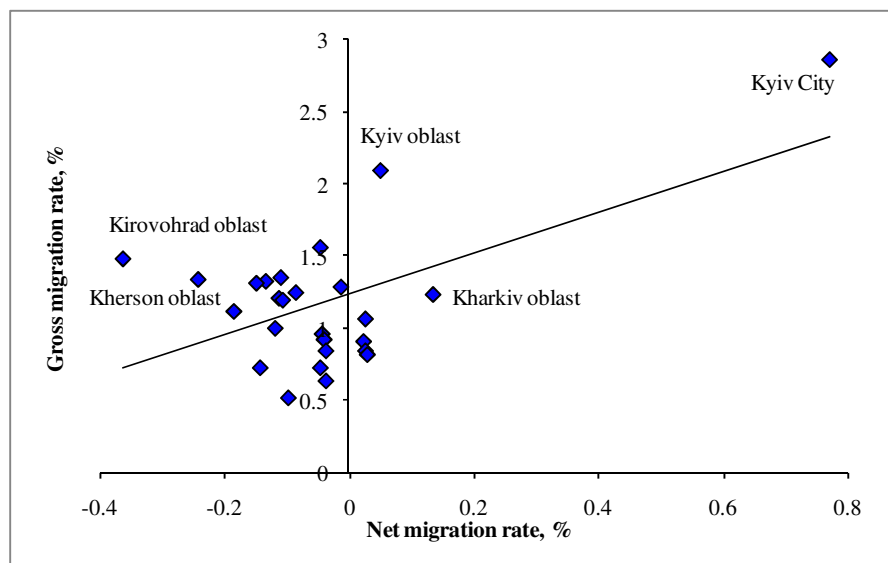
4.2. Determinants of inter-regional migration: analysis of gross flows in 2002-2010

Before we examine the determinants of regional in-migration, out-migration and net migration flows normalized by population size to answer the question on what factors account for the variation in migration rates in 27 regions of Ukraine between 2002 and 2010, we look at the persistence of these flows over the same period.

In-migration and out-migration appear to be strongly persistent: the correlation coefficient for in-migration rate in 2002 and 2010 is over 0.95 and for out-migration is about 0.9 (the correlation coefficients with previous year's values are close to 1 in all years). Net migration is also persistent but not so much as gross migration: although the correlation coefficients of net migration rates with previous year's values is over 0.97 in all years except for 2010, the correlation between the values in two extreme years (2002 and 2010) is about 0.75.

Our data also reveal positive and strengthening correlation between in-migration and out-migration rates since 2004, with correlation coefficients increasing from 0.66 in 2004 to 0.94 in 2010. Hence, there are a lot of churning flows between regions which are not resulted in effective relocation of people from less to more developed regions with better employment opportunities. Figure 4.1 plots the average rates of gross inter-regional migration in 2002-2010 against net migration for 26 administrative units in Ukraine. As expected, high levels of turnover and positive values of net migration are found in Kyiv City and Kyiv oblast. Positive net migration but lower levels of turnover are observed in Kharkiv and Dnipropetrovsk oblast in the East, Crimean AR and Odesa oblast in the South oblast, and Chernivtsi oblast in the West. It is also noticeable that other areas of relatively high turnover (but with net losses) tend to be more concentrated in the central part of Ukraine and around the capital region.

Figure 4.1. Average gross inter-regional migration rate versus net migration rate in 2002-2010



Source: Author's calculations based on SSSU data.

Taking into account the previous empirical work on modeling inter-regional migration in transition economies (e.g. Fidrmuc (2004) and Hazans (2003a)), our preferred equation for migration rates is:

$$m_{i,t} = \beta_0 + \beta_1 \frac{w_{i,t-1}}{w_{t-1}} + \beta_2 u_{i,t-1} + \alpha' X_{i,t-1} + \delta_t + \xi_{i,t} \quad (8)$$

where

- ✓ $m_{i,t}$ is one of the three region-level migration rates (in-migration, out-migration and net migration) calculated according to eq. (1)-(3);
- ✓ $\frac{w_{i,t-1}}{w_{t-1}}$ is the wage ratio, i.e. the average gross monthly wage in region i divided by the nationwide average wage to eliminate the effects of inflation and to take control for relative wages;
- ✓ $u_{i,t-1}$ is the unemployment rate measure such as the unemployment rate in region i in the previous year (alternative measures are the ratio of regional unemployment rate to the national one and the unemployment difference of region i , as suggested by Pissarides and McMaster (1990));
- ✓ $X_{i,t-1}$ is a vector of other region-specific characteristics which are expected to influence in-migration or out-migration. Following Fidrmuc (2004), we use the log of the population density to account for the degree of urbanization. We also use a set of regional characteristics to control for differences in demographic composition of population, amenities and local government spending on social services (the latter is taken as the ratio of per capita spending in i divided by the nationwide average spending to eliminate the effects of inflation) as potential determinants of inter-regional migration in accordance with the equilibrium theoretical perspective;
- ✓ δ_t refers to time dummies to control for changes in the macroeconomic environment;
- ✓ $\xi_{i,t}$ refers to compound disturbance term. Taking into account that panel regression is preferred to a pooled OLS on the basis of the Breusch and Pagan Lagrangian multiplier test in all specifications, the regressions are estimated as a random effects panel regression, given the outcome of the Hausman specification test.

All independent variables are lagged by one year to ensure that they are predetermined and sequentially exogenous. Definitions and data sources of all variables used in the empirical analysis are presented in Table A.6 in Annex.

Estimation results are reported in Table A.7 in Annex for the two samples of regions: a larger sample of regions consisting of all 27 regions; and a smaller sample without Kyiv and Sevastopol cities. All specification presented here include lagged wage ratio and unemployment rates, the log of the

population density, demographic and social characteristics, year dummies, and regional random effects.

The results of the second panel for the reduced sample of regions suggest that inter-regional migration in Ukraine seems to respond to income differences in the expected manner, with more in-migration and net migration in the regions with higher relative wages. But these effects disappear once Kyiv and Sevastopol cities are added to the sample, whereas relative wages become significantly and positively related with out-migration rates that may be attributed to the fact that large numbers of people outflow from high-wage Kyiv and Sevastopol cities for permanent residence in suburban areas or to other regions after completing studies by young people.

Unemployment rates influence migration in the expected direction but the effect is marginal: higher unemployment rates in the origin places push more people to out-migrate (in a smaller sample) whereas lower unemployment rates in the destination region attract more migrants in net terms (in a larger sample). Marginal effect of the unemployment rate is a sign of its little influence on those who have a job and who are more likely to afford the change of residence.²⁵

When wage levels and unemployment rates are taken into account and two cities are excluded from the sample, only some demographic and amenity variables are likely to explain variation in aggregate migration flows. Specifically, net migration rate is higher in regions with larger share of youth population and more dwellings constructed in the previous year. Gross in-migration rate is negatively correlated with population density and air pollution that is quite expected. Surprisingly, more students, higher relative social expenditure of local governments and less air pollution seem to encourage more out-migration but these effects are very negligible.

4.3. Determinants of inter-regional migration: analysis of bilateral flows in 2008-2010

Taking into account that migration between regions is not equally probable as it depends on the initial location of potential migrants and the potential gains from moving either to neighboring regions or to remote regions, we examine the determinants of bilateral migration flows using available statistics in 2008-2010.

Methodology. Our empirical analysis is based on the modified gravity model which became common in the migration literature since the 1960-s (Greenwood, 1997). The key to the basic gravity model is the Zipf's law of spatial interaction according to which migration is hypothesized to be directly related to the size of relevant origin and destination populations, and inversely related to distance. Besides these variables, the modified gravity model includes other characteristics of the origin and destination areas that are expected to influence the decision to migrate, e.g. income variables, price levels, unemployment rates, various amenity variables and many other factors. Thus, the model is based upon behavioral foundations and includes a mix of disequilibrium and equilibrium notions.

Following Andrienko and Guriev (2004), we estimate the modified gravity models in double logarithmic form because of reasonably good fits and easy interpretation of the estimated coefficients as elasticities of migration's response to changes in the independent variables. The basic equation is:

$$\begin{aligned} \ln M_{ij,t} = & \beta_0 + \beta_1 \ln D_{ij} + \beta_2 \ln P_{i,t} + \beta_3 \ln P_{j,t} + \beta_4 \ln Y_{i,t} + \beta_5 \ln Y_{j,t} + \\ & + \beta_6 UR_{i,t} + \beta_7 UR_{j,t} + \lambda X_{i,t} + \gamma X_{j,t} + \alpha X_{ij} + \delta_t + u_{ij} + \xi_{ij,t} \end{aligned} \quad (9)$$

where:

- ✓ $M_{ij,t}$ is migration flows from region i (origin) to region j (destination) in year t ;
- ✓ D_{ij} is distance between origin and destination proxied in our study by distance between the main regional cities. Migration is expected to decrease with distance (i.e. $\beta_1 < 0$) because the letter serves as a proxy for all direct and indirect costs related to moving. Furthermore, distance

²⁵ Greenwood (1997, p.682) argues that “the failure of unemployment rates to influence migration in the expected direction and/or with the expected relative magnitude can be caused by aggregating population subgroups whose motives for migration differ widely... Since higher unemployment rates are likely to be of most concern to the unemployed and perhaps of little or no concern to those who have a job when they move, the effects of higher unemployment rates may well not be apparent in studies that attempt to explain population or labor force migration with aggregate data”.

reflects the importance of relatives and friends and other forces if lagged migration variable is not included in the model (Greenwood, 1997);

- ✓ $P_{i,t}$ and $P_{j,t}$ refer to population size of origin and destination areas, respectively. According to the gravity law of spatial interaction, migration is expected to be directly related to the size of origin and destination regions (i.e. $\beta_2 > 0$ and $\beta_3 > 0$);
- ✓ $Y_{i,t}$ and $Y_{j,t}$ refer to income variables – real wages, disposable per capita income or gross regional product per capita of origin and destination areas.²⁶ Based on the disequilibrium perspective, according to which spatial differences in wages or income represent potential for household utility gains that can be realized through migration, the origin wage or income variable is expected to take a negative sign ($\beta_4 < 0$), whereas the destination wage or income variable is expected to take a positive sign ($\beta_5 > 0$). On the other hand, if we take into account that potential migrants from high-income regions are better able to finance a move to attractive but often expensive areas, the sign on the origin-income variable can be also positive;
- ✓ $UR_{i,t}$ and $UR_{j,t}$ are the unemployment rates (defined according to the ILO methodology) in origin and destination regions. According to the disequilibrium approach, regions with lower unemployment rates and supposedly higher rates of employment growth tend to attract migrants from the regions with worse employment opportunities (i.e. $\beta_6 > 0$ and $\beta_7 < 0$);
- ✓ $X_{i,t}$, $X_{j,t}$, X_{ij} are vectors of other explanatory variables which are expected to influence migration decision. In our analysis we include the following variables:
 - dummy variable for common language (1 if the main language, either Ukrainian or Russian, in region i is the same as in region j). It is included in the model to test our hypothesis that language (as well as cultural and religious) differences between various parts of Ukraine are likely to negatively influence migration flows between remote regions;
 - comparability index or economic distance between two regions c_{ij} to measure regional differences in the composition of employment by economic sectors. It is defined by us as the Euclidean distance between points s^i and s^j in n -space:

$$c_{ij} = d(s^i, s^j) = d(s^j, s^i) = \sqrt{\sum_{l=1}^n (s_l^i - s_l^j)^2},$$

where s_l^i and s_l^j stand for the respective shares of working-age population (in our study aged 15 to 70 years) employed in sector l in the origin and destination region, and n is the number of sectors which is equal to 11 broad sectors such as agriculture, industry, construction, trade (including hotels and restaurants), transport and communication, financial intermediation, real estate and business services, public administration, education, health care, and other services.²⁷ By using this variable we will test the importance of skills mismatch in its very broad interpretation in explaining migration flows. The idea is that if employment opportunities in the destination region are very similar to the workers' existing work experience in the origin region (economic distance is small), migration flows between two regions are expected to be larger because potential migrants may have better chances of getting a job in the destination area;

- a set of demographic variables to proxy characteristics of the population at risk to move, namely its age composition (youth (15-24 years) vs. prime-age population (25-59 years)), the share of urban population, the share of women, and the share of population with complete higher education (to measure the human capital stock);²⁸

²⁶ All monetary indicators (wages, income and expenditures) are deflated by Gross Regional Product deflator which has been calculated from the series of real GRP growth and nominal GRP.

²⁷ Initially we used the same comparability index as in Jackman and Savouri (1992) measured as the square of the difference in the proportion of population employed in industry and construction in origin and destination regions but it failed to account for the differences in the employment structure.

²⁸ The only regularly published indicator on the composition of region's population by education level in Ukraine is the share of population aged 6 years and over with complete higher education which is based on the Household Budget Survey (HBS). Given that this indicator heavily depends on the age composition of population and sample characteristics of the

- following the tradition of equilibrium studies, variables on amenities or disamenities such as crime rate, air pollution indicator, the presence of a sea coast (dummy variable), the presence of areas most affected by the Chernobyl disaster (dummy variable), number of doctors and higher education students per 10,000 residents are included into the model;
 - real per capita expenditures of local governments on education, health, and social assistance to test the famous Tiebout hypothesis according to which people ‘vote with their feet’ preferring regions with better public goods provision;
 - housing market characteristics such as an indicator of new dwellings commissioned during a year (in square meters per person), the average price per square meter for the apartment bought at secondary market (per square meter) and the average monthly rent payment in the main regional city to control for responsiveness of migration to housing prices;²⁹
- ✓ δ_t refers to year dummies (2008 is a base year) to control for macroeconomic shocks as a result of the global economic crisis;
- ✓ u_{ij} and $\xi_{ij,t}$ refer to disturbance terms.

An implicit assumption underlying the equation (9) is that individuals have fairly accurate information about wages, employment opportunities, public services, housing prices, and other conditions in other regions. Since there is usually a time lag in dissemination of this information, this may be an excessively strong assumption. To test an alternative hypothesis that migrants’ expectations are based on the previous period’s values of the explanatory variables and to correct for possible simultaneity bias we estimate the models with most independent variables lagged one period. However, a comparison of these results with the original model (9) with current values of independent variables reveals little difference in the parameter estimates. This may be attributed to the fact revealed before that the regional disparities in Ukraine are quite persistent over time and therefore the relative attractiveness of the different regions does not change much from year to year.

Data and specifications. We use bilateral flows data on inter-regional migration in 2008-2010 collected by the State Statistics Service of Ukraine. For three years and 27 regions there are in total 2106 observations (27*26*3). In a smaller sample without Kyiv and Sevastopol cities the number of observations is 1800 (25*24*3).

