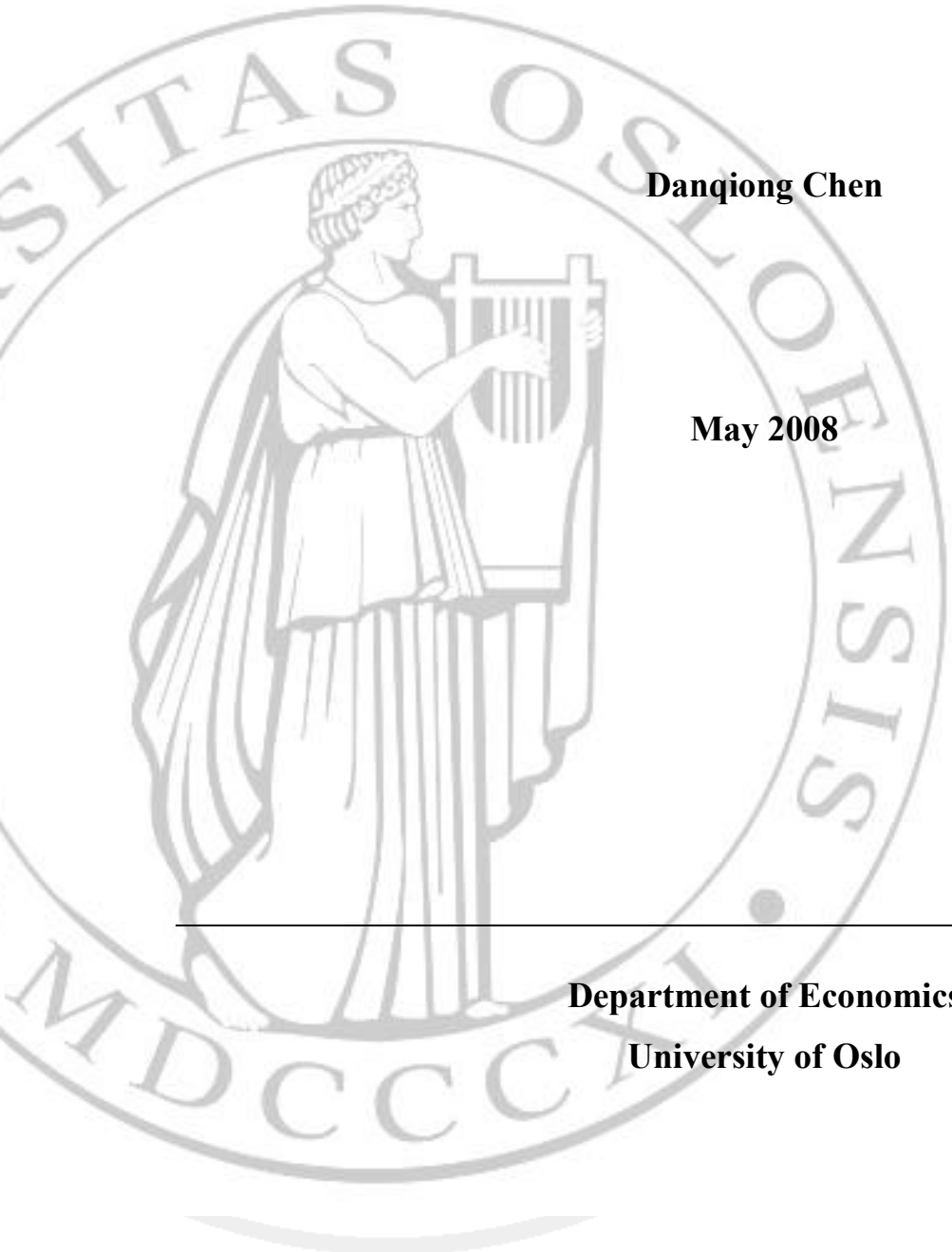
Master thesis for the Master of Philosophy in Environmental and Development Economics

Does There Exist Welfare Magnets:

Testing the Effect of Welfare Benefits in the Context of East-West European Migration



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May 2008

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Preface

I would like to express my gratitude to all those who fostered the possibility to complete this thesis.

First and foremost, it's difficult to overstate my appreciation to my supervisor, Professor Erling Barth, whose patient help, stimulating suggestions, insightful comments and constant encouragement guided me all the way through this gloomy period.

I am deeply grateful to Professor Olav Bjerkholt, for giving me the opportunity to be a student of this program, for always being such a firm standby, and for making my two-year stay in Oslo so much more enjoyable and unforgettable.

I am also indebted to all my friends and classmates, for the sharing of pleasure and desperation, of jests and grumbles, for the emotional support and ardent caring, and for all those various memorable moments.

I wish to express my sincere gratitude to my entire extended family, to my grandparents for always treating me as a five-year-old kid, to my uncles for rousing my aspiration, and to my eldest cousin for being so much like a mother rather than a sister.

Lastly, and most importantly, I are obliged to give all my loving thanks that I owe to my parents, who bore me, raised me, supported me, taught me and loved me. And I am uttermost pleasured to dedicate this thesis to this happy couple, without whom I wouldn't be here writing this acknowledgement.

Contents

Abstract

This paper investigates the impact of welfare benefits on the east-west internal European migration. Based on the existing theoretical discussions, we present a migration model where welfare benefits stand amongst the key factors. Combing this with the compiled data from Eurostat, OECD and World Bank WDI, we conduct an empirical analysis afterwards on the migration flow from 12 “east” countries to 15 “west” countries during the period of 1992-2006. The results tend to indicate that generally speaking, the migration flow in the context of east-west internal European migration is determined by the regional differences in income or wages and in employment opportunity, by migration network, and by costs and risks rendered by language and distance. As to the effect of welfare benefits, the existence of welfare magnets seems to be supported to a certain extent, yet there finds certain implication that the impact does not stand robust.