We start our modeling with choosing between pooled OLS, random effects (RE) and fixed effects (FE) panel models. Breusch and Pagan Lagrangian multiplier test for REs (p-value is 0 in all tested specifications) suggests that there is a significant difference across units (i.e. pairs of countries), i.e. that RE panel regression is more appropriate than a simple OLS regression (even though the panel is small). Since the output from the standard Hausman test for FE versus RE leads to a strong rejection of the null hypothesis that the RE model provides consistent estimates, the FE model is preferred (Greene, 2011). The FE model provides consistent estimates but not for the coefficients of time-invariant regressors such as distance or location which are likely to be important factors of migration flows. To overcome the problems of both RE and FE models, we apply the Hausman-Taylor (1981) instrumental variables approach for the RE model assuming that wages, unemployment rate and the share of population with higher education are endogenous time-varying variables (i.e. correlated with a group specific random element u_{ij}). The Hausman specification test suggests that the procedure has produced the desired result: the modified RE model provides consistent and efficient estimates and therefore it is the better choice.

The estimation results of the modified RE models are reported in Table A.8 in Annex. Model (1) includes all variables of the basic gravity models, economic variables – average real wages³⁰ and

HBS, we use an alternative indicator calculated on the basis of the individual-level Labor Force Survey data – the share of economically active population (labor force) aged 25-70 years with complete higher education.

²⁹ In the final model we do not include rental and housing prices because migration itself can affect prices in the destination region causing them to go up. Besides, these prices are available only for large cities and therefore they are bad proxies for costs of living in the whole region, particularly in densely populated and urbanized regions.

³⁰ We also tested per capita disposable income and gross value added as income variables but results are very similar to the ones with wages. Here we show the results with wages because the wage rate is one of the major factors affecting labor supply and mobility of workers across regions, and information on wages is easily available. However, it should be taken

unemployment rates, and other variables such as a measure of economic distance for 11 sectors, demographic variables, local-specific amenities, total local government social expenditures and an indicator of new dwellings. Model (2) is similar to the previous one but it includes variables for 3 types of social expenditures (education, health and social assistance) instead of total social expenditures used before (this model is presented only for a larger sample). Model (3) repeats model (1) but for a smaller sample of regions which excludes 2 cities with a special status.

Estimation results. Table A.8 in Annex shows that the effects of basic gravity variables on migration flows between regions are highly significant and robust to the various specifications. The estimated distance elasticity of migration (-1.24) suggests that with a 1% increase in the distance between two regions migration flow from one region to another decreases by about 1.24%, other factors held constant. This finding indicates that distance provides a serious obstacle to migration within Ukraine, due to a poorly developed system of inter-regional transportation (and therefore higher transport costs associated with migration and trips back to the origin where relatives and friends keep living) and large uncertainty associated with new destination because of worse access to relevant information about remote regions. Meanwhile, common language is a not significant factor in explaining inter-regional migration when other important factors are taken into account. Larger regions send and attract more migrants which is in line with the gravity law of spatial interaction but the effect of population is not so strong in a smaller sample.

The effects of wages and unemployment rates in origin and destination areas are less robust to changes in the specification than of the gravity variables. After controlling for demographic and social characteristics, real wage in the origin region has significant and positive effect on migration flows in all specifications, whereas real wage in the destination region has only marginally significant effect in models (2) and (3). Positive effect of wages in the origin region may point to the possible income effects when people living in low-income regions are less able to finance a move to attractive areas when their counterparts living in high-income regions. The coefficients on the unemployment rate in the origin and destination have expected signs (models 1-2) but the former is insignificant and the latter is marginally significant. This confirms our findings based on the analysis of aggregate flows and suggests that the unemployment rate is not so important in encouraging or discouraging people to change their place of residence. Our measure of economic distance is found to be insignificant implying that the hypothesis of regional-level skills mismatch as a barrier to migration is not generally supported.

Demographic variables such as the share of women, youth, prime age workers and urban population are also important determinants of migration flows although their effects are not always consistent with expectations. Shares of youth and women in the destination place are positively correlated with migration flows. Taking into account that these categories are actively involved in education migration their larger share at the destination may signal about better education and employment opportunities.

The unexpected negative effect (albeit marginally significant in a smaller sample and insignificant in a larger one) of the urban share in the destination region may be linked to the fact that densely populated regions, which are predominantly located in the Eastern part of Ukraine, suffer from many problems of heavily industrialized economies without appropriate modernization which deter individuals from locating there. These include high incidence of occupational accidents leading to disability or death; prevalence of social diseases (e.g. HIV/AIDS, tuberculosis and hepatitis), alcohol and drug abuse; high incidence of involuntary underemployment and wage arrears; low birth rates and high mortality rates; high pollution and crime rates and low quality of public services (the latter three indicators are directly controlled for in the model).

Estimates on the education variable (proxy for human capital stock) seem to support the hypothesis about self-selective nature of inter-regional migration: the larger the share of persons with complete higher education in the labor force in the origin region, the larger migration flows from these regions.

into account that official gross wage data are not very reliable in Ukraine due to widespread informal employment and under-declared earnings.

Not all amenity variables included in the estimated equations have significant coefficients with the expected signs. For example, proximity of a region to Chernobyl or a sea coast, availability of doctors and the number of students of higher education institutions (per 10,000 residents) appear to be not important despite our finding that education-related migration is an important component of total migration in Ukraine. At the same time, people are more likely to move to the regions with higher crime rates but the issue of reverse causality is important here as crime rate tend to be higher in the regions with more migrants. Poor environmental quality (measured by emissions of air pollutants) distracts people from in-migration but, surprisingly, it does not push people to out-migrate.

The results with respect to the per capita spending of local governments are particularly interesting. In a larger sample, the coefficient of total social spending (sum of expenditure on health, education and social assistance) is statistically significant and negative in the origin on region whereas in a smaller sample it is significant and negative in the destination place. Therefore, the supply of local public goods roughly measured by local government spending does influence migration. If we distinguish between three components of total social spending (model 2), it appears that the coefficients of expenditures on education are insignificant and the coefficients of expenditures on health and social assistance are significant and negative in the origin region only. The latter result may be interpreted in a way that if people are satisfied with financing of health and social assistance they are less likely to move to some other region in search of better public goods. Therefore, our empirical results do not support the Tiebout hypothesis that people are likely to ‘vote by their feet’ by moving to the regions with better quality of local public goods and services.

In summary, distance is an important factor of inter-regional migration, and there are signs of the selective nature of migration, especially for long distances and between dissimilar places. Migrants respond to labor market and income variables but these are not major factors of migration. At first glance, individuals seem irrational and inherently risky in their choices regarding whether and where to migrate, probably due to incomplete information and lack of perfect foresight, as they choose places with higher crime rates but not the regions with a sea coast. However, a closer look on the results suggests that they are quite rational economic agents because they believe that their utility levels improve through migration in view of the fact that better employment opportunities and higher wages usually compensate relocating households for poor environmental quality and unfavorable social conditions in the destination region.

5. Determinants of individual migration decisions in Ukraine: empirical evidence from existing studies

To the best of our knowledge, there is only one study of Voznyak (2008, 2009) that examines the determinants of internal migration decisions in Ukraine on the basis of individual-level data, namely the Ukrainian Longitudinal Monitoring Survey (ULMS), used for the estimation of the logit model.

The more detailed study of all migration events³¹ in Ukraine in 1997-2002 (Voznyak, 2008) and its shorter version but for the period from 1997 to 2006 find that, as expected, the migration probability is higher among men, it decreases with age (with more rapid decline among women than among men) and increases with educational attainment (with stronger correlation for men than for women). However, in contrast to theoretical expectations, marital status is found to be positively related with women’s probability of changing the place of residence and is not related to men’s probability. Furthermore, married young people migrate much often than non-married persons of the same age. The study also reveals positive correlation between the number of children under 15 and migration probability for men and insignificant correlation for women.

As far as the labor market status and its impact on the probability to migrate are concerned, it is found that males are more likely to move to another place of residence when they are unemployed, while

³¹ It is not clear from the mentioned papers whether the author has excluded people born abroad (i.e. international moves) as well as moves within the same settlement which are not employment-induced. This issue is particularly important as the ULMS fixes all changes of the respondent’s place of residence, including those taking place within the boundaries of the same town or village. Only the changes of residence which are of little importance from the point of view of the respondent’s life history, e.g. the changes of dormitory places or private accommodation during studies, were not taken into account.

females are more likely to move when they are inactive. The author tries to explain this phenomenon as follows: “a reasonable explanation of the high migration probability for married inactive females is just a coincidence with husbands’ period of unemployment, when the whole family migrates after husband finds a new job at a new place” (Voznyak, 2008, p.36). We find this argument unconvincing because, as anecdotal evidence suggests, couples without sources of regular income and permanent residence are more likely to move to their parents’ home in the same or other settlement rather than migrate to other settlement in hoping to find a new job and better life.

Unexpectedly, previous migration experience negatively affects migration probability. According to the author’s interpretation this implies that persons who had changed the place of residence before are significantly less likely to move again than persons without previous migration experience due to a strong intention to settle down of the former in view of high migration costs. A short (and censored below) period of observation may also account for this unexpected result.

Like in other countries, tenancy is found to be an important predictor of the probability of migration (tenants are much more mobile than their counterparts having permanent residence), and it appears to be the most important factor of migration for men and the second important factor for women.

The settlement type is also found to be an important determinant of migration flows: during the observed period in 1997-2002 people moved from urban areas more often than from rural areas, and the intensity of outflows from urban settlements declines with its size (from small town to large cities) what is quite expectedly in view of the fact that small towns were characterized by oversupply of labor force due to closures of old enterprises and weak growth of the de-novo private sector, while rural areas were attractive for many migrants due to the possibility of employment in subsistence agriculture (used as a buffer against unemployment) and lower living costs. Meanwhile, big cities did not attract more migrants during the observed period, and it is explained by high living costs which discourage potential migrants from relocating to big cities, particularly on the back of inadequate wage premiums to cover these costs.

Finally, it is found that mobility increased in booming years and decreased during recession. According to Voznyak’s study (2008) people seem to react on regional disparities in terms of unemployment as workers are more likely (with marginal significance) to move out of the regions with higher unemployment rates and are more likely to stay at home if they have higher probability of being hired in their region of residence than in a region where they do not live. At the same time, Ukrainians seem to be not responsive to regional differences in the average wage and the environment characteristics.

6. Commuting in Ukraine: patterns and determinants

6.1. Data and definitions

Taking into account that employment opportunities are better in urban areas than in the countryside and in larger cities compared to the smaller ones, and that the transport costs of commuting in terms of money and time are usually lower than the transaction costs and non-economic costs of residential relocation, commuting is often viewed as a substitute for labor and residential migration in facilitating transitions out of joblessness and smoothing regional disparities (EC, 2007; Paci et al., 2007; Hazans, 2003b).

In our study of commuting in Ukraine based on the individual-level LFS data in 2005-2010, we use two definitions of commuting. The first is a broader one and defines commuters as the employed individuals aged from 15 to 70 years who cross a local boundary to reach their workplace (i.e. their workplace differs from the place of residence of their households) independently of whether the commute is inter-regional or intra-regional. In general, there are four suggested options for the answers about workplace: (i) the place of work is the same as the place of residence (non-commuters); (ii) the place of work is in another settlement but in the same oblast/ region (intra-regional commuters); (iii) the place of work is in another settlement outside the oblast/ region (we define it as inter-regional commuters); and (iv) the place of work is in another country (international labor migrants, used in several cases for comparison reasons).

In order to be able to compare our results to those found in the CEE countries, in our second definition we cover only inter-regional commuters in line with Paci et al. (2007) where regions refer to 26 administrative units described above, with the exception of Sevastopol City which will be analyzed together with the Crimean AR.

We must note, however, that not all people are properly classified as daily commuters here because many of them may in fact work and live in the region which is different from their permanent place of residence according to registration (where other household members live and take part in the survey), i.e. they are temporary labor migrants rather than genuine commuters. Anecdotal evidence suggests that this is often the case for workers from the oblasts adjacent to Kyiv oblast who work in Kyiv City or oblast on weekdays and returning home for weekends only. Unfortunately, there are no direct questions about the commuting time, distance and frequency of trips in the LFS questionnaire which would provide important information for distinguishing such temporary migrants from genuine commuters.

6.2. Magnitude of commuting and its main characteristics

Commuting: dynamics and international comparison. According to the LFS data (Table 6.1), the total number of commuters, i.e. those who cross a local boundary to reach their workplace, was above 2.6 mln. people in 2010, or 13.2 percent of the employed population in Ukraine. Of them, 840.1 thousand people belong to the households those all employed members (from two to five) are employed either in the same region (741.7 thousand), in the other region (53.9 thousand) or both (44.5 thousand). Hence, entire families living in the areas with limited employment and income opportunities actively use these opportunities in some other places.

Despite a slight increase in the commuting rate in 2008-2010, it is still significantly lower than in the EU countries.³² Inter-regional commuting rate (1.6 percent in 2010) is also very low compared to the EU15, even though it is roughly comparable to the rates observed in Poland, Romania or Bulgaria (see Figure 4.1 in Paci et al., 2007).

Analysis of commuting numbers based on monthly data reveals some seasonality. A peak-season for intra-regional commuting is summer. This is mainly related to seasonal jobs in agriculture, retail trade, catering, construction and transport. The number of individuals who move to other region peaks in September (in 2007-2010 but not in earlier years) that might be associated with the end of vacation period and increasing mobility of workers and jobseekers. This argument is supported by statistics of housing prices (both for purchase and rent) that usually go up in the beginning of autumn after a period of sluggish demand in summer.

Table 6.1. Size and rates of commuting, 2005-2010

A) Number (thousand people)

	2005	2006	2007	2008	2009	2010
Total						
All commuters	2,162.6	2,227.0	2,406.9	2,710.4	2,659.0	2,664.4
Intra-regional	1,883.2	1,947.4	2,109.1	2,310.0	2,325.1	2,347.0
Inter-regional	279.4	279.6	297.8	400.4	333.9	317.4
Urban						
All commuters	938.7	986.8	1,031.0	1,079.3	961.3	986.8
Intra-regional	731.4	783.8	842.1	847.2	767.1	794.2
Inter-regional	207.3	203.0	188.9	232.1	194.2	192.7
Rural						
All commuters	1,223.9	1,240.3	1,375.9	1,631.1	1,697.7	1,677.6
Intra-regional	1,151.8	1,163.6	1,267.0	1,462.8	1,558.0	1,552.8

³² Based on an “ad hoc labor market survey” conducted in 2004, Buscher et al. (2005, p.10) have found the following rates of commuting in the EU countries: 76 percent in Ireland, 59 percent in Belgium, over 50 percent in Portugal, Denmark and Spain, 27 percent in Luxembourg, 22 percent in Finland, 16 percent in Italy; 83percent in Slovenia, 80 percent in Poland, 24 percent in Lithuania, and 21 percent in Estonia.

Inter-regional	72.1	76.6	108.8	168.3	139.7	124.7
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B) Commuting rate (share of the employed population, %)

	2005	2006	2007	2008	2009	2010
Total						
All commuters	10.5	10.8	11.6	13.0	13.2	13.2
Intra-regional	9.2	9.5	10.2	11.1	11.6	11.6
Inter-regional	1.4	1.4	1.4	1.9	1.7	1.6
Urban						
All commuters	6.7	7.0	7.2	7.5	7.0	7.2
Intra-regional	5.2	5.6	5.9	5.9	5.6	5.8
Inter-regional	1.5	1.4	1.3	1.6	1.4	1.4
Rural						
All commuters	18.8	19.2	21.2	25.2	26.3	26.0
Intra-regional	17.7	18.0	19.5	22.6	24.1	24.1
Inter-regional	1.1	1.2	1.7	2.6	2.2	1.9

Source: Author's calculations based on individual-level LFS data.