1. Introduction

Since the dissolution of the "Communist Community" in the central and eastern region of Europe at the end of 1980s, the internal European migration therefrom began to accelerate. The guest worker scheme, the European Agreement since 1993, as well as the bilateral agreement between Central and Eastern European countries and individual Western European countries further instigated the phenomenon. In 1993, the influx of immigrants into Germany, France, Italy, UK and Greece from East Europe totaled 0.6 million (Bruecker et al., 2002). And the year 1997 witnessed an official record of 0,95 million people from the Central and Eastern European countries (CEECs) living in the European Union (Alecke et al., 2001). Given the incompleteness of the official data and considering the fact that European Union's measure of immigration is based on nationality and hence normally excludes the naturalized group, the flow of people from CEEC into EU should be much more "impressive" than what is mathematically described above.

Such an "impressive" internal European migration has long before aroused the interests of scholars and researchers in this field. Some of them touched upon more peripheral issues such as the assimilation and integration of migrants. Some of them examined the impact of migration, both on the receiving countries and on the sending countries. And relatively more of them probed into the causes of this internal European migration, through exploring the mechanism of migration decision.

Drawing upon the relatively well-developed thesaurus of migration theories which can be traced back to Smith (1776) and Ravenstein (1889), scholars distinguished their researches through different levels of analysis, micro perspective versus macro perspective, through different proposed locus of migratory action, individual, household versus more macro one such as social structure and economic transformation, and through different emphases, on economic factors, social conditions versus other specific considerations. However, a close look at the empirical studies in particular would yield a common pool of explanatory factors. Generally speaking, therein find GDP, unemployment rate, wage, income distribution, and etc. The philosophy behind is that the difference between the receiving countries and the

sending countries in those fields mentioned above constitutes the magnets that foster internal European migration. Notwithstanding, another field which in general also boasts difference, is surprisingly often neglected, that is, the welfare system. And the very aim of this paper is to address this small black hole through investigating and testing the effect of welfare systems in the older EU member states on the migration from the Central and Eastern European countries.

The structure of this paper is organized as follows. Chapter 2 presents a literature review. Chapter 3 formulates a migration model. The collected data is described and summarized in Chapter 4. Chapter 5 gives out model specifications and focuses on interpreting regression results from Stata. And a brief conclusion is given in Chapter 6.

2. Literature Review

2.1 Theoretical approaches regarding the causes of international migration

The efforts to account for international migration prevail across different disciplines. Hoffmann-Nowotny (1981), from the perspective of sociology, proposes the tension approach, stating that migration is "a means of a tension management policy" to reduce the structural or anomic tensions arising respectively from the divergence of power and prestige and from the external position of a power deficit system and the imbalance in internal status quo (Gorter et al., 1998). Another group of scholars, based on the work of Wallerstein (1974), discuss the international migration from the combined perspective of sociology and political science and devise the world systems theory, which regards migration as the natural offspring of "disruptions and dislocations that inevitably occur in the process of capitalist development" (Massey et al., 1993). Studying international migration theories regardless of the disciplinary boundaries may help to capture the complex and multifaceted nature of international migration. However, considering the length of this paper, we will limit ourselves here to a concise review of those that are relatively more closely related to the discipline of economics, namely, neoclassical theory, human capital theory, the new economics of migration and migration system theory. For a more detailed review of international migration theories across disciplines, please refer to Nijkamp and Spiess (1994), Gorter et al. (1998), Bauer and Zimmermann (1998) and Massey et al. (1993).

2.1.1 Neoclassical theory of migration

Probably the oldest theory of international migration, the neoclassical migration theory can be dated back to Smith (1776) and Ravenstein (1889). It poses that migration decision is made out of a cost-benefit evaluation by a utility-maximizing individual taking a budget constraint into consideration. The costs refer to the monetary expenses incurred to facilitate the movement, and hence are closely related to the distance of the movement, while the benefits correspond to the monetary gains therefrom (Bauer and Zimmermann, 1998). Based on the theoretical model assuming full employment, the earlier proponents hold that the benefits come solely from the wage differential between the two regions. For instance, Hicks

(1932, p.76) concludes that "…differences in net economic advantages chiefly in wages are the main causes of migration". Harris and Todaro (1970) later introduce the likelihood of unemployment into the theoretical argument and propose that individuals consider the expected return which should be the expected earning weighted by the probability to get employed in the receiving region, rather than the actual earning.

The neoclassical approach further regards the observed migration flow as the cumulative result of individual decisions, and thereby argues that migration flow can be explained by the differentials both in wage and in unemployment rate. Since the wage and the unemployment rate are both assumed to be at the equilibrium level of the respective labor market, this approach holds per se that the demand and supply in the labor markets of both the sending region and the receiving region play a big role in determining the migration flow at the macro level. (Gorter et al., 1998)

2.1.2 Human capital theory of migration

The human capital approach developed by Sjaastad (1962) based on the human capital model formulated by Becker (1962) also contains a cost-benefit evaluation at the individual level in the argument. What is quite different is that this approach treats migration as an investment decision. Individuals calculate the present discounted value of expected return net of the discounted costs of movement in every region including the home location, and choose thereupon to migrate or not and where to migrate. The costs of movement, regarded as indispensable to this "investment", include: 1) monetary costs, such as the material costs of traveling, the costs of maintenance during moving and job-seeking and the opportunity costs of the job left behind in the home location; 2) psychological costs, arising from cutting old ties like family and friends and from forging new ones in the destination region; 3) information costs, of getting oneself acquainted with the situation in the destination region and getting oneself adapted to the new labor market there. The benefits are still linked to the earning differential between the sending and the receiving region. (Bauer and Zimmermann, 1998; Massey et al., 1993)

Burda (1995) and Bauer (1995) later introduce into the model uncertainty about the wage differential and about the costs of migration respectively. Based on that, they put forward a concept called "option of waiting", which is borrowed from the literature on the investment

behavior of firms (see Dixit and Pindyck, 1994 for an overview), and argue that given the uncertainty regarding the economic environment, the individual may choose to wait for the new information about the real return and costs related to migration.

Many scholars think that the human capital theory and the neoclassical approach can be integrated into one framework. Massey et al. (1993) imbed the human capital theory into the big category of neoclassical economics of migration, while Bauer and Zimmermann (1998) believe that Harris-Todaro-model can be integrated into the framework of human capital theory. Notwithstanding, it should be noted that the main essence of human capital theory lies in its emphasis on heterogeneity of individuals and in turn on the effects of their socioeconomic characteristics. It argues that every individual evaluates the costs and returns differently, and hence that individuals with different socioeconomic characteristics may have different propensities to migrate. For instance, individuals with different skills may have different expected remunerations and face different expected likelihood of employment in the receiving region. Elder individuals may appear more reluctant to migrate for the higher psychological costs and for the shorter span of time that they could enjoy the gains. Individuals with higher education might have higher propensity to migrate because they bear lower information costs with their higher abilities to collect and process related information. (Bauer and Zimmermann, 1998)

To sum it up, following human capital theory of migration, in initiating migration, not only aggregate variables such as wage and unemployment rate play a role, factors at more micro level like age, education, language, and skills are also active.