Note: Respondents temporarily working abroad are excluded.

Rural vs. urban and intra-regional vs. inter-regional commuting. As expected, commuting rates (both intra- and interregional) of rural population are much higher than of people living in urban areas where employment opportunities are usually better. In fact, each fourth employed individual living in rural area works in another place, predominantly within the same oblast. Again, rural employed population in Ukraine is less likely to commute than their counterparts in other transition economies (see, e.g. Hazans (2003b) for the Baltic States).

Rural residents outnumber urban workers in intra-regional commuting flows but are in the minority in commuting between regions. Hence, rural residents tend to work within their oblast more often than outside it, probably due to lower transportation costs in terms of money and time (saved time is crucial for rural residents most of whom are also engaged in subsistence agriculture), lack of information about jobs in other oblasts and other factors binding them to the origin place.

In 2010, 75.8 percent of all inter-regional commuters from the countryside and 76.5 percent of commuters from urban areas were absorbed by Kyiv City. Workers living in Kyiv oblast made up the lion's share of them: 45.6 percent of rural inter-regional commuters to Kyiv City and 60.3 percent of their urban counterparts originate from Kyiv oblast. Commuting and temporary labor mobility to Kyiv City from adjacent raions of Kyiv oblast have been well documented in the studies of labor mobility in the capital region based on alternative surveys. For example, according to the survey of local authorities in rural areas in Kyiv oblast conducted in April 2009, 32.4% of all employed persons from the surveyed rural areas, predominantly from neighboring raions, worked in Kyiv City, compared to 57 percent working in the same raion, and 8.6 percent working in other raions of Kyiv oblast (Yakobinchuk, 2009). The survey of non-resident employed population in Kyiv City carried out by the Institute of Demography and Social Studies in 2005 reveals that 36.3 percent of all labor migrants in the capital city are rural residents, with about 70 percent of them living in Kyiv (without registration) and 30 percent commuting between their homes in the countryside and their places of work in Kyiv on a daily basis (IDSS, 2007, p.182-183). Overall, the ratio of labor migrants to commuters in Kyiv City is found to be about 8 to 5 (Poznyak, 2007). There are no significant differences between these two groups of workers in their composition by age (with higher share of youth aged 20 to 29), education (with highly educated workers accounting for about 60 percent) and place of residence (with prevalence of urban residents) but there are noticeable differences in terms of economic sector and occupation. Commuters were predominantly employed in low paid jobs in education, health care and social work, public administration, and scientific activity while labor migrants who temporarily lived in Kyiv worked in relatively higher paid jobs in retail trade, catering, construction and transport (IDSS, 2007, p.182-183).

In addition to employment-induced mobility, high commuting rates between Kyiv oblast and Kyiv may also reflect so-called ‘suburbanization’ as many persons change residence from Kyiv City to the suburban zone but did not change their workplace in Kyiv City.

Finally, it is necessary to note that according to our study Kyiv City employs workers not only from Kyiv oblast (54.9 percent of 241.9 thousand commuters to Kyiv City in 2010)³³ and other neighboring oblasts such as Chernihiv (10.4 percent), Zhytomyr (7.3 percent), Cherkasy (7.0 percent), Vinnytsia (4.6 percent), and Poltava (2.3 percent) oblasts but also remote Western regions, particularly from Khmelnytskyi (3.6 percent), Rivne (1.8 percent), and Volyn (1.5 percent) oblasts. This finding supports our hypothesis that not all workers analyzed in this section are properly classified as genuine commuters since they are not likely to cover a distance of over 300 kilometers (one-way) between their regular place of residence and workplace on a daily basis. Further support is found in the results of the above mentioned survey of non-resident employed population in Kyiv City reported in Poznyak (2007): commuters to Kyiv City live predominantly in Kyiv oblast (97 per cent) and adjacent raions of Zhytomyr (1 percent) and Chernihiv (2 percent) whereas labor migrants come to Kyiv from all over Ukraine, and 13.9 percent of them are residents of the Western regions.

Individual characteristics of commuters. As Table A.9 in Annex shows, Ukrainian women are more likely to commute (within the region as well as outside it) than their male counterparts, that results in a significantly higher proportion of women among commuters. This contradicts the pattern found in developed economies,³⁴ but it does not mean that women in Ukraine have less spatial constraints associated with domestic responsibilities than women all over the world. As a survey of the registered unemployed in 2010 showed (Kupets, 2010, p.51), women prefer jobs with favorable working conditions for them defined by respondents as those with flexible or fewer working hours, easier work and a suitable location closer to home. However, lack of suitable jobs in their place of residence forces many women to find jobs elsewhere. Greater flexibility of Ukrainian women which has been already documented in the literature (see, e.g. ETF, 2009; Kupets, 2010) explains their lower unemployment rates compared to men despite existing gender inequalities in the national labor market. This finding also contradicts existing stereotypes that Ukrainian men have on average higher propensity to migrate and commute than women. Furthermore, existence of a partner (official or civil marriage) does not seem to be a strong factor against commuting, particularly intra-regional.

As expected, the proportion of employees who commute appears to decline with age. Younger workers who are less bound with various family commitments are disproportionately more represented among commuters, compared to those who work in the same place where they live (see Table A.9 in Annex for age and marital status). This finding is another support for a larger mobility of youth which has been already discussed above but it may also suggest that young workers face more difficulties in finding decent jobs in the local labor market and in settling in the destination place by renting or buying housing.

Commuting rates almost uniformly decrease with education and the skill level proxied by occupation group according to the ISCO-88. This implies that commuting plays an important role at macro-level compensating a shortage of low-skilled manual workers (those wages are usually too low to encourage residential mobility) in Kyiv City and other booming cities and areas.

Indicators of commuting by economic sector presented in Table A.9 in Annex also support this argument. There are significant differences in the composition of intra- and inter-regional commuters by economic sector: agriculture, industry and public sector have relatively larger shares among intra-regional commuters, whereas construction and services’ shares are significantly larger among inter-regional commuters. Thus there is a strong correlation between earnings of commuters (some of whom are labor migrants as observed above), transportation and living costs: the less migrants earn (certainly it depends on their profession and possible wage differentials between the regions), the less they are

³³ According to the estimates of Poznyak (2009) based on four indirect methods, the total number of non-resident population (including children and other inactive family members) living in Kyiv City was about 420 thousand persons in 2008.

³⁴ See Box 4.1 in Paci et al. (2007) on arguments suggested in the literature for lower commuting rates among women than men.

likely to move far from their place of residence and afford expensive living in seemingly attractive places outside their region in terms of employment and income opportunities.

Finally, at first sight it seems quite surprising that informally employed workers who are riskier and more flexible have lower commuting rates than their counterparts working in the formal sector. But when workers engaged in subsistence agriculture are excluded from the sample of the employed population, the pattern changes on the opposite and becomes in line with our expectations: informal workers have slightly higher incidence of intra-regional commuting (14.7 percent compared to 13.4 percent among formal workers) and significantly higher incidence of inter-regional commuting (3.2 vs. 1.7 percent, respectively).

Commuting by regions.³⁵ In all regions except for Kyiv oblast intra-regional commuting occurs more often than inter-regional one as the share of resident employed population moving within their regions is significantly higher compared to the share of those moving between regions (see Table A.10 in Annex). Six oblasts with the highest intra-regional commuting rates are all located in the Western part of Ukraine. On the contrary, oblasts that have high inter-regional commuting rates are predominantly located in Center and North (see also Table A.9 in Annex), i.e. are close to the most attracting destination place – Kyiv City.

Kyiv city accounted for 76.2 percent of all inter-regional commuters in 2010. Other popular regions attracting relatively more workers from other regions were Kyiv, Crimean AR, Luhansk, Odesa, Dnipropetrovsk and Chernivtsi oblasts. All remaining regions accounted for about 7 percent of all inter-regional moves.

It is worth noting, that in six regions workers were more likely to commute abroad (or migrate for a short period) than to some other region of Ukraine (see Table A.10 in Annex). These are bordering oblasts in the West (Volyn, Zakarpattia, and Chernivtsi oblasts) and in the East (Kharkiv oblast) as well as two Black sea regions in the South (Crimean AR and Odesa oblast). Russia is the only destination country for external migrants (covered by LFS) from Russian-speaking Kharkiv oblast, one of two destination regions for residents of Crimean AR, but it is also important destination for the residents of oblasts located in the West. This suggests that higher expected returns rather than geographic or cultural proximity encourage many workers to find employment in Russia and not in Ukraine. Odesa oblast is a unique example as external outflows of its workers are mostly related to officially registered employment of merchant seamen in Greece, Italy, South Africa, China, Turkey, Argentina and some others.

6.3. Determinants of commuting

To analyze the determinants of commuting in Ukraine, we used the pooled LFS for all available years (2005-2010) and the Logit specification, commonly used in the empirical studies of commuting and labor mobility (see Hazans (2003b) and Paci et al., 2007 for the Baltic State and new EU member states, respectively). The independent variables include sex, marital status, age, age squared (divided by 100), educational attainment, occupation, employment status, economic sector, type of employment (formal vs. informal), place of residence (Kyiv city vs. others; urban vs. rural), and regional labor market indicators (oblast-level unemployment rate and average gross wages in constant 2004 prices, lagged one year, both in the region of residence and region of employment), and year dummies.

We used three samples to compare: (1) all employed commuters with other categories of the economically active population aged 15 to 70 years (e.g. labor force), namely employed non-commuters and the unemployed; (2) all employed commuters with other employed (similar approach is used by Paci et al., 2007); and (3) commuters with non-commuters among wage and salary workers only (to get rid of self-employed workers engaged in subsistence agriculture). For the second sample we also estimated multinomial logit model to distinguish between determinants of intra-regional vs. inter-regional commuting (working in the place of residence is the baseline outcome). Estimation results are reported in Table A.11 in Annex.

³⁵ Data on commuting by regions should be interpreted with care because of a small cell size problem that impairs reliability of estimates.

Female workers are significantly more likely to commute to work, particularly to other region. This effect is in line with results of the univariate analysis discussed above and is consistent across all specifications. Single workers are generally more mobile than widowed or separated workers and both groups of workers are more mobile than married persons. But marital status appears to be a significant determinant only in the case of intra-regional commuting (see estimation results for multinomial logit model (4) in Table A.11). Thus family reasons are very important for short-distance moves but they do not matter for the decision to work in other regions or, most likely, are relatively less important than other reasons (e.g. lack of well-paid jobs in the origin region).

Results in the majority of specifications show that probability of commuting decreases with age. In the first specification (sample includes not only employed but also the unemployed), however, probability of commuting first increases and then decreases. In model (4) age appears to be a significant predictor only for intra-regional flows.

Education is a significant determinant of the decision to commute but its effect is not uniform across specifications. According to multinomial model (4), the probability of inter-regional commuting increases with educational attainment whereas the probability of intra-regional commuting is inversely correlated with educational attainment (except for the least educated workers which have the lowest probability of commuting in both cases).

As expected, wage and salary workers are much more likely to commute than other categories (namely, own-account workers most of whom are rural residents engaged in subsistence agriculture for sale or barter, employers and unpaid family helpers) which are usually tightly bound to the place of residence.

Employment- and skill-related characteristics also matter in explaining of the commuting behavior. For example, workers in agriculture are much less likely to commute for work than workers in all other broadly defined sectors. Construction workers are significantly more mobile than industrial workers, whereas the latter have higher probability of commuting than services workers and public sector employees. Given this, it is not surprising that inter-regional commuting is more prevalent among blue-collar and white-collar workers than among their counterparts with elementary occupations.

It follows from these results that commuting can help reduce geographical imbalances of skills providing a solution to region-specific skill shortages, for instance in Kyiv City and other metropolitan areas. However, if the skill shortage is industry-wide due to inadequate work and pay conditions or some other reasons, commuting of people with the most sought-after skills from one places to more attractive ones will simply create shortages of these skills elsewhere (BTRE, 2007). This negative trend which is often accompanied with skill waste among migrants is currently observed in Ukraine in public sectors such as education, health care and social work.

Finally, the place of residence and regional characteristics are important predictors of commuting. Residents of Kyiv City are very unlikely to take jobs elsewhere, while residents of rural areas are much more likely to commute than urban residents. Regional labor market indicators are generally significant and have expected signs (albeit not in all specifications): workers are more likely to commute to another region from regions with higher unemployment rate and lower average wage reported in the previous year; at the same time, regions with lower unemployment rate and higher wages encourage higher commuter inflow from other regions (see specification (4) in Table A.11 in Annex).

7. Summary and conclusions

This paper provides an extensive analysis of internal migration in Ukraine and its role in regional adjustment to asymmetric shocks caused by impetuous structural and institutional transformations during a transition period. The main findings of the study are as follows:

- There are large and persistent regional disparities in unemployment, income and human development characteristics in Ukraine. Regions tend to be clustered into distinct groups: those with high wages and income, low unemployment and high migration turnover, and those with low wages and income, high unemployment and low geographical mobility (at least according to official statistics).

- Population residential migration within the boundaries of Ukraine is generally low and decreasing since 2004, with a slight upturn in 2010. We attribute this trend to liquidity constraints and housing market imperfections which were accentuated by the economic and financial crisis in 2008-2009. Besides, decreasing number of youth and declining real household incomes that could be used for investment in children's education contribute to a decrease in the number of high school graduates moving to another settlement to pursue studies in higher educational institutions. Finally, population seems to react on falling inter-regional economic differences but increasing migration costs by changing their permanent places of residence less frequently.
- Net inter-regional migration rate more than halved in the past five years having led to increased importance of churning flows in total migration which usually contribute little to the narrowing of regional disparities.
- The peak migration propensity is observed among teens aged 15-19 years who move to other places and regions in pursuit of post-secondary education. There are signs of return migration of 20-24 year olds to their home places after completion studies but initial out-migration substantially outweighs subsequent return migration. Although migration of talented youth brings development impulse to the destination areas it is likely to reinforce stagnation and to limit development potential of sending areas by depriving them of critically needed human capital through the "brain drain".
- Teens and young adults (15-24 years) who predominantly migrate to pursue education and/or start families made up almost a half of all internal migration flows in 2010. The share of prime-age adults (25-59 years) who at least hypothetically could move for labor market reasons was 34.6 percent in 2010, down from to 35.9 percent in 2002. Anecdotal evidence suggests that this may reflect not so much declining migration propensity of adults as the change of the nature of migration from permanent and documented (i.e. with change of the officially registered place of residence) to more temporary and undocumented. Our study reveals the conflict of laws On Freedom of Movement and Free Choice of the Place of Residence in Ukraine and the Civil Code that acts as a latent force for increasing share of undocumented flows in total migration flows. This definitely damages the quality of migration statistics based on the state population register.
- Despite continuous net gains of urban population from in-migration of rural inhabitants the degree of urbanization is fairly low in Ukraine due to substantial natural decrease of urban population. The lack of critically needed human capital puts a damper on the long-term development potential of urban areas and fiscal sustainability of local governments. Under such conditions, the growing needs of metropolitan areas for skilled human resources should be satisfied by commuters from nearby as well as by migrants from depressed urban areas with high unemployment and low incomes. Analysis of the determinants of commuting behavior shows that commuters and temporary labor migrants are responsive to economic incentives, and that they do help reduce existing skills shortages in large cities which become less and less affordable for many low-wage workers.
- Inter-regional migration is found to be dominated by bilateral flows between neighboring regions. Long-distance migrants tend to move to the capital region, Crimean AR and major cities (Kharkiv, Odesa, Lviv). Meanwhile, flows from the least economically developed Western regions to rich regions in the East are very small, and what is surprising, net flows between two macroregions were in favor of the former regions. We explain this phenomenon by the following factors: (i) high costs associated with long-distance migration which lock low-wage workers and the unemployed in the depressed regions; (ii) important cultural, religious, linguistic and political differences between certain parts of Ukraine; (iii) locational inertia of population and lack of necessary skills; (iv) significant differences in housing and living costs between less and more prosperous regions which are not adequately compensated by wage premium and fringe benefits, partly due to wage and labor market rigidities; (v) spatial differences in topological, climatological, and environmental amenities and the availability of public goods; and (vi) an alternative of temporary emigration to European countries and Russia which seems to be provide more utility gains than internal migration to remote and dissimilar regions in Ukraine.

- Residential inter-regional migration is found to be related to regional unemployment rates and income measures but also to the differences in the quality of local public goods and environmental characteristics. Persistence of aggregate migration rates and strong correlation between in-migration and out-migration rates suggest that there are important unobservable factors that explain the patterns of inter-regional mobility.
- Furthermore, inter-regional mobility predominantly occurs within macroregions with similar strengths and weaknesses in terms of their economic and human development. This supports the view that internal migration in its current form is unlikely to be an effective mechanism for eliminating regional disparities in unemployment and wages and for further convergence between the most backward and the best performing regions.

Hence, exclusive reliance on labor mobility as a market adjustment mechanism to idiosyncratic economic shocks could be very costly in terms of under-utilized resources in the high unemployment regions with a highly immobile population. Government action aimed at addressing regional imbalances is crucial here. A regional development policy oriented at bringing ‘work to the workers’ should mobilize investments and direct them at infrastructure, human capital and R&D development of more backward regions. This strategy should be complemented by the policy measures oriented at bringing ‘the workers to work’ by removing all direct and indirect barriers to migration of workers within the country. Analysis of the literature and anecdotal evidence reveals the following major barriers to geographical labor mobility within Ukraine:

- lack of affordable housing in fast-growing urban areas combined with inadequately high housing prices (both for rent and purchase) relative to wages in the most popular destinations and the difficulties in obtaining financing for the purchase of residential property through mortgage lending. Although jobseekers can relatively easily sell their residential property at their current place of residence they may face difficulties in buying homes/apartments in the other places because of significant regional differences in real estate prices;
- limited access to locally provided public services in the destination place and non-portability of housing subsidies, unemployment and social benefits which are generally tied to residency (throwback to the Soviet-type system of *propiska*). The same barrier is for private entrepreneurs who must pay taxes and report to the local tax office in their official place of residency according to registration;
- deficiencies in transport infrastructure between hinterlands and urban centers that directly limit access to better employment opportunities but also have indirect impacts on labor force participation through its effects on access to child care facilities, education, health care, etc.;
- poor ICT infrastructure and insufficient basic computer and search skills of individuals. These factors limit access of job seekers to information about vacancies in other settlements/ regions available in the Internet (e.g. all-Ukrainian job portal maintained by the PES of Ukraine “Trud” at www.trud.gov.ua) and contribute to informational asymmetries. Informational barrier is particularly important in Ukraine due to the weakness of formal channels for the exchange of labor market information³⁶ and abundance of informal jobs, information about which is not easily available;
- existing skills mismatch between skills of potential migrants and the needs of employers and low coverage of the adult population by vocational training, retraining and skills upgrading;
- existing nationwide wage and labor market rigidities which limit cost-of-living adjustments in regional wages;

³⁶ According to the LFS in 2009, unemployed men used personal contacts as the major method of job search (39.6 per cent) and only 3 out of 10 unemployed men used PES job placement services (for comparison, 48.9 per cent of unemployed women used PES services and 25.7 per cent relied on personal contacts). The use of media advertisements is only the third popular method for both genders (17.7 per cent of men and 14.9 per cent of women), but it became more popular in 2009, particularly among men. The shares of men and women using direct contacts with employers in 2009 are 9 and 8.7 per cent, respectively.

- social factors, including the existence of ‘binding’ social capital (family, kinship, networks) and locational inertia, which is partly encouraged by large social housing sector;
- possible discrimination, violence and exploitation, particularly in the case of informal employment.

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Annex

Table A.1. Main characteristics of administrative units in Ukraine, grouped by geographic macroregions

	Region	Main city	Land area (thousand sq km)	De facto population in 2010 (thousand persons)*	Population density (persons per sq km)*	Share of urban population in 2010 (%)*	Number of raions	Number of cities and towns	Number of rural settlements	Share of Ukraine's GDP in 2010(%)	Share of Ukraine's population in 2010 (%)
Center & North	Kyiv City	Kyiv	0.8	2792.2	3490.3	100.0	10	1	-	18.2	6.1
	Vinnitsia Oblast	Vinnitsia	26.5	1645.9	62.1	49.5	27	18	1466	2.2	3.6
	Zhytomyr Oblast	Zhytomyr	29.8	1282.4	43.0	57.8	23	11	1613	1.7	2.8
	Kyiv Oblast	Kyiv	28.1	1719.7	61.2	61.2	25	26	1127	4.2	3.7
	Kirovohrad Oblast	Kirovohrad	24.6	1013.9	41.2	61.8	21	12	1003	1.5	2.2
	Poltava Oblast	Poltava	28.8	1493.7	51.9	60.9	25	15	1815	4.1	3.3
	Sumy Oblast	Sumy	23.8	1166.9	49.0	67.3	18	15	1466	1.7	2.5
	Cherkasy Oblast	Cherkasy	20.9	1290.3	61.7	56.0	20	16	824	2.1	2.8
Chernihiv Oblast	Chernihiv	31.9	1104.0	34.6	62.6	22	16	1485	1.6	2.4	
East	Dnipropetrovsk Oblast	Dnipropetrovsk	31.9	3346.0	104.9	83.5	22	20	1435	10.7	7.3
	Donetsk Oblast	Donetsk	26.5	4449.9	167.9	90.5	18	52	1118	11.9	9.7
	Zaporizhia Oblast	Zaporizhia	27.2	1806.5	66.4	76.9	20	14	915	3.9	3.9
	Luhansk Oblast	Luhansk	26.7	2301.4	86.2	86.7	18	37	783	4.2	5.0
	Kharkiv Oblast	Kharkiv	31.4	2762.1	88.0	80.0	27	17	1681	6.0	6.0
South	Crimean AR	Simferopol	26.1	1964.4	75.3	62.9	14	16	949	3.0	4.3
	Mykolaiv Oblast	Mykolaiv	24.6	1186.4	48.2	67.7	19	9	894	2.2	2.6
	Odesa Oblast	Odesa	33.3	2389.9	71.8	66.7	26	19	1127	5.0	5.2
	Kherson Oblast	Kherson	28.5	1090.8	38.3	61.1	18	9	658	1.4	2.4
	Sevastopol City	Sevastopol	0.9	380.6	413.7	93.9	4	2	29	0.7	0.8
	Volyn Oblast	Lutsk	20.1	1036.9	51.6	51.7	16	11	1054	1.3	2.3
West	Zakarpattia Oblast	Uzhhorod	12.8	1246.1	97.4	37.2	13	11	579	1.4	2.7
	Ivano-Frankivsk Oblast	Ivano-Frankivsk	13.9	1380.2	99.3	43.2	14	15	765	1.9	3.0
	Lviv Oblast	Lviv	21.8	2547.2	116.8	60.7	20	44	1850	3.8	5.6
	Rivne Oblast	Rivne	20.1	1152.1	57.3	47.8	16	11	1000	1.5	2.5
	Ternopil Oblast	Ternopil	13.8	1086.5	78.7	43.7	17	18	1023	1.2	2.4
	Khmelnitskyi Oblast	Khmelnitskyi	20.6	1330.4	64.6	54.6	20	13	1414	1.7	2.9
	Chernivtsi Oblast	Chernivtsi	8.1	904.3	111.6	42.0	11	11	398	0.9	2.0

Source: State Statistics Service of Ukraine (Statistical yearbook "Regions of Ukraine in 2010. Part 1", Express-bulletin "On demographic situation in 2010", and on-line statistics on gross regional product in 2010).

Note: * Average over a year de facto population.

Table A.2. Selected labor market and socio-economic characteristics and net migration by macroregions, 2010

Macroregion	Nominal monthly wage, UAH	Disposable per capita income, UAH	Gross regional product per capita, UAH	Unemployment rate, %	Share of the employed in:					Share of population aged:			Urban share, %	Share of population with complete higher education, %	Crime rate, registered crimes per 100,000 people	Emission of air pollutants, kg per person	Total social expenditures of local government per capita, UAH	Total expenditures of local government per capita, UAH	Housing price at secondary market, \$ per sq. m	Rental price, \$ for one bedroom apartment	Monthly household money expenditures (UAH)	Total net migration, persons
					Agriculture, %	Industry, %	Construction, %	Services, %	Public sector, %	0-14 years, %	15-24 years, %	25-59 years, %										
Classification according to geographic location																						
Kyiv City	3,431	37,573	70,424	5.8	0.2	11.7	6.0	59.6	22.6	13.0	15.3	54.2	100.0	56.2	1308	95	2,637	6,248	1,884	439	4,276	8,366
Center and North	1,899	16,553	18,589	9.6	20.0	15.4	4.1	37.6	23.0	13.9	13.7	49.7	59.2	22.4	918	99	2,660	3,320	714	106	2,493	-1,313
East	2,287	19,608	26,156	7.5	10.4	24.5	4.4	42.5	18.2	12.5	13.8	52.1	83.3	26.8	1370	248	2,415	3,164	832	158	2,709	-5,133
South	2,012	15,836	18,826	7.1	17.5	11.2	4.7	44.2	22.5	14.2	14.2	51.5	70.2	26.5	1278	68	2,604	3,463	903	169	2,998	2,400
West	1,823	14,251	13,425	9.0	23.2	12.6	4.8	37.0	22.3	17.1	15.2	49.1	47.2	21.7	643	76	2,808	3,446	827	127	2,623	-4,320
Classification based on a cluster analysis																						
Kyiv City	3,431	37,573	70,424	5.8	0.2	11.7	6.0	59.6	22.6	13.0	15.3	54.2	100.0	56.2	1308	95	2,637	6,248	1,884	439	4,276	8,366
Sevastopol	2,167	16,763	20,455	6.0	3.1	11.9	7.2	49.6	28.1	13.0	13.3	52.6	93.8	34.7	1452	55	2,472	3,523	1,071	215	3,780	1,192
Industrially developed regions	2,344	19,910	26,785	7.6	10.5	25.9	4.4	41.3	17.9	12.6	13.7	52.0	84.3	25.4	1457	285	2,420	3,187	842	160	2,717	-6,355
Core regions	2,098	17,240	22,208	6.7	12.3	14.0	4.5	47.5	21.7	13.8	14.2	51.6	67.3	26.7	1183	102	2,575	3,486	952	184	2,811	8,532
Least econ. developed regions	1,793	14,147	13,264	9.4	26.3	11.9	4.4	34.4	23.1	16.4	15.1	49.0	43.1	22.6	457	111	2,756	3,367	719	124	2,576	-984
Other regions	1,850	15,333	15,871	9.3	22.5	13.8	4.3	37.1	22.2	15.3	14.4	49.6	55.5	22.0	854	77	2,725	3,354	770	116	2,562	-10,751

Source: Author's calculations based on State Statistics Service data.

Note: All indicators except for net migration are the mean values of region-level indicators. *Center and North* consists of Vinnytsia, Zhytomyr, Kyiv, Kirovohrad, Poltava, Sumy, Cherkasy and Chernihiv oblasts; *East* includes Dnipropetrovsk, Donetsk, Zaporizhia, Luhansk and Kharkiv oblasts; *South* consists of Crimean AR and Sevastopol, Mykolayiv, Odesa and Kherson oblasts, and *West* stands for Chernivtsi, Ivano-Frankivsk, Khmelnytskyi, Lviv, Rivne, Ternopil, Volyn, Zakarpattia oblasts. Clusters were defined by Kupets (2009) on the basis of hierarchical cluster analysis of 19 variables (13 human development indicators, 5 main labor market indicators, and per capita gross value added) and 27 cases (i.e. regions). *Industrially developed regions* consist of Dnipropetrovsk, Donetsk, Zaporizhia, and Luhansk oblasts; *core regions* include Kyiv, Odesa, Kharkiv oblasts and Crimean AR; *the least economically developed regions* include Ivano-Frankivsk and Ternopil oblasts; *other regions* include the rest of Ukrainian administrative units (15 oblasts). Housing and rental prices refer to the average prices in the major cities of oblasts (so-called oblast centers) and Simferopol in the Crimean AR.

Table A.3. Net migration by sex and region for two youth age cohorts, 2007

Region	Net migration (people)					Net migration rate (%)			
	15-19 years		20-24 years		15-24 years	15-19 years		20-24 years	
	Male	Female	Male	Female	Total	Male	Female	Male	Female
Crimean AR	-724	-499	851	418	46	-1.01	-0.72	0.98	0.50
Vinnitsia	-806	-833	106	103	-1,430	-1.33	-1.45	0.16	0.16
Volyn	-594	-575	408	429	-332	-1.47	-1.50	0.94	0.96
Dnipropetrovsk	384	268	28	-85	595	0.31	0.23	0.02	-0.06
Donetsk	-425	-584	413	277	-319	-0.27	-0.40	0.22	0.15
Zhytomyr	-739	-1039	357	300	-1,121	-1.53	-2.31	0.68	0.60
Zakarpattia	-526	-342	-46	219	-695	-1.02	-0.69	-0.09	0.41
Zaporizhia	-321	-266	224	33	-330	-0.49	-0.43	0.30	0.04
Ivano-Frankivsk	-321	-356	102	255	-320	-0.58	-0.68	0.17	0.44
Kyiv	-1516	-1659	424	502	-2,249	-2.44	-2.85	0.58	0.73
Kirovohrad	-896	-965	-20	-149	-2,030	-2.36	-2.71	-0.05	-0.39
Luhansk	-890	-954	103	-86	-1,827	-1.09	-1.25	0.10	-0.09
Lviv	504	319	-240	-344	239	0.51	0.34	-0.21	-0.33
Mykolaiv	-506	-362	327	185	-356	-1.14	-0.85	0.64	0.38
Odesa	1,356	811	989	289	3,445	1.51	0.95	0.91	0.30
Poltava	-559	-792	97	215	-1,039	-1.03	-1.55	0.16	0.37
Rivne	-358	-376	-37	-182	-953	-0.78	-0.85	-0.07	-0.37
Sumy	-729	-857	126	93	-1,367	-1.76	-2.18	0.27	0.20
Ternopil	-288	-308	-39	-254	-889	-0.69	-0.77	-0.09	-0.55
Kharkiv	4,036	3,379	-2045	-2040	3,330	4.05	3.53	-1.59	-1.71
Kherson	-708	-907	-2	80	-1,537	-1.67	-2.30	0.00	0.18
Khmelnyskyi	-1,061	-1,100	458	476	-1,227	-2.19	-2.40	0.89	0.98
Cherkasy	-1,018	-1,211	419	639	-1,171	-2.21	-2.77	0.84	1.30
Chernivtsi	127	383	-20	-187	303	0.36	1.11	-0.05	-0.47
Chernihiv	-843	-896	430	376	-933	-2.25	-2.52	0.94	0.93
Kyiv City	8,745	10,211	-1,641	-1,658	15,657	8.71	10.18	-1.19	-1.24
Sevastopol	364	126	-142	106	454	2.70	1.03	-0.79	0.69

Source: State Statistics Service of Ukraine, Yearbook "Migration of population of Ukraine in 2007", Tables 2.2-2.28.