2.1.3 The new economics of migration

Different from the two schools of migration theory mentioned above, which in general base their analysis on individuals, the new economics of migration states that migration decisions are made by families or households, "the larger units of related people, rather than by isolated individuals", in a hope not only to maximize the expected income, but also to minimize risks as well as to alleviate constraints imposed by a variety of market failures (Massey et al., 1993). Scholars of this school argue that families or households may employ a risk-sharing scheme of sending family members to another labor market where wages, employment situation and other economic conditions are probably negatively or weakly

correlated with those in the home region, so that their economic well-being can still be maintained through remittances in case of deterioration of local economy (Bauer and Zimmermann, 1998). Moreover, the new economics of migration underlines the concept of "relative deprivation", stating that families or households might send out members to reduce this relative deprivation, that is, to improve income relative to other households or a reference household (Bauer and Zimmermann, 1998; Massey et al., 1993).

Hence, apart from wage and employment differentials, the new economics of migration also regards the risk habit of households which corresponds to the propensity to diversify risks, the existence of market failure in the sending region, as well as the income distribution in the origin place as the explanatory factors for migration.

2.1.4 Migration system theory

Migration system theory proposes existence of migration system, where two or more places or countries are linked to each other through flows and counter flows of people (Kulu-Glasgow, 1992). With a dynamic and more macro perspective, it formulates that apart from the most micro and atomistic level, where the individual is the active decision maker subject to different influences in the system, migration flows should be studied at the national level in addition, where political, demographic, economic and social dimensions respond to the feedbacks and adjustments that stem from migration itself, exert a continuous effect and hence constitute a dynamic mechanism which Myrdal (1957) called "cumulative causation" (Gorter et al., 1998).

In particular, the theory highlights the effect of network. Kritz and Zlotnik (1992) point out that networks of institutions and individuals connect various countries together into a coherent migration system, where networks at the origin and at the destination restrain or encourage migration through the provision of economic and social support, and networks between the two act as a channel for information, migrants, remittances and cultural norms (Gorter et al., 1998). This system is dynamic, in that network, defined as sets of interpersonal ties such as ties of kinship, friendship and shared community origin (Massey et al., 1993), elicits migration, hence reduces risks and costs in terms of psychology and information for the potential migrants and in turn further instigates migration.

In effect, migration system approach is more a conceptual framework than a specific theory. It considers such a variety of macro and micro factors at multiple levels that it can encompass many other migration theories. The political context in its discussion includes exit, entry and settlement policies, while Zolberg (1989), in the so-called regulatory approach, also emphasizes the importance of borders and regulations and states that it is the policy of potential recipient countries that determines whether a migration movement can take place and of what kind. The social context discusses welfare differentials, whereas Freeman (1986), in the welfare state approach, poses that differences in welfare system can constitute attracting magnets for residents in less prosperous societies and at the same time create a demand for foreign labor in that introducing foreign labor is "the only real alternative to the elimination of the privileges of the indigenous work force". (Gorter et al., 1998)

Furthermore, its emphasis on the analysis at the national level also wins echoes from other theories. While highlighting structural factors such as socioeconomic and political developments, the historical-structural approach, represented by Goss and Lindquist (1995), holds that migration stems from the changes in production organization brought about by the pressures and counter pressures in national economies. And Piore (1979), in his dual labor market theory, states more explicitly that the key and decisive role in initiating migration is shouldered by the built-in demand for immigrant labor in receiving regions which results from four fundamental characteristics advanced societies usually boast, namely, structural inflation, motivational problems, economic dualism, and the demography of labor supply.

Generally speaking, neoclassical theory and human capital theory both base their analysis on the micro level of individual decision, while the latter focuses on socioeconomic characteristics such as skills and language in addition to the differentials in wages and employment conditions which the former mainly considers. The new economics of migration employs a more macro level of analysis of families or households and regards migration as a household decision to minimize risks to family income or to overcome various constraints on family production activities, whereas migration system theory proposes an intertwined framework discussing migration both at the micro level of individual and at the macro level of nation or society with a wide variety of factors taken into consideration. As a conclusion for this subsection, we present below a table revised from Gorter et al. (1998, p.12) to epitomize what has been discussed above.

Table 2-1: A typology of theoretical approaches regarding causes of international migration

Theory	Level of analysis	Explanatory variables
Neoclassical theory	Micro level, individual	Wage, employment
Human capital theory	Micro level, individual	Wage, employment, age, education, language, skill
The new economics of migration	Macro level, family or household	Wage, employment, risk habit of household, income distribution and market failure in the origin
Migration system theory	Micro level, individual & Macro level, nation or society	Economic: wage, employment, price Social: welfare, migrant networks Political: exit, entry and settlement policy, international relations Demographic: population

Source: Revised and reproduced from Gorter, Nijkamp and Poot 1998, p. 12.

2.2 Empirical findings related to the causes of international migration

Most empirical studies of international migration use aggregate data due to the lack of available micro data sets or insufficient computer facilities. In light of this and considering that our analysis in the later section will also be based upon a macro data set, we will here only discuss the empirical findings using aggregate data. Down below is a brief review of those studies, organized and sorted by the explanatory variables that they touch upon.

2.2.1 Income or wages

Most studies have found a statistically significant and positive effect of income or wages in the destination region (Hartog and Vriend, 1989; Katseli and Glytsos, 1989; Lundborg, 1991a; Quigley, 1972) and a negative effect of wages and income in the origin (Lundborg, 1991a; Katseli and Glytsos, 1989; Quigley, 1972). Considering the combined effect of the income or wages in the receiving and the sending region, most studies have concluded that there exists a positive relationship between migration and the income differential (Eriksson,

1989; Faini and Venturini, 1994; Geary and O Grada, 1989; Molle and van Mourik, 1989; Poot, 1995; Rotte and Vogler, 1998).