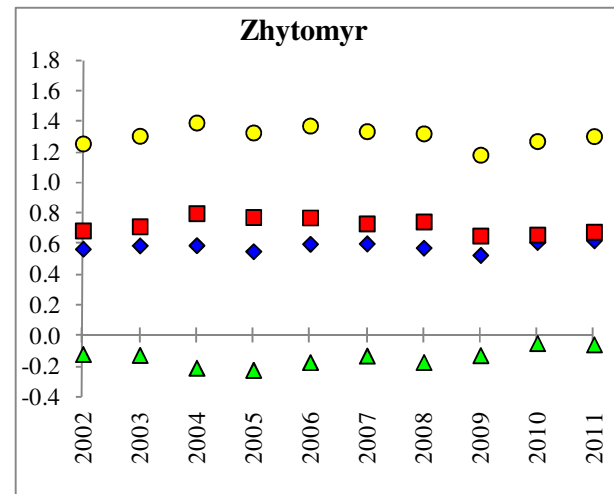
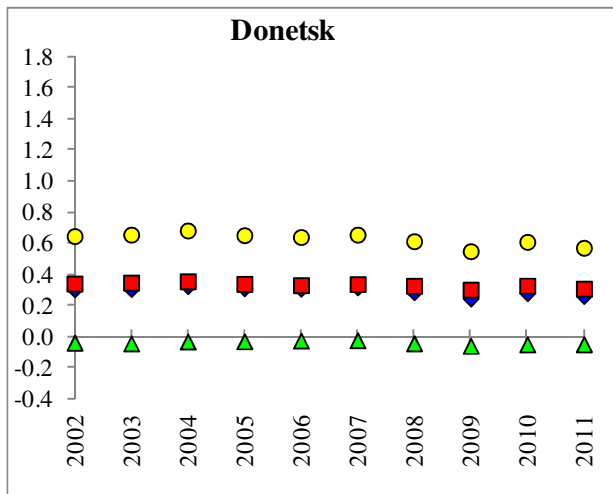
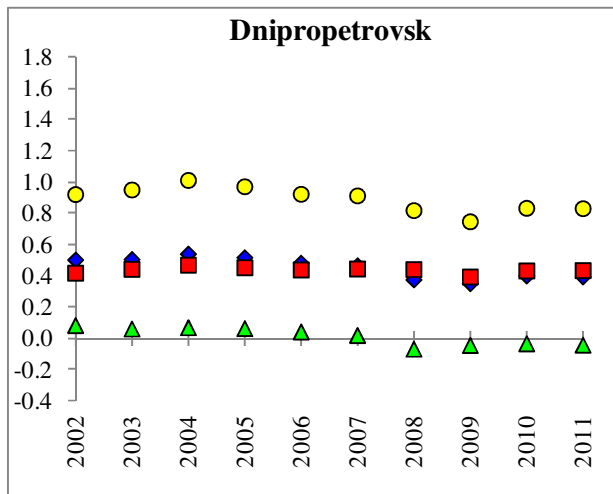
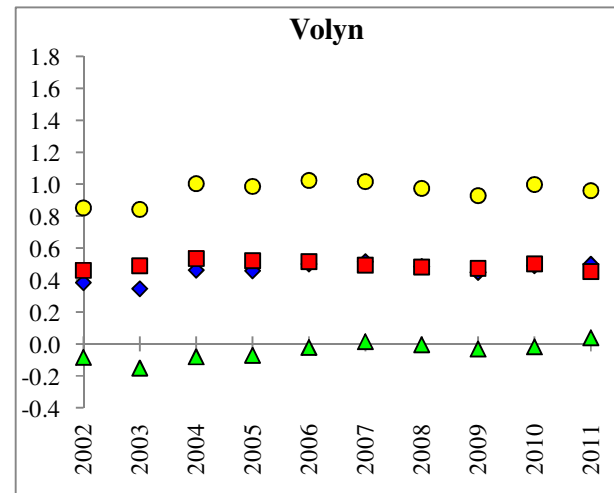
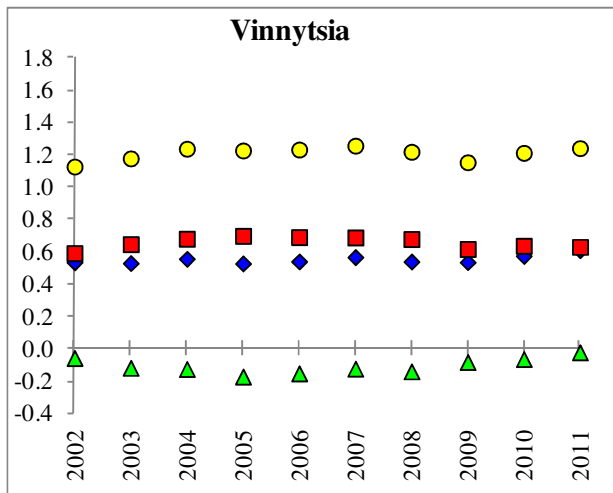
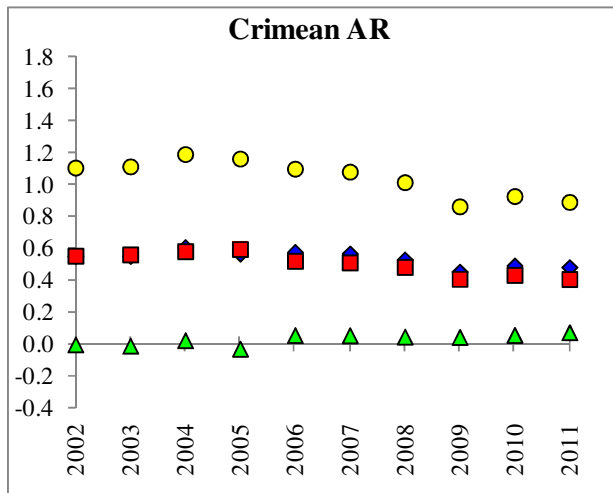
Note: Migration includes here internal and international flows.

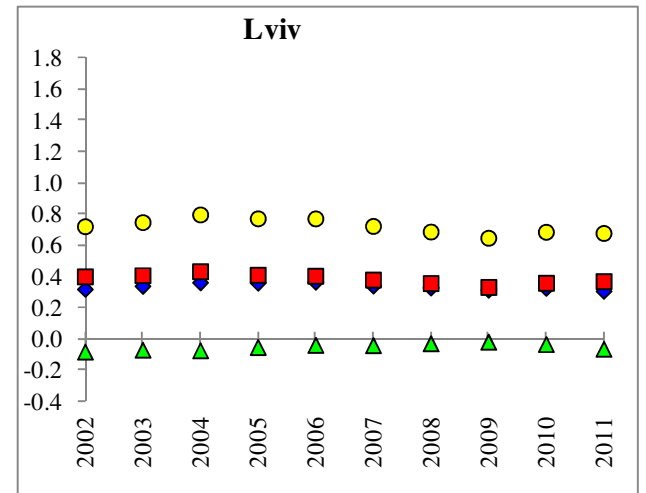
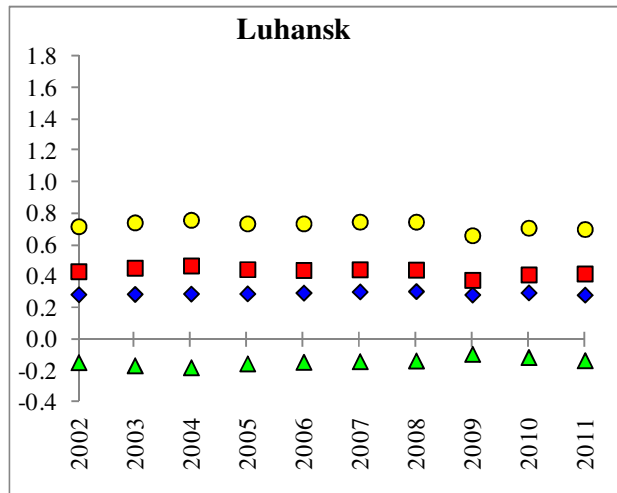
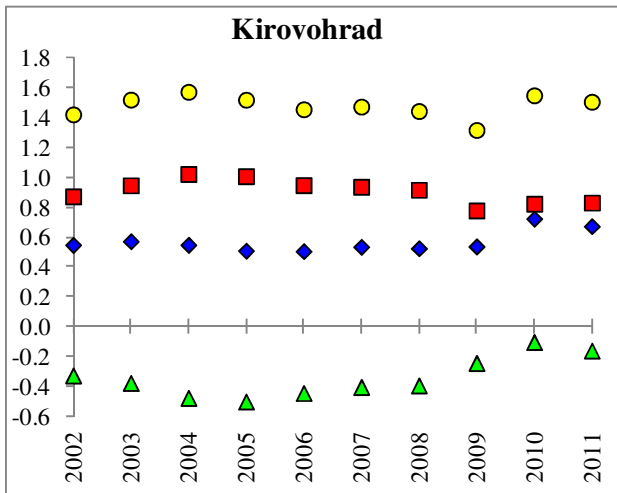
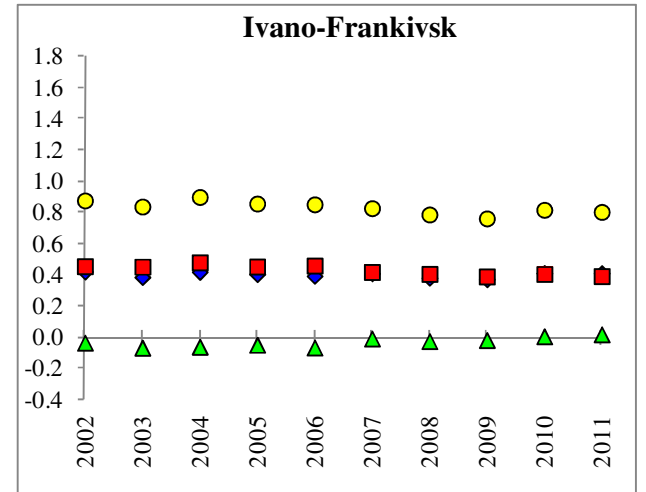
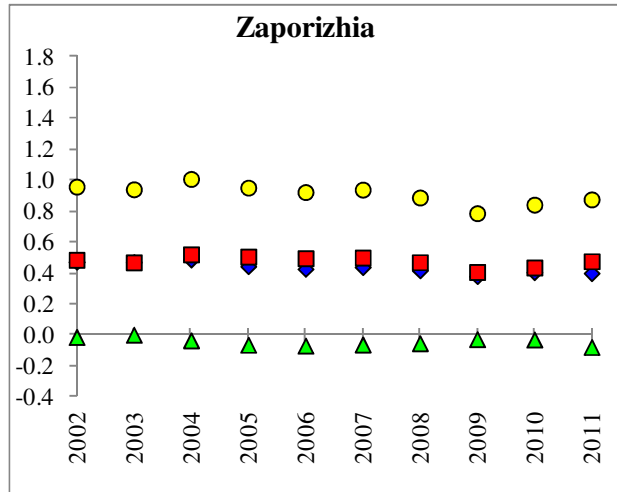
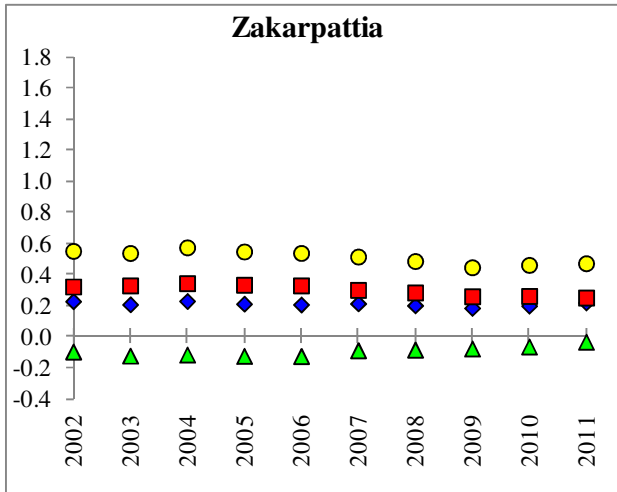
Table A.4. Indicators of internal migration and population changes between urban and rural areas, 2002-2011

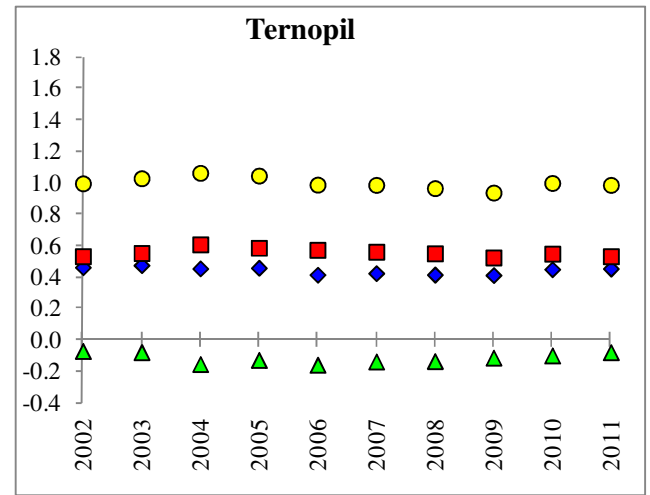
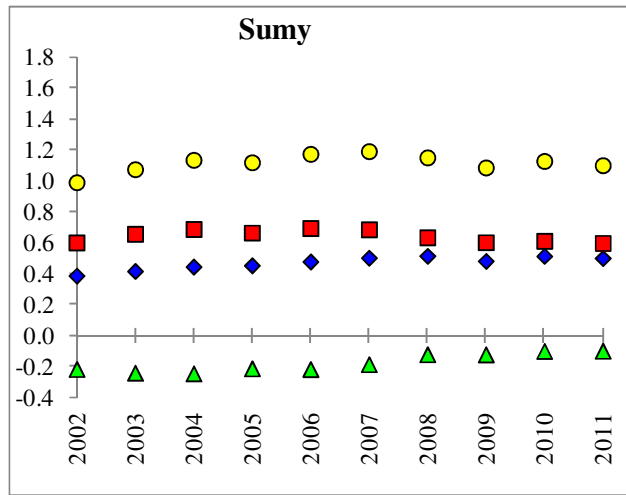
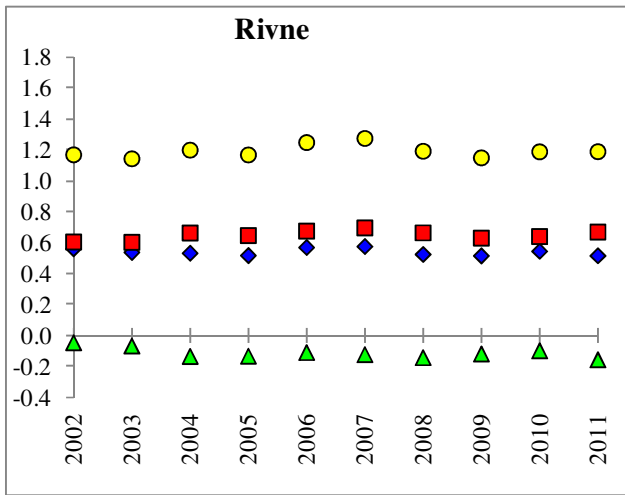
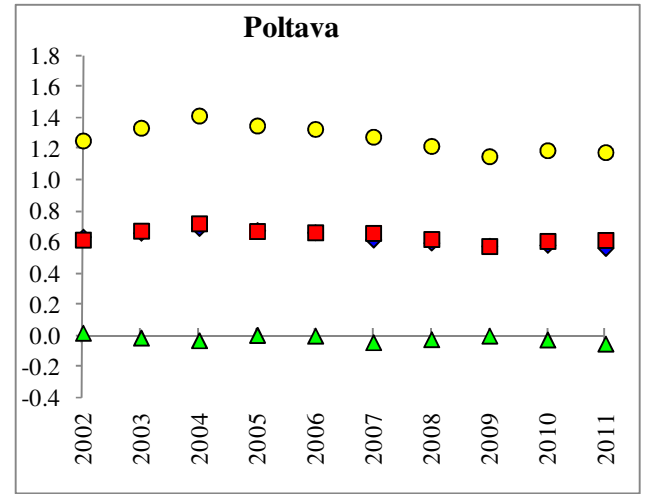
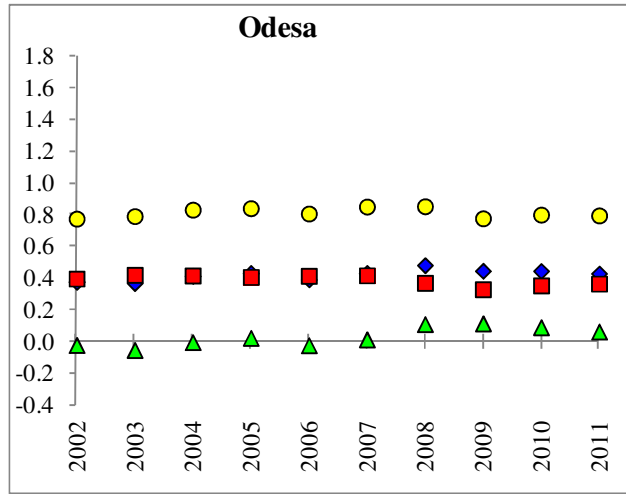
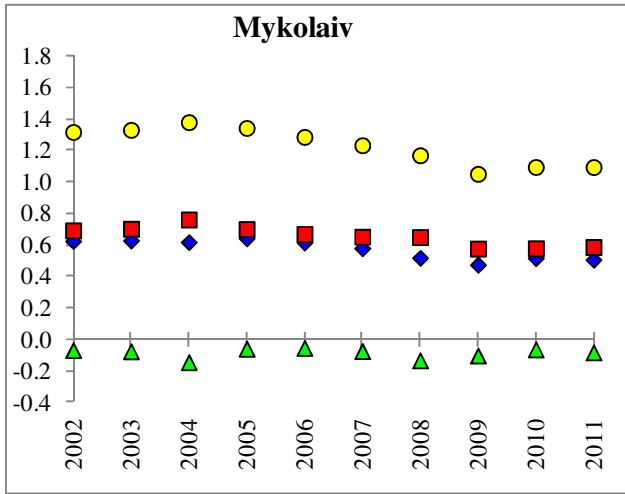
Category of population	Indicator	Type of migration	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Urban	Net migration rate (%)	Intra-regional	0.04	0.04	0.07	0.09	0.06	0.04	0.05	0.03	0.014	0.014
		Inter-regional	0.03	0.04	0.06	0.07	0.05	0.05	0.05	0.03	0.018	0.017
	Net population gains (losses) from migration (thd. people)	Intra-regional	9.8	13.4	23.6	30.3	18.4	13.4	15.3	11.9	4.6	4.3
		Inter-regional	11.0	15.0	20.3	22.5	18.2	16.0	14.4	8.9	5.5	5.4
		International	-29.9	-20.5	-6.8	2.9	11.9	14.2	11.1	9.1	11.2	11.7
	Net population gains (losses) from natural decrease (thd. people)			-205.5	-193.6	-176.1	-187.3	-155.1	-152.2	-122.3	-92.8	-104.5
Rural	Net migration rate (%)	Intra-regional	-0.06	-0.08	-0.15	-0.2	-0.12	-0.09	-0.11	-0.09	-0.032	-0.03
		Inter-regional	-0.07	-0.1	-0.13	-0.15	-0.12	-0.1	-0.1	-0.06	-0.039	-0.038
	Net population gains (losses) from migration (thd. people)	Intra-regional	-9.8	-13.4	-23.6	-30.3	-18.4	-13.4	-15.3	-11.9	-4.6	-4.3
		Inter-regional	-11.0	-15.0	-20.3	-22.5	-18.2	-16.0	-14.4	-8.9	-5.5	-5.4
		International	-3.9	-3.7	-0.8	1.7	2.3	2.6	3.9	4.3	4.9	5.4
	Net population gains (losses) from natural decrease (thd. people)			-158.7	-163.3	-157.9	-168.6	-142.6	-138.0	-121.6	-101.4	-96.0

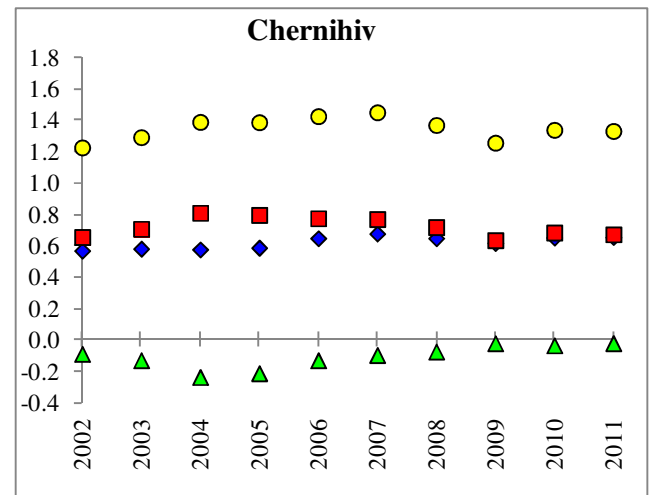
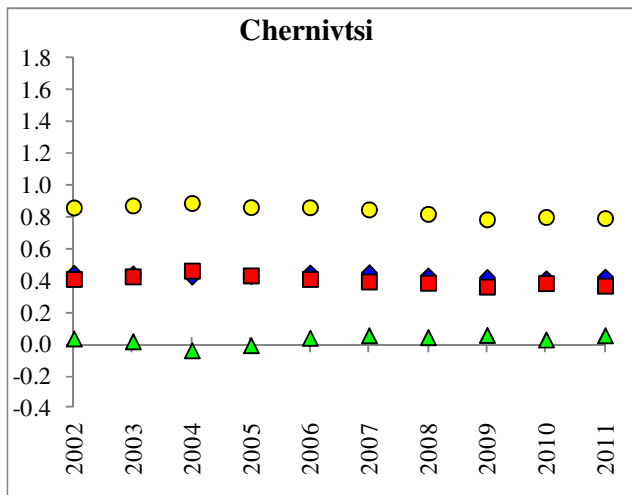
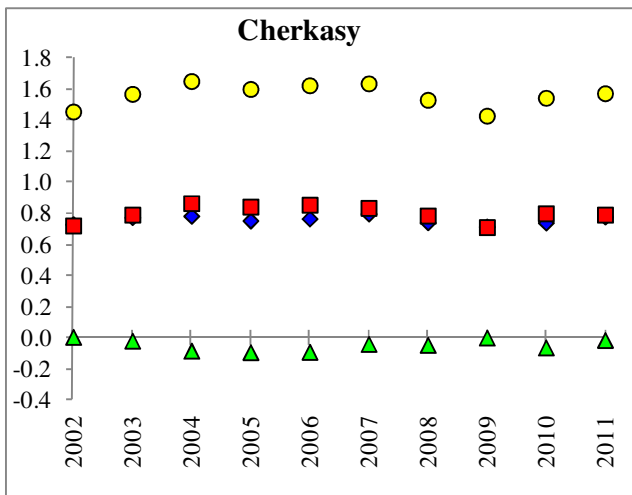
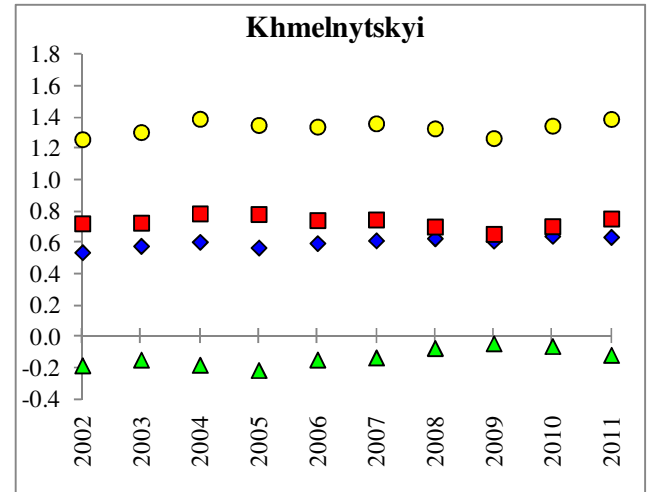
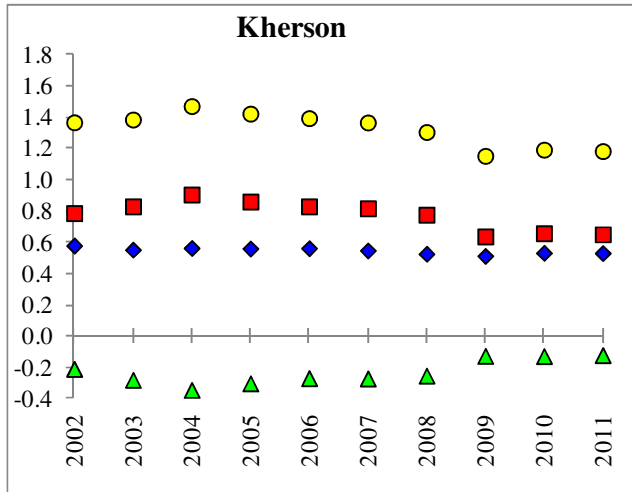
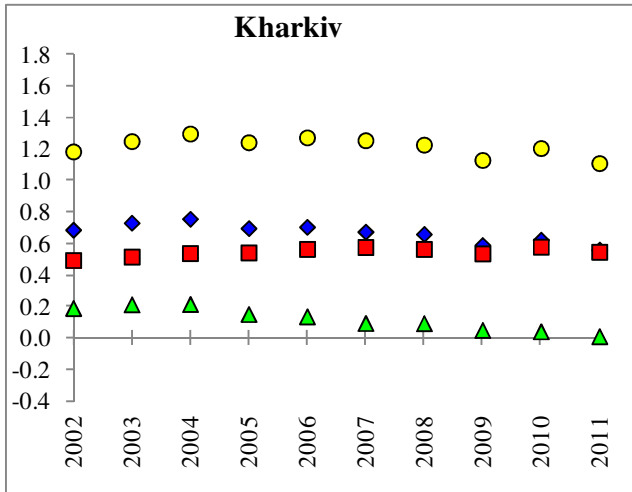
Source: State Statistics Service of Ukraine.

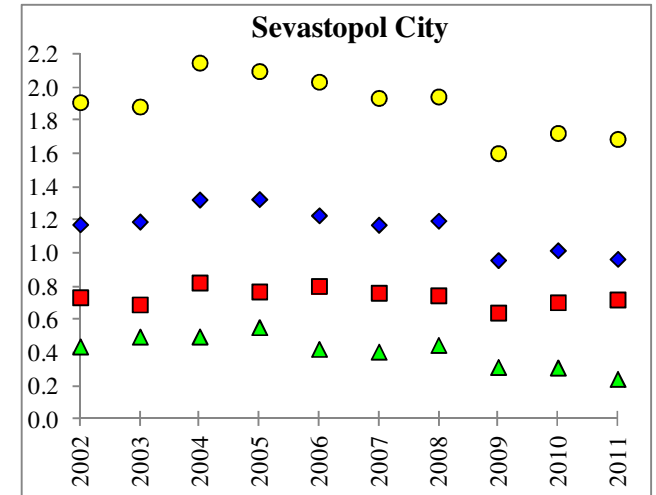
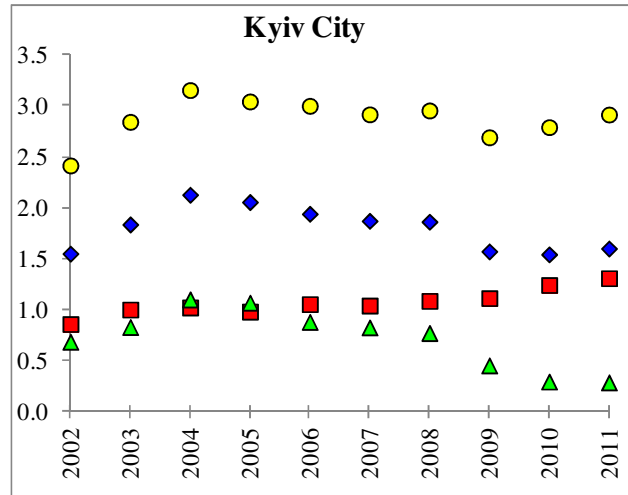
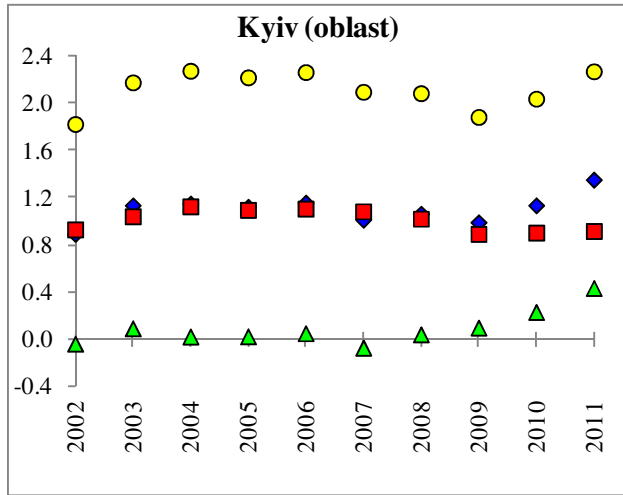
Figure A.1. Inter-regional migration rates (%), 2002-2011











Source: State Statistics Service of Ukraine and author's calculations.
 Note: Inter-regional migration rates are calculated according to eq. (1)-(4).