Faini and Venturini (1994) have looked in particular into the non-linear influence of income level on migration and found a positive coefficient on the income level of the sending region while that of its square being negative. This thereby suggested existence of a hump-shaped pattern of migration with respect to the home country's income implies that in the early stages of development, improvements in the sending country's economic well-being increase migration, rather than reduce it, the mechanism of which might be carried out through alleviating the financial and educational constraints which previously prevented many would-be migrants from moving aboard. (Bauer and Zimmermann, 1998)

Introducing into the regression income or wages which are weighted by the inverse of the unemployment rates in a hope to foster a proxy for expected income gains, Straubhaar (1988) have found a statistically highly significant influence of the expected income gains on migration flow.

As to the importance of the impact of income or wages, Boehning (1970) showed that wage differential is the main determinant in migration, particularly when labour demand pressure is roughly the same in the sending and the receiving country.

2.2.2 Employment opportunities

However, findings with regard to employment opportunities fail to reach a consensus, no matter whether unemployment rates or employment rates are used as proxies. Molle and van Mourik (1989) and Lundborg (1991a) posited an insignificant effect on migration of unemployment rate in the receiving region and of that in the sending region respectively. Katseli and Glytsos (1989) found a positive relationship between the employment opportunities in the sending region and the size of migration and a negative correlation between that in the receiving region and the size of migration flow and questioned whether individuals are attracted to regions which boast a shortage of jobs. By contrast, the argument of the negative effect of unemployment rate in the receiving region and the positive effect of that in the sending region on migration still gain support from some of the other empirical evidences (Eriksson, 1989; Faini and Venturini, 1994; Hartog and Vriend, 1989; Lundborg,

1991a; Poot, 1995). Furthermore, some empirical studies even suggest that "employment rates are more important in determining the migration decision than are wages or income levels" (Greenwood, 1975; Greenwood, 1981; Levy and Wadycki, 1973; Waldorf and Esparza, 1988).

2.2.3 Distance

The conclusion regarding the effect of distance is quite unanimous. Poot (1995) as well as Molle and van Mourik (1989) manifested a statistically significant and negative influence of the distance from the origin to the destination on migration flows. Most scholars hold that this negative influence lends support to the theoretical suggestion that costs and risks of the movement play a role in migration decision. Some researchers further point out that it is mainly the costs and risks of obtaining the relevant information that facilitate the impact of distance on migration, which is firmly backed-up by the empirical finding of Schwartz (1973), who examined the influence of age and education on the distance elasticity of migration for internal migrants in the US and found an insignificant effect of age and a negative coefficient of the level of education on the distance elasticity.

2.2.4 Migration network

The attitude towards the effect of network is quite straightforward. It is mostly held that the stock of migrants from a particular origin in a destination is positively correlated with subsequent migration (Eriksson, 1989; Faini and Venturini, 1994; Lundborg, 1991a; Quigley, 1972; Rotte and Vogler, 1998; Zimmermann, 1994). Zimmermann (1994) in particular emphasized the importance of the network effect. Using lagged net immigration as the proxy, his regression on net immigration to Germany from Yugoslavia and Turkey, the two non-EU member states, yielded that the lagged migration coefficient dominates the immigration process.

2.2.5 Education and age

Most empirical findings agree on that migration increases with mean education and decreases with mean age of migrants (Katseli and Glytsos, 1989).

2.2.6 Policy and regulation

Zimmermann (1994) argues that in the case of Europe, immigration is largely driven by policy measures and that relative wages and employment thereby do not matter much. In his standard OLS regression of net immigration from the main recruitment countries such as Italy, Greece, Portugal, Spain, Turkey and Yugoslavia to Germany, different parameters for the period up to 1973 and for that after 1973 were allowed, in a hope to capture the impact of the policy and practice of recruitment in Germany which came to a stop in 1973. The results confirmed different patterns of immigration before and after 1973.

Below is a reproduced and revised table from Bauer and Zimmermann (1998, p. 114) to present the conclusion of those empirical findings with regard to the most common variables.

Table 2-2: Signs of coefficients in econometric studies using aggregate data

	Country	Y in j	Y in i	rel Y	U in j	U in i	rel U	Age	D	MS in j
Quigley (1972)	Sweden	+	-							+
Rotte and Vogler (1998)	Germany			+					-	+
Lundborg (1991a)	Sweden	+	-		-	0				+
Waldorf and Esparze (1998)	Germany			0			-			
Molle and van Mourik (1989)	Europe			+	0				-	
Geary and O Grada (1989)	U.S.			+						
Eriksson (1989)	Sweden			+		+	+			+
Hartog and Vriend (1989)	Netherlands	+			-					
Katseli and Glytsos (1989)	Germany	+	-		+	-		-		
Faini and Venturini (1994)	Europe		+	+	-	+				+
Poot (1995)	Australia			+	-	+			-	

Source: Revised and reproduced from Bauer and Zimmermann 1998, p. 114.
Note: 1, Y: Income or wages; rel Y: Income differential; U: Employment opportunities; rel U: Employment opportunity differential; S: Education; D: Distance between destination and source; MS: Network variables; j: Receiving country; I: Sending country. 2, The + sign denotes a positive relationship, the – sign negative and 0 statistically insignificant.

2.3 The issue of welfare benefits

Generally speaking, welfare benefits do not stand in the priority list of variables that researchers look into when seeking for the causes of migration. Furthermore, possibly due to the difficulty to conceptualize and compare welfare benefits in the international context, most of the researches that do examine the impact of welfare benefits are primarily based on internal migration, and mostly the internal migration within United States. In spite of this, we still present below a brief literature review of theoretical and empirical approaches that focus on welfare benefits regardless of whether they pose in the international realm or not, which we hope to draw upon later in our theoretical and empirical discussion in the forthcoming chapters.

Most of the researches that concern welfare benefits still base themselves on the conventional rational-choice model of migration discussed above, in which utility-maximizing individuals or families engage in a cost-benefit calculation when deciding whether to move and where to move and come up with a final decision which can maximize their quality of life (utility) (Da Vanzo, 1981; Fischer et al., 1997; Schram and Soss, 1999). What is different or new is that they hold welfare benefits as one of the important active, if not key, factors in this cost-benefit evaluation.