Table A.5. Main origin and destination regions in inter-regional migration flows and the share of flows from/ to neighboring regions, 2010*

Region	Origin regions		Destination regions	
	Three major origin regions	Share of flows from neighbor. regions (%)	Three major destination regions	Share of flows to neighbor. regions (%)
Crimean AR	Sevastopol City, Kharkiv oblast, Donetsk oblast	23	Sevastopol City, Kharkiv oblast, Kyiv City	29
Vinnitsia Oblast	Kyiv City, Odesa oblast, Khmelnytskyi oblast	70	Kyiv City, Odesa oblast, Khmelnytskyi oblast	75
Volyn Oblast	Rivne oblast, Lviv oblast, Kyiv City	45	Kyiv City , Rivne oblast, Lviv oblast	40
Dnipropetrovsk Oblast	Zaporizhia oblast, Donetsk oblast, Kirovohrad oblast	64	Zaporizhia oblast, Kyiv City , Kirovohrad oblast	56
Donetsk Oblast	Kharkiv oblast, Luhansk oblast, Dnipropetrovsk oblast	65	Kharkiv oblast, Luhansk oblast, Kyiv City	54
Zhytomyr Oblast	Kyiv City, Kyiv oblast, Vinnitsia oblast	64	Kyiv City, Kyiv oblast, Vinnitsia oblast	69
Zakarpattia Oblast	Lviv oblast, Kyiv City , Ivano-Frankivsk oblast	32	Lviv oblast, Kyiv City , Ivano-Frankivsk oblast	30
Zaporizhia Oblast	Dnipropetrovsk oblast, Donetsk oblast, Kherson oblast	51	Dnipropetrovsk oblast, Kyiv City , Donetsk oblast	44
Ivano-Frankivsk Oblast	Lviv oblast, Ternopil oblast, Chernivtsi oblast	59	Lviv oblast, Chernivtsi oblast, Kyiv City	58
Kyiv Oblast	Kyiv City, Cherkasy oblast, Zhytomyr oblast	70	Kyiv City, Cherkasy oblast, Zhytomyr oblast	78
Kirovohrad Oblast	Dnipropetrovsk oblast, Kyiv City , Cherkasy oblast	59	Dnipropetrovsk oblast, Kyiv City , Cherkasy oblast	57
Luhansk Oblast	Donetsk oblast, Kharkiv oblast, Kyiv City	61	Donetsk oblast, Kharkiv oblast, Kyiv City	53
Lviv Oblast	Ivano-Frankivsk oblast, Volyn oblast, Ternopil oblast	59	Ivano-Frankivsk oblast, Kyiv City , Volyn oblast	52
Mykolaiv Oblast	Odesa oblast, Kherson oblast, Kyiv City	53	Odesa oblast, Kyiv City , Kherson oblast	52
Odesa Oblast	Mykolaiv oblast, Vinnitsia oblast, Kherson oblast	37	Mykolaiv oblast, Vinnitsia oblast, Kyiv City	36
Poltava Oblast	Kharkiv oblast, Kyiv City, Dnipropetrovsk oblast	73	Kharkiv oblast, Kyiv City, Dnipropetrovsk oblast	78
Rivne Oblast	Volyn oblast, Khmelnytskyi oblast, Kyiv City	59	Kyiv City , Volyn oblast, Khmelnytskyi oblast	51
Sumy Oblast	Kharkiv oblast, Kyiv City , Chernihiv oblast	47	Kharkiv oblast, Kyiv City , Chernihiv oblast	45
Ternopil Oblast	Khmelnyskyi oblast, Lviv oblast, Ivano-Frankivsk oblast	65	Khmelnyskyi oblast, Lviv oblast, Ivano-Frankivsk oblast	63
Kharkiv Oblast	Donetsk oblast, Luhansk oblast, Poltava oblast	61	Donetsk oblast, Luhansk oblast, Poltava oblast	58
Kherson Oblast	Mykolaiv oblast, Dnipropetrovsk oblast, Zaporizhia oblast	49	Dnipropetrovsk oblast, Zaporizhia oblast, Kyiv City	47
Khmelnyskyi Oblast	Kyiv City , Vinnitsia oblast, Ternopil oblast	48	Kyiv City , Rivne oblast, Vinnitsia oblast	42
Cherkasy Oblast	Kyiv City, Kyiv oblast, Kirovohrad oblast	66	Kyiv City, Kyiv oblast, Kirovohrad oblast	68
Chernivtsi Oblast	Ivano-Frankivsk oblast, Ternopil oblast, Khmelnytskyi oblast	59	Ivano-Frankivsk oblast, Khmelnytskyi oblast, Ternopil oblast	56
Chernihiv Oblast	Kyiv City, Sumy oblast, Kyiv oblast	65	Kyiv City, Sumy oblast, Kyiv oblast	69
Kyiv City	Kyiv oblast, Cherkasy oblast, Zhytomyr oblast	53	Kyiv oblast, Cherkasy oblast, Chernihiv oblast	60
Sevastopol City	Crimean AR, Donetsk oblast, Kyiv City	51	Crimean AR, Kyiv City, Zaporizhia oblast	57

Source: State Statistics Service of Ukraine and author's calculations.

Note: * The entries in bold denote non-neighboring regions (i.e. those which do not share the land borders). Kyiv City is considered to have the same neighboring regions as Kyiv oblast. The same applies to Sevastopol City in the Crimean AR.

Table A.6. Data description

Variable name		Definition	Source
In-migration, out-migration	A	Total number of people who migrated to/from region in given year, respectively	SSSU Yearbooks “Population migration” in 2002-2007, on-line Express-bulletins on demographic situation in 2008-2011
Bilateral migration	G	Number of people who migrated from region <i>i</i> to region <i>j</i> in a given year	SSSU, Demographic yearbooks “Population of Ukraine” in 2008-2010
Distance	G	Distance between the main regional cities of oblasts (so-called oblast centers and Simferopol in the Crimean AR) as well as Kyiv City, km	Official letter of the State Custom House of Ukraine N11/6-10.19/1268-EII (Feb 2010)
Neighbor	G	Dummy: 1 if regions <i>i</i> and <i>j</i> share the same land borders, 0 if not	Author
Common language	G	Dummy: 1 if the same language (Ukrainian or Russian) dominates in regions <i>i</i> and <i>j</i> , 0 if not	Kiev International Institute of Sociology, Household survey in 2011
Wage	B	Average gross monthly wage in a given year, UAH	SSSU web-page
Unemployment	B	Unemployment rate (ILO definition), percent	SSSU web-page for 2008-2011 and statistical-analytical yearbooks “Economic activity of population” for 2001-2007
Comparability index	G	The square of the difference in the proportion of population aged 15 to 70 years employed in industry and construction between regions <i>i</i> and <i>j</i>	Author’s calculations based on the composition of employment taken from SSSU, Statistical-analytical yearbooks “Economic activity of population” in 2007-2010
Population	B	Average de jure population in a given year, persons (to calculate per capita expenditures of local governments and to use in the gravity model) Average de facto population in a given year, persons (to calculate migration rates)	Data bank of population statistics http://stat6.stat.lviv.ua/ukrcensus/Dialog/statfile1_c.asp
Population density	A	Density of de facto population as of beginning of a given year, persons per square meter	
Urban share	G	Share of urban population de jure population as of beginning of a given year, %	
Share of women	G	Share of women in de jure population as of beginning of a given year, %	
Share of children	B	Share of 0-14 years old in de jure population as of beginning of a given year, %	
Share of youth	B	Share of 15-24 years old in de jure population as of beginning of a given year, %	
Share of prime age population	B	Share of 25-59 years old in de jure population as of beginning of a given year, %	
Marriage (divorce) rate	B	Number of marriages (divorces) per 1,000 de facto population	
Higher education	G	Share of the labor force aged 25 to 70 years with complete higher education, %	
Crime rate	B	Number of registered crimes per 100,000 de facto population	SSSU, Yearbooks “Social indicators of the standard of population living”
Air pollution	B	Emissions of air pollutants from stationary and mobile sources of pollution, kg per person	
Doctors	B	Number of doctors of all specializations per 10,000 population (end-year)	SSSU, Yearbooks “Regions of Ukraine”
Students	B	Number of students of higher education institutions of the I-IV levels of accreditation per 10,000 population as of beginning of academic year	

Social expenditures	B	The sum of per capita expenditures of local governments on education, health care, and social assistance, UAH	Author's calculations based on the data of the Ministry of Finance on the structure of local expenditures published in yearbooks "Budget of Ukraine"
Total expenditures	B	Total expenditures of local governments per capita, UAH	
New dwellings	B	Commissioning of new housing, square meters per person	SSSU web-page (Commissioning of new housing)
Housing price	G	Average price of an apartment at secondary market in the main regional city, USD per square meter	World Bank data base collected for Internal Mobility Study
Rental price	G	Average monthly rent payment for one bedroom apartment in the main regional city, USD	
Chernobyl	G	Dummy for regions having areas which have been most affected by Chernobyl disaster affected by the Cherbobyl disaster (Volyn, Zhytomyr, Kyiv, Rivne and Chernihiv obslasts)	Author (based on the Decree of the Cabinet of Ministers N 106, July 23, 1991)
Coast	G	Dummy for regions with a sea coast (Donetsk, Zaporizhia, Odesa, Mykolaiv, Kherson oblast and Crimean AR)	Author

Note: G refers to variables used only in the gravity model (analysis of bilateral migration flows in 2008-2010), A refers to variables used only in the analysis of aggregate migration rates in 2002-2010, B refers to variables used in both types of analysis.

Table A.7. Regression results: determinants of inter-regional migration rates in 2002-2010

	27 regions						25 regions					
	(1) In-migration rate		(2) Out-migration rate		(3) Net migration rate		(4) In-migration rate		(5) Out-migration rate		(6) Net migration rate	
Wage ratio	0.001	(0.001)	0.002***	(0.001)	-0.001	(0.001)	0.004***	(0.001)	0.001	(0.001)	0.003**	(0.001)
Unemployment rate	-0.001	(0.004)	0.004	(0.003)	-0.007*	(0.004)	0.001	(0.004)	0.005*	(0.002)	-0.004	(0.004)
Density (log)	0.107*	(0.059)	-0.020	(0.058)	0.119***	(0.037)	-0.256***	(0.055)	-0.267***	(0.070)	0.055	(0.051)
Share of youth	0.100***	(0.021)	-0.029*	(0.016)	0.128***	(0.021)	0.028	(0.022)	-0.022	(0.016)	0.058**	(0.027)
Share of prime age	0.077***	(0.013)	0.007	(0.012)	0.054***	(0.013)	0.015	(0.012)	0.018	(0.012)	-0.001	(0.013)
Share of old	0.057***	(0.013)	0.009	(0.011)	0.042***	(0.009)	0.018	(0.012)	-0.002	(0.012)	0.016	(0.013)
Marriage rate	0.031*	(0.017)	0.001	(0.014)	0.032*	(0.017)	0.003	(0.015)	-0.004	(0.012)	0.015	(0.016)
Crime rate	-0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
Air pollution	-0.001***	(0.000)	-0.001***	(0.000)	-0.000	(0.000)	-0.000**	(0.000)	-0.000**	(0.000)	-0.000	(0.000)
Doctors	0.001	(0.001)	-0.001**	(0.001)	0.002	(0.001)	-0.000	(0.001)	-0.000	(0.001)	-0.000	(0.001)
Students	0.000	(0.000)	0.000***	(0.000)	-0.000*	(0.000)	0.000	(0.000)	0.000***	(0.000)	0.000	(0.000)
Ratio of social expenditures	0.005***	(0.001)	-0.000	(0.001)	0.005**	(0.002)	0.000	(0.001)	0.002***	(0.001)	-0.001	(0.001)
New dwellings	0.052	(0.101)	-0.106	(0.076)	0.120	(0.102)	0.080	(0.086)	-0.077	(0.063)	0.173*	(0.091)
Constant	-6.997***	(0.956)	0.433	(0.814)	-6.557***	(0.868)	-0.323	(1.061)	0.847	(1.084)	-1.735	(1.247)
Year dummies	Yes		Yes		Yes		Yes		Yes		Yes	
Random effects	Yes		Yes		Yes		Yes		Yes		Yes	
Number of observations	216		216		216		200		200		200	
Number of groups	27		27		27		25		25		25	
R ² within	0.5100		0.6404		0.4749		0.3446		0.7109		0.3433	
R ² between	0.7227		0.3819		0.8933		0.3416		0.4444		0.5324	
R ² overall	0.7158		0.3869		0.8495		0.3418		0.4598		0.4917	

Note: Dependent variable is the corresponding region-level inter-regional migration rate estimated according to eq. (1)-(3). All independent variables except for density and age composition (they are taken in the beginning of a given year) are lagged by one year. Smaller sample excludes Kyiv and Sevastopol cities.

Robust standard errors in parentheses. *, **, *** denote significance levels at the 10%, 5%, and 1% level, respectively.

Table A.8. Regression results: determinants of inter-regional bilateral flows in 2008-2010 (modified gravity model, Hausman and Taylor Instrumental Variable Method)

	Large sample (with Kyiv and Sevastopol cities)		Small sample	
	(1)	(2)	(3)	
Distance ij (log)	-1.24*** (0.29)	-1.24*** (0.30)	-1.27*** (0.33)	
Common language	0.06 (0.37)	0.06 (0.38)	0.05 (0.42)	
Population i (log)	0.97*** (0.35)	0.96*** (0.36)	0.87* (0.52)	
Population j (log)	0.65* (0.35)	0.60* (0.36)	0.94* (0.52)	
Real wage i (log) [#]	0.76*** (0.19)	0.51** (0.23)	0.46* (0.25)	
Real wage j (log) [#]	0.29 (0.19)	0.41* (0.23)	0.44* (0.25)	
Unemployment rate i [#]	0.00 (0.01)	0.00 (0.01)	-0.00 (0.01)	
Unemployment rate j [#]	-0.01* (0.01)	-0.01* (0.01)	-0.01** (0.01)	
Economic distance ij (11 sectors)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	
Urban share i	0.01 (0.01)	0.01 (0.01)	0.01 (0.02)	
Urban share j	-0.00 (0.01)	-0.01 (0.01)	-0.03* (0.02)	
Share of women i	0.24* (0.14)	0.27* (0.14)	0.27** (0.13)	
Share of women j	0.61*** (0.14)	0.60*** (0.14)	0.50*** (0.13)	
Share of youth i	-0.04 (0.02)	-0.04* (0.02)	-0.01 (0.03)	
Share of youth j	0.16*** (0.02)	0.16*** (0.02)	0.15*** (0.03)	
Share of prime age i	0.04 (0.03)	0.04 (0.03)	0.06* (0.03)	
Share of prime age j	-0.07** (0.03)	-0.07** (0.03)	-0.02 (0.03)	
Share of educated i [#]	0.01*** (0.00)	0.01** (0.00)	0.00 (0.00)	
Share of educated j [#]	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	
Marriage rate i	0.02 (0.02)	0.00 (0.02)	0.02 (0.02)	
Marriage rate j	-0.04** (0.02)	-0.03 (0.02)	-0.03* (0.02)	
Doctors i (log)	0.16 (0.12)	0.23* (0.12)	0.12 (0.11)	
Doctors j (log)	0.16 (0.12)	0.14 (0.12)	0.11 (0.11)	
Students of HEI i (log)	-0.22 (0.20)	-0.24 (0.20)	-0.09 (0.21)	
Students of HEI j (log)	-0.22 (0.20)	-0.25 (0.20)	-0.26 (0.21)	
Crime rate i (log)	-0.10 (0.08)	-0.10 (0.08)	-0.03 (0.08)	
Crime rate j (log)	0.21*** (0.08)	0.21*** (0.08)	0.31*** (0.08)	
Air pollution i (log)	-0.17** (0.08)	-0.11 (0.08)	-0.21*** (0.07)	
Air pollution j (log)	-0.14* (0.08)	-0.16* (0.08)	-0.16** (0.07)	
Coast i	-0.26 (0.42)	-0.26 (0.44)	-0.29 (0.46)	
Coast j	-0.02 (0.42)	-0.03 (0.44)	0.16 (0.46)	
Chernobyl i	-0.02 (0.46)	-0.04 (0.48)	-0.02 (0.47)	
Chernobyl j	-0.14 (0.46)	-0.15 (0.48)	-0.01 (0.47)	
New dwellings i (log)	-0.10 (0.08)	-0.13 (0.08)	-0.04 (0.09)	
New dwellings j (log)	-0.00 (0.08)	0.02 (0.08)	0.03 (0.09)	
Total social expenditures i (log)	-0.63*** (0.18)		-0.36 (0.28)	
Total social expenditures j (log)	-0.17 (0.18)		-0.58** (0.28)	
Education expenditures i (log)		0.46 (0.34)		
Education expenditures j (log)		-0.44 (0.34)		
Health expenditures i (log)		-0.63*** (0.22)		
Health expenditures j (log)		0.05 (0.22)		
Social assist. expenditures i (log)		-0.17** (0.08)		
Social assist. expenditures j (log)		0.02 (0.08)		
Year 2009	-0.10 (0.06)	-0.11 (0.07)	-0.08 (0.06)	
Year 2010	0.04 (0.08)	0.02 (0.09)	0.07 (0.09)	
Constant	-55.93*** (13.44)			
N	2106	2106	1800	
p -value (Hausman test: FE vs. HTIVM)	0.4922	0.7705	0.30	

Note: Dependent variable is the log of migration flows between two regions. Index i denotes source region, and index j denotes destination region. Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Endogenous time-varying explanatory variables (assumed to be correlated with the unobserved random effect) in the Hausman-Taylor IV method.

Most time-varying variables (except for population shares and economic distance) are lagged one year. Smaller sample excludes Kyiv and Sevastopol cities.

Table A.9. Indicators of commuting by socio-demographic characteristics, 2010

Characteristic/ Category	Proportion (% of total)			Commuting rate (share of the employed population, %)	
	Non- commuters	Intra- regional	Inter- regional	Intra- regional	Inter- regional
Sex					
Male	50.9	39.0	31.1	9.2	1.0
Female	49.1	61.0	68.9	14.0	2.1
Marital status					
Married	63.9	62.9	54.9	11.5	1.4
Single	19.5	24.3	32.3	14.0	2.5
Widowed or separated	16.6	12.8	12.8	9.2	1.3
Age					
15-24 years	10.3	13.9	18.0	14.9	2.6
25-34 years	25.4	29.3	30.7	13.2	1.9
35-44 years	24.4	26.4	26.0	12.5	1.7
45-59 years	33.6	29.4	23.9	10.4	1.1
60-70 years	6.4	1.1	1.5	2.2	0.4
Education ^{a)}					
Lower secondary and less	8.0	6.7	4.1	10.0	0.8
Upper secondary	43.0	53.4	51.9	14.0	1.8
Post-secondary non-tertiary	20.9	19.5	18.4	11.0	1.4
Tertiary	28.1	20.4	25.6	8.7	1.5
Occupation group					
Legislators, senior officials and managers	10.0	5.5	7.7	8.0	1.5
Professionals	17.3	10.4	11.5	8.7	1.3
Technicians and associate professionals	13.6	14.0	11.1	14.0	1.5
Clerks	4.1	3.1	2.9	10.7	1.3
Service workers and shop and market sales workers	16.9	17.5	20.4	13.9	2.2
Skilled agricultural workers	1.2	1.8	0.2	19.3	0.3
Craft and related workers	13.1	15.9	21.4	15.8	2.9
Plant and machine operators and assemblers	13.1	17.6	14.1	17.5	1.9
Elementary occupations	10.7	14.2	10.6	17.3	1.7
Employment status at main job					
Wage and salary workers	78.6	97.1	98.9	13.9	1.9
Self-employed and unpaid family helpers in subsistence agriculture	16.1	0.0	0.0	0.0	0.0
Other	5.4	2.9	1.1	6.7	0.4
Economic sector ^{b)}					
Agriculture	22.0	9.2	1.8	5.3	0.1
Industry	18.5	25.5	13.0	15.5	1.1
Construction	5.7	9.9	23.8	17.8	5.8
Services	33.4	32.4	47.5	11.3	2.2
Public sector	20.3	23.0	13.8	13.1	1.1
Type of employment ^{c)}					
Formal	75.5	88.7	81.8	13.4	1.7
Informal	24.5	11.3	18.2	5.7	1.3
Type of settlement (Residence)					
Rural	27.2	66.2	39.3	24.1	1.9
Urban	72.8	33.8	60.7	5.8	1.4
Macroregion (Residence) ^{d)}					
Kyiv City	7.9	0.0	3.2	0.0	0.7
Center and North	22.3	20.4	73.9	10.4	5.1
East	33.9	27.6	8.4	9.8	0.4
South	16.1	13.2	2.2	9.9	0.2
West	19.8	38.9	12.3	20.6	0.9
Macroregion (Employment) ^{d)}					
Kyiv City	7.9	0.0	76.2	0.0	14.9
Center and North	22.2	20.4	9.1	10.9	0.7
East	33.9	27.6	6.5	9.8	0.3

South	16.2	13.2	4.9	9.9	0.5
West	19.8	38.9	3.3	20.9	0.2

Source: Author's calculations based on individual-level LFS data.

Note: Respondents temporarily working abroad are excluded. Only non-missing values are taken into account when calculating shares and the incidence of commuting. a) Education is classified according to the International Standard Classification of Education (ISCED). *Tertiary education* includes complete higher and basic higher education according to the national classification; *post-secondary non-tertiary education* stands for incomplete higher education; *upper secondary education* is complete general secondary education; *lower secondary education and less* includes basic general secondary education, primary general education and no any education. b) Workers engaged in subsistence agriculture are reclassified as those working in agriculture (before they had missing information about a sector of employment). *Public sector* includes education, health care and social work, and public administration defined according to the NACE Rev.1 classification. *Services sector* includes all types of market service activities. c) *Informal employment* refers to all persons employed in the informal sector as well as wage and salary workers holding informal jobs (i.e. employed by oral agreement) in formal sector enterprises. d) See definition of macroregions in a note to Table A.2.

Table A.10. Indicators of commuting by region of origin (residence), 2010

Region	Share of a region in total commuting flows (%)			Commuting rate (share of the employed population, %)		
	Intra-regional	Inter-regional	International	Intra-regional	Inter-regional	International
Crimean AR and Sevastopol	6.1	0.5	3.5	13.2	0.1	0.3
Vinnitsia	2.9	4.3	5.4	9.8	2.0	0.6
Volyn	3.7	1.4	6.8	20.2	1.1	1.2
Dnipropetrovsk	4.9	1.6	5.2	7.5	0.3	0.3
Donetsk	7.8	3.9	3.5	9.2	0.6	0.1
Zhytomyr	2.8	6.0	3.3	11.6	3.4	0.5
Zakarpattia	4.3	0.3	2.6	18.9	0.2	0.4
Zaporizhia	3.3	0.8	0.6	9.4	0.3	0.1
Ivano-Frankivsk	7.1	2.4	1.7	31.4	1.5	0.3
Kyiv oblast	5.5	42.1	0.1	17.1	17.6	0.0
Kirovohrad	1.3	2.2	1.6	6.8	1.7	0.3
Luhansk	2.5	1.0	0.3	5.7	0.3	0.0
Lviv	11.6	0.0	0.0	24.9	0.0	0.0
Mykolaiv	0.9	0.6	0.0	3.8	0.4	0.0
Odesa	4.0	0.3	13.8	8.9	0.1	1.0
Poltava	2.3	2.5	1.9	8.4	1.2	0.2
Rivne	3.7	3.5	5.4	18.3	2.3	0.9
Sumy	1.9	1.6	1.9	8.8	1.0	0.3
Ternopil	2.7	0.9	0.3	14.9	0.7	0.1
Kharkiv	9.0	1.1	11.0	16.7	0.3	0.7
Kherson	2.2	0.9	0.2	10.7	0.6	0.0
Khmelnyskyi	2.4	3.2	4.1	9.8	1.7	0.6
Cherkasy	2.3	6.1	5.6	9.4	3.4	0.8
Chernivtsi	3.3	0.7	19.0	20.3	0.5	3.9
Chernihiv	1.5	9.1	2.0	7.2	6.0	0.3
Kyiv City	0.0	3.2	0.5	0.0	0.7	0.0

Source: Author's calculations based on individual-level LFS data.

Note: Respondents temporarily working abroad are not excluded here.

Table A.11. Determinants of the commuting decision, 2005-2010

Variable	Binary regression (logit)						Multinomial regression (mlogit)			
	(1) Labor force		(2) Employed		(3) Wage and salary workers		(4) Employed			
	Commuter vs. non-commuter		Commuter vs. non-commuter		Commuter vs. non-commuter		Intra-regional commuter vs. non-commuter		Inter-regional commuter vs. non-commuter	
	Odds	SE	Odds	SE	Odds	SE	Odds	SE	Odds	SE
Female	1.707***	(0.012)	1.594***	(0.014)	1.545***	(0.014)	1.579***	(0.014)	2.162***	(0.083)
Single	1.180***	(0.012)	1.177***	(0.014)	1.179***	(0.014)	1.183***	(0.014)	1.037	(0.049)
Widowed or separated	1.005	(0.010)	1.024**	(0.012)	1.021*	(0.012)	1.028**	(0.012)	0.956	(0.051)
Age	1.119***	(0.002)	1.003	(0.003)	0.985***	(0.003)	1.004	(0.003)	0.992	(0.011)
Age squared (/100)	0.846***	(0.002)	0.978***	(0.003)	1.001	(0.003)	0.977***	(0.003)	0.990	(0.014)
Upper secondary education	1.663***	(0.021)	1.127***	(0.016)	1.113***	(0.016)	1.124***	(0.016)	1.207***	(0.081)
Post-secondary non-tertiary ed.	1.874***	(0.027)	1.079***	(0.018)	1.077***	(0.018)	1.071***	(0.018)	1.303***	(0.101)
Tertiary education	1.767***	(0.026)	1.007	(0.018)	0.999	(0.018)	0.998	(0.018)	1.321***	(0.110)
Blue-collar worker			1.285***	(0.016)	1.120***	(0.013)	1.284***	(0.016)	1.356***	(0.072)
White-collar worker			1.102***	(0.017)	0.974*	(0.014)	1.094***	(0.017)	1.344***	(0.092)
Wage and salary worker			6.409***	(0.164)			6.408***	(0.167)	5.615***	(0.715)
Industry			6.577***	(0.099)	5.564***	(0.081)	6.647***	(0.101)	4.386***	(0.382)
Construction			8.902***	(0.166)	6.795***	(0.126)	8.803***	(0.166)	9.228***	(0.818)
Services			5.329***	(0.078)	4.173***	(0.060)	5.326***	(0.079)	4.564***	(0.383)
Public sector			3.599***	(0.054)	3.059***	(0.044)	3.638***	(0.055)	2.119***	(0.185)
Informal employment			0.523***	(0.008)	0.675***	(0.010)	0.509***	(0.008)	1.053	(0.057)
Urban, residence	0.230***	(0.002)	0.073***	(0.001)	0.075***	(0.001)	0.072***	(0.001)	0.189***	(0.008)
Capital city, residence	0.040***	(0.003)	0.086***	(0.006)	0.089***	(0.006)	0.041***	(0.004)	0.521***	(0.101)
Unemployment rate, residence	1.039***	(0.003)	4.208***	(0.230)	4.374***	(0.243)	1.036	(0.031)	19.826***	(2.091)
Real wages, residence	1.001***	(0.000)	0.997***	(0.000)	0.997***	(0.000)	1.009	(0.030)	0.053***	(0.006)
Unemployment rate, work	0.249***	(0.014)	0.239***	(0.013)	0.249***	(0.014)	1.002***	(0.000)	0.998***	(0.001)
Real wages, work	1.003***	(0.000)	1.003***	(0.000)	1.003***	(0.000)	0.998***	(0.000)	1.004***	(0.000)
Year 2006	1.019	(0.013)	1.115***	(0.016)	1.105***	(0.016)	1.112***	(0.016)	1.285***	(0.095)
Year 2007	1.020	(0.013)	1.166***	(0.017)	1.158***	(0.017)	1.174***	(0.018)	1.125	(0.091)
Year 2008	1.146***	(0.015)	1.232***	(0.019)	1.224***	(0.019)	1.236***	(0.019)	1.346***	(0.112)
Year 2009	1.073***	(0.015)	1.240***	(0.019)	1.230***	(0.020)	1.251***	(0.020)	1.175**	(0.097)
Year 2010	1.034**	(0.014)	1.174***	(0.019)	1.171***	(0.019)	1.188***	(0.019)	1.404***	(0.104)
Number of observations	1,391,423		1,346,706		917,093		1,346,706			
Pseudo R ²	0.106		0.300		0.270		0.351			

Source: Author's calculations based on individual-level LFS data (individuals aged 15 to 70, pooled sample for 2005-2010, estimated with sample weights).

Note: Odds ratios significantly different from 1 at the 10%, 5%, and 1% level (based on robust standard errors) are denoted by *, **, and ***, respectively. Respondents working abroad are excluded. All variables except for age, age squared, unemployment rate and wage are dummies. Base categories for dummies: male, married, lower secondary education or less, unskilled worker, self-employed or unpaid family helper, employed in agriculture, formally employed, living in rural area, not residing in the capital city, and year 2005, respectively. See definitions of education, economic sector and informal employment in a note to Table A.9. Regional unemployment rate and the ratio of average wages to monthly household money expenditures are lagged one year (in 26 regions except for Sevastopol).