The empirical findings regarding the effect of welfare benefits on migration are inconclusive in effect. Some findings claim that welfare benefits are magnets, in that they pull agents away from origins with lower welfare benefits and that places with higher welfare benefits appear to be more attractive to migrants than other peers do (Albritton, 1989; Blank, 1988; Borjas, 1999; Clark, 1990; De Jong et al., 2005; Dye, 1990; Gramlich and Lauren, 1984; Peterson and Rom, 1990; Schram and Soss, 1999). On the contrary, other findings hold that the effect of welfare benefits on migration is rather weak or at least ambiguous (Beale, 1971; Cebula, 1979; De Jong and Donnelly, 1973; Hanson and Hartman, 1994; Levine and Zimmermann, 1995; Long, 1974; Piven and Cloward, 1971; Schram et al., 1998; Steiner, 1971; Sternlieb and Indik, 1973; Walker, 1994)

3. A Migration Model

The model we formulate below is primarily based on Hatton (1995) and Faini and Venturini (1994). In short, it incorporates four important features: 1), uncertainty is introduced into the migration decision and thus the agents care more about the expected terms of the variables; 2), heterogeneity of agents is highlighted; 3), the formations of those variables in discussion, in particular, wage, employment rate and welfare benefits, have the Markov chain property; 4) the importance of time gets due attention. In the following section, we discuss two cases subsequently, the static case, where time finds no role and where the first and the second features are most underscored, and the semi-dynamic case, where particular emphases are imposed on the last two features mentioned above.

3.1 Static case without time connotation

Formally, we assume that the individual's utility is given by:

$$U=U(y_i, f_i) \quad (1)$$

where y_i and f_i denote respectively the income and the amenities in region i, which is either the sending region s, or the receiving region d for a potential migrant. The income, y_i, is equivalent to wage, w_i, weighted by the probability of employment, e_i, i.e. $y_i= w_i e_i$. Amenities, while encompassing miscellaneous qualitative factors, can be expressed as an increasing function of welfare benefits, b_i, the key focus of this paper, namely, $f_i=g(b_i)$, $g'_b \geq 0$. Considering people's intrinsic preference over staying at their original residence place, we assume that amenities are evaluated to be larger in the origin region of the potential migrant, i.e. $f_s>f_d$. Hence the reason why people ever think about migration is that there exists a positive income differential between the receiving region and the sending region, i.e., $y_d>y_s$.

Introducing uncertainty, migration will occur if $EU(y_d, f_d) \geq EU(y_s,f_s)$. Expanding $EU(y_d, f_d)$ and $EU(y_s,f_s)$ in a first-order Taylor series around (Ey_d, Ef_d), we will have:

$$EU(y_d, f_d) =U(Ey_d, Ef_d) + U_y * E(y_d - Ey_d) + U_f * E(f_d - Ef_d) \quad (2)$$

$$EU(y_s, f_s) = U(Ey_d, Ef_d) + U_y * E(y_s – Ey_d) + U_f * E(f_s – Ef_d) \quad (3)$$

where the derivatives of the utility function, U_y and U_f, are evaluated at Ey_d and Ef_d.

Since Ey_d, Ef_d are constants, $E(y_d - Ey_d)$ and $E(f_d - Ef_d)$ will only take the value of 0. Hence, the migration incentive condition of $EU(y_d, f_d) \geq EU(y_s, f_s)$ becomes:

$$0 \geq U_y * E(y_s - Ey_d) + U_f * E(f_s - Ef_d) \quad (4)$$

or:

$$\frac{U_y}{U_f} \geq \frac{E(f_s - Ef_d)}{E(y_s - Ey_d)} = \frac{Ef_s - Ef_d}{Ey_s - Ey_d} \quad (5)$$

Assume the utility function has the general CES form as:

$$U=[(1-\delta)y_i^{\rho} + \delta f_i^{\rho}]^{1/\rho} \quad (6)$$

where $1/(1-\rho)$ is the elasticity of substitution between y and f, while δ is the distributional parameter associated with f. We can rewrite the migration incentive condition as:

$$\frac{1-\delta}{\delta} \geq \frac{Ef_s - Ef_d}{Ey_d - Ey_s} * (\frac{Ey_d}{Ef_d})^{1-\rho} \quad (7)$$

Allowing for the heterogeneity among agents, we assume that $\gamma = (1-\delta) / \delta$ is distributed within the home country population according to a Pareto distribution function:

$$\frac{\theta}{x_o} * (\frac{x_0}{\gamma})^{\theta+1} \quad (8)$$

where x_0 and θ are parameters of the distribution function[1]. The share of migrants in the home country population can thereby be given as:

$$\Pr ob(\gamma \geq z) = \int_z^{\infty} \frac{\theta}{x_0} (\frac{x_0}{\gamma})^{\theta+1} d\gamma = {x_0}^{\theta} z^{-\theta} \quad (9)$$

where $z = (Ey_d/Ef_d)^{1-\rho} (Ef_s-Ef_d) / (Ey_d-Ey_s)$.

Up to now, we haven't considered the cost of migration. We assume that the would-be migrants finance the costs of migration from their wealth. Hence, they are faced with a constraint given by $A_i \geq C_i$, where A_i represents the wealth of the individual and C_i denotes the costs of migration for which we assume no uncertainty for simplification. Intuitively, C_i increases with the distance of the movement, d_i, and, following the discussion in Chapter 2, decreases with the stock of the agent's "folk people" in the destination region, s_i, and with the similarity between the languages in use in those two locations in discussion, l_i. Formally,

[1] See Faini and Venturini (1994). The Pareto distribution function is defined over the interval (x_0, ∞).

$C_i = C(d_i, s_i, l_i)$, $C'_d \geq 0$, $C'_s \leq 0$, and $C'_l \leq 0$.

Therefore, the number of actual migrants would be the intersection of the two relevant sets of agents, those who are willing to migrate (for which the migration incentive condition given by equation (7) holds) and those who are able to move (for which the migration feasibility constraint of $A_i \geq C_i$ holds). Hence we have the share of actual migrants in the home country population as follows:

$$\Pr ob(\gamma \geq Z, A \geq C) = \int_{z}^{\infty}\int_{C}^{\infty} f(\gamma, A)dAd\gamma \qquad (10)$$

where f(γ, A) is the joint density function of γ and A. Assuming that A is again distributed among the population according to a Pareto distribution function and that A and γ are independently distributed, we can show that the actual number of migrants, M, as a share of the home country's population, P, can be expressed as below:

$$\frac{M}{P} = x_0^{\theta} z^{-\theta} x_1^{\varphi} C^{-\varphi} \qquad (11)$$

where x_1 is the lower limit of the support of the distribution of A. We also assume that an increase in the general income level of the home country will shift the distribution of the wealth to the right. More precisely, we postulate that:

$$x_1 = (Ew_s)^{\alpha}(Ee_s)^{\beta} \qquad (12)$$

where α, β>0, indicating that an increase in the general income level in the home country, either resulting from an increase in wage or from an increase in employment rate, will relax the constraint.

Substituting the expressions for z, x_1 and C into equation (11) and taking logarithms yields:

$$\ln(M/P) = \theta \ln x_0 - \theta \ln z + \psi \ln x_1 - \psi \ln C$$

$$= \theta \ln x_0 - \theta \ln(Ef_s - Ef_d) + \theta \ln(Ey_d - Ey_s) - \theta(1-\rho)\ln Ey_d + \theta(1-\rho)\ln Ef_d + \psi\alpha \ln Ew_s + \psi\beta \ln Ee_s - \psi \ln C(d, s, l) \qquad (13)$$

3.2 Semi-dynamic case with time connotation

Now we consider the dynamic case where time counts. Assume that most of the factors that are embodied by amenities which f represents, such as the possibility of hanging around with relatives, old friends and other "folk people", are qualitative and hence constant over time in

general. We postulate thereby that the only uncertainty in amenities lies in the welfare benefits. Mathematically, this claim is equal to the formulation that $Ef_i = Eg(b_i) = g(Eb_i)$. In addition, we assume that wage, employment rate and welfare benefits observe the following AR (1) mechanism[2]:

$$w_{td} = D1w_{t-1d} + D\varepsilon_t$$
$$e_{td} = D2e_{t-1d} + D\mu_t$$
$$w_{ts} = S1w_{t-1s} + S\varepsilon_t$$
$$e_{ts} = S2e_{t-1s} + S\mu_t$$
$$b_{td} = D3b_{t-1d} + D\lambda_t$$
$$b_{ts} = S3b_{t-1s} + S\lambda_t$$

where D1, D2, S1, S2 are constants, error terms Dε, Sε, Dλ, Sλ, Dμ, Dμ are normally distributed with an expected value of 0 and a variance of $\sigma^2_{d\varepsilon}$, $\sigma^2_{s\varepsilon}$, $\sigma^2_{d\lambda}$, $\sigma^2_{s\lambda}$, $\sigma^2_{d\mu}$, $\sigma^2_{s\mu}$ respectively, and there exists no correlation either between any of these error terms or between any of these error terms and the lagged variable in discussion. Take Dε for an example, we literally assume $cov(D\varepsilon, w_{t-1d})=cov(D\varepsilon, e_{t-1d})=cov(D\varepsilon, w_{t-1s})=cov(D\varepsilon, e_{t-1s})=cov(D\varepsilon, b_{t-1d})=cov(D\varepsilon, b_{t-1s})=cov(D\varepsilon, S\varepsilon)=cov(D\varepsilon, D\mu)=cov(D\varepsilon, S\mu)=cov(D\varepsilon, D\lambda)=cov(D\varepsilon, S\lambda)=0$ and $D\varepsilon \sim N(0, \sigma^2_{d\varepsilon})$. Hence, in a give time period, t, we have:

$$E_t y_{td} = E_t w_{td} * E_t e_{td} + cov(w_{td}, e_{td}) = D1w_{t-1d} * D2e_{t-1d} + D1D2cov(w_{t-1d}, e_{t-1d})$$
$$E_t y_{ts} = E_t w_{ts} * E_t e_{ts} + cov(w_{ts}, e_{ts}) = S1w_{t-1s} * S2e_{t-1s} + S1S2cov(w_{t-1s}, e_{t-1s})$$
$$E_t f_{td} = E_t g(b_{td}) = g(E_t b_{td}) = g(D3b_{t-1d})$$
$$E_t f_{ts} = E_t g(b_{ts}) = g(E_t b_{ts}) = g(S3b_{t-1s})$$

Therefore, z in the static context now becomes $\tilde{z}_t$ given as:

$$\ln \tilde{z}_t = (1-\rho)\ln E_t y_d - (1-\rho)\ln E_t f_d + \ln(E_t f_s - E_t f_d) - \ln(E_t y_d - E_t y_s)$$
$$= (1-\rho)\ln[D1w_{t-1d} * D2e_{t-1d} + D1D2cov(w_{t-1d}, e_{t-1d})] - (1-\rho)\ln(g(D3b_{t-1d})) + \ln(E_t f_s - E_t f_d) - \ln(E_t y_d - E_t y_s) \quad (14)$$

In a simpler context where we tentatively assume the independence of wage and employment rate, we have:

$$\ln \tilde{z}_t = (1-\rho)\ln(D1w_{t-1d} * D2e_{t-1d}) - (1-\rho)\ln(g(D3b_{t-1d})) + \ln(E_t f_s - E_t f_d) - \ln(E_t y_d - E_t y_s)$$
$$= (1-\rho)\ln D1 + (1-\rho)\ln(w_{t-1d}) + (1-\rho)\ln D2 + (1-\rho)\ln(e_{t-1d}) - (1-\rho)\ln(g(D3b_{t-1d})) + \ln(E_t f_s - E_t f_d) - \ln(E_t y_d - E_t y_s) \quad (15)$$

[2] Here, we implicitly assume that the formations of wage, employment rate and welfare benefits have the Markov chain property, in that only the situation or information in the previous period matters.

In this semi-dynamic case, if an individual plans to migrate in period t, he will have to bear the costs, C_{it}, which are determined by the distance he plans to move across in this time t, d_{it}, by the similarity of languages evaluated at time t, l_{it}, and by the extent of other risks and costs which he projects to face taking into consideration the existing stock of his folk people in the destination region that he can draw upon after the migration is realized, s_{it-1}. Mathematically, we can formulate this into $C_{it} = C(d_{it}, s_{it-1}, l_{it})$. To finance for the costs, the agent again relies on his wealth, A_{it}. Hence, the migration feasibility constraint now becomes $A_{it} \geq C_{it}$. In the same argument, we now have instead:

$$x_{1t} = (Ew_{ts})^{\alpha} (Ee_{ts})^{\beta} = (S1w_{t-1s})^{\alpha} (S2e_{t-1s})^{\beta}$$

Therefore the equation (13) in the static case will turn out to be as follows:

$$\begin{aligned}\ln(M/P_t) &= \theta \ln x_{0t} - \theta \ln z_t + \psi \ln x_{1t} - \psi \ln C_t \\ &= -\theta(1-\rho)\ln(w_{t-1d}) - \theta(1-\rho)\ln(e_{t-1d}) + \psi\alpha \ln w_{t-1s} + \psi\beta \ln e_{t-1s} \\ &\quad + \theta(1-\rho)\ln(g(D3b_{t-1d})) - \psi \ln C(d_t, s_{t-1}, l_t) - \theta \ln(E_t f_s - E_t f_d) + \theta \ln(E_t y_d - E_t y_s) \\ &\quad + \theta \ln x_{0t} + \psi\alpha \ln S1 + \psi\beta \ln S2 - \theta(1-\rho)\ln D1 - \theta(1-\rho)\ln D2 \qquad (16)\end{aligned}$$

To conclude, we now have derived two equations regarding the share of migrants in the source country population, for static case and for the quasi-dynamic case respectively. They state that the share of migrants in the source country population is determined by wages, employment rates, and amenities in the sending region and the receiving region, by welfare benefits and stock of migrants in the receiving region, and by distance of movement as well as similarity of languages. However, what we formulate above is notional supply of migrants. In reality, the evolution of migration is also determined by the demand in destination country in addition. Following Faini and Venturini (1994), we further extend the model. Assume that the rationale of the behavior of policy-makers in destination country can be illustrated formally as follows:

$$\text{Min } L(M - L^d, E) \qquad (17)$$

$$\text{s.t.: } M = M(M^s, E) \quad M'_m > 0, M'_s < 0 \qquad (18)$$

where M, M^s, L^d, E denotes respectively the actual amount of migrants, the notional supply of migrants, the desired amount of migrants from the perspective of destination country and the expenditure incurred in implementing effective migration controls. Hence, what we postulate is that policy-makers try to minimize a loss function through the manipulation of the difference between the actual amount of migrants and the desired amount and of the expenditure of migration controls. The actual amount of migrants is formulated as a function

of the notional supply of migrants, which is given by equation (13) or (16), and the expenditure on migration controls.

Since the desired amount of migrants is certainly closely related to the labor demand in destination country, which in turn is determined by the existing labor force and assumptively by the economic growth, we can write L^d as below:

$$L^d = d(LF_d, GDPgr_d) \quad L'_{lf}<0, L'_{gr}>0$$

where LF_d and $GDPgr_d$ represents respectively labor force and GDP growth rate in destination country.

Solving the optimization problem given by equation (17) and (18), we will have an equation for the actual number of migrants which includes as right hand variables those terms appear as determinants of the notional supply of migrants in equation (13) or (16) and labor force as well as GDP growth rate in destination country in addition.

4. Data

The data we have collected encompass variables for 15 developed European countries, namely, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and U.K., and 12 transition countries, i.e. Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia. Of those 15 developed countries, 13 are EU member states, belonging to the group often addressed as EU15. Due to the lack of data concerning migration flow, we leave out Luxembourg and Ireland, the rest two of that group. However, such a treatment should be justifiable considering the limited territory and relative insignificance of the former and the peripheral geographic position of the latter. The two substitutes for them are selected from the "club" of four non-EU EEA member states. Understandably, we choose the two relatively more important entities, Norway and Switzerland. Standing almost in the center of Europe, Switzerland has long before been a destination for migrants and hence holds a high relevance to our study of migration. Norway, one of the well-recognized welfare state paradigms, certainly boasts a particular interest since the key focus of our study would be imposed on the discussion of the effect of welfare benefits on migration. Among the 12 transition countries, 10 are usually addressed as CEECs (Central and Eastern European countries), the terminology of which is a combination of Visagrad-4 (Czech Republic, Hungary, Slovak Republic and Poland), the Balkan-3 (Bulgaria, Romania and Slovenia), and the Baltic-3 (Estonia, Latvia and Lithuania). 8 of those 10 CEECs were admitted into EU in 2004, together with Cyprus and Malta, while the rest two outliers of CEECs, Bulgaria and Romania, followed suit in 2007.

Internal European migration has long been trickling even if we narrow our scope to the flow from central and eastern regions to western regions after the Second World War, This tradition of emigration of east Europeans is intertwined with the dislocation in the wake of the war and with the guest-worker arrangement afterwards aiming at fuelling for the excessive demand for labor in the western countries. Our particular interest, however, lies in the east-west migration within Europe in a context of relatively free flow of labor. Hence, we would limit our horizon to the period starting from 1989 when the communist community in

the Central and Eastern Europe dissolved and the “boycott” of east-west migration was consequently lifted up to a large extent.

Therefore, to sum it up, what we examine in this section is the data of migration from 12 European transition countries into 15 developed European countries during 1989-2006, and those of other related economic and social variables for those 27 countries during this period. To insure a better illustration, we allocate those data into four groups, migration, welfare, economic variables, as well as social variables, and present them subsequently down below.

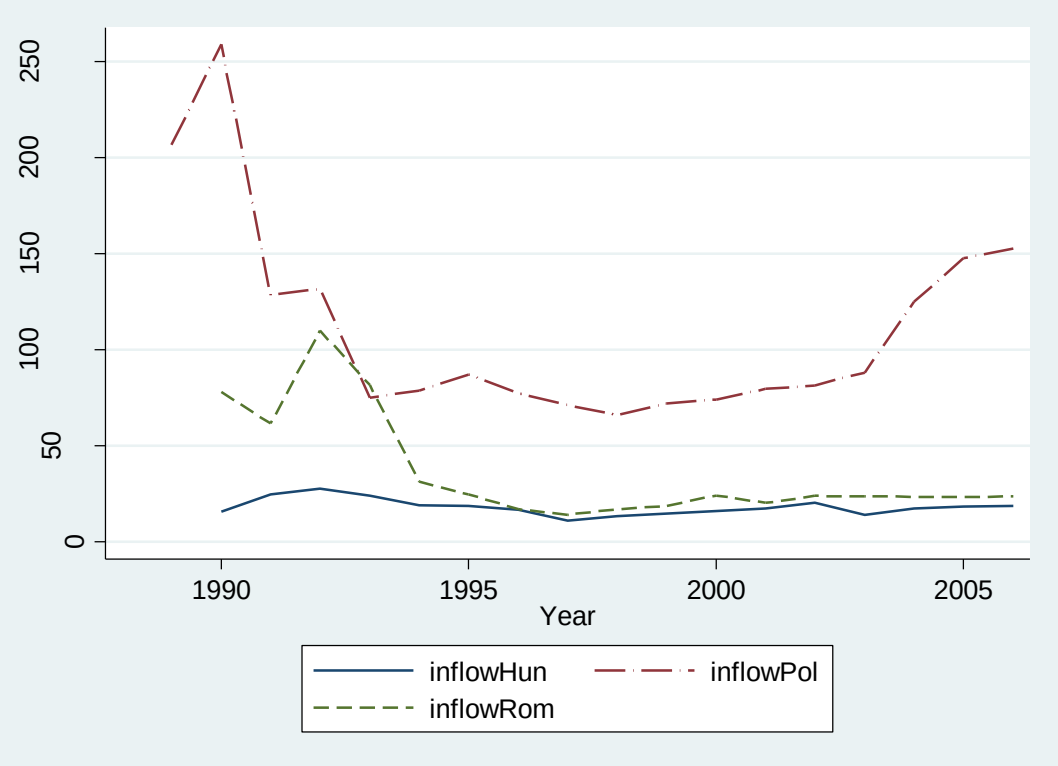
4.1 Migration

Brosnan and Poot (1987) point out that analysis based on net migration, defined as the absolute difference between emigration and immigration in a region, will lead to an overestimation of the effects of the variables which have same impacts on the flows in both directions and to an underestimation of the effects of those variables with different impacts on the flows. This is because emigration and immigration flow might be correlated and hence models using net migration flows might fail to separate the various push and pull factors which are responsible for the gross migration flows in both directions (Bauer and Zimmermann, 1998). Therefore, we collect data on gross migration flow instead. Extracting data related to migration from Eurostat, OECD Source and WDI, we compile a three-dimension (year, source and destination) panel data of gross migration inflows from 12 European transition countries into 15 developed European countries during the period of 1989-2006.

With such a wide scope as 27 countries and with relatively long period in focus as 18 years, our panel data of gross migration flows turns out inevitably to be quite unbalanced. However, for several specific countries, namely, Sweden, Finland, Norway and Germany in the group of destination countries, as well as Poland, Romania, Hungary and Bulgaria in the group of source countries, the data is very neat. Below present we three figures, primarily based on the data for those “statistically well-behaved” countries mentioned above, to illustrate the intricate three dimensions of the migration flow panel data and to forge a brief picture of the internal east-west European migration during 1989-2006. Figure 4-1 shows the time-serie behaviors of gross migration inflows into Germany from Hungary, Poland and Romania respectively. Figure 4-2 focuses on the gross migration inflows into Austria from

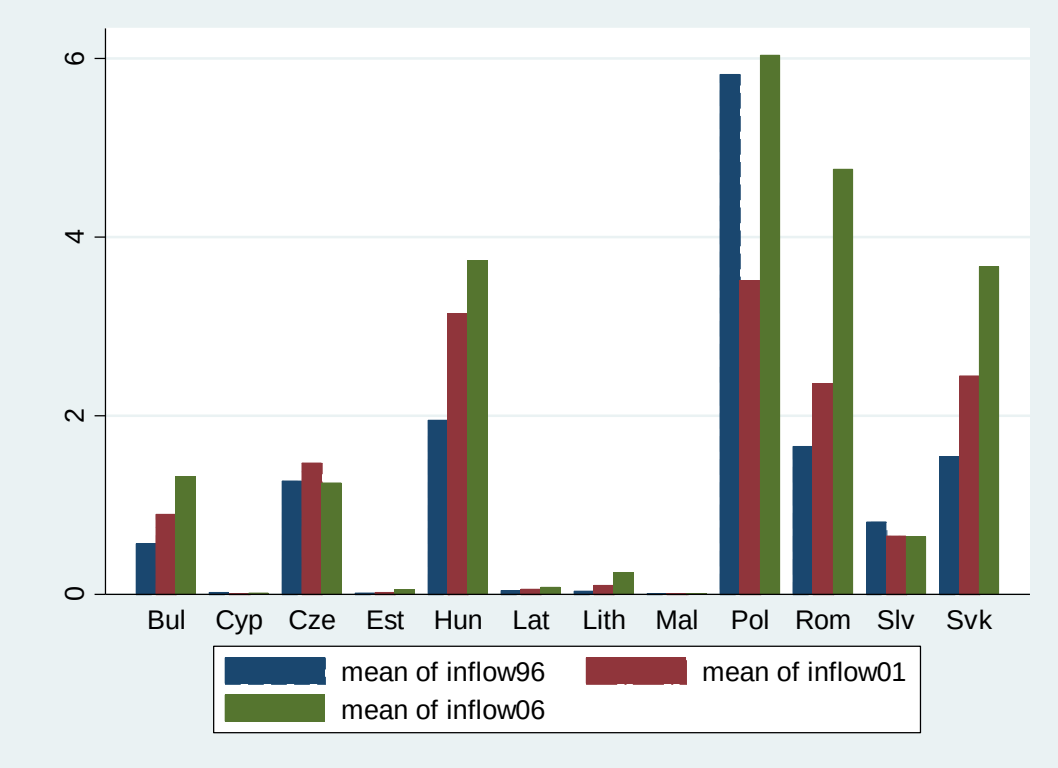
12 source countries in the year 1996, 2001 and 2006. Figure 4-3 presents the gross migration flows from Poland into 15 destination countries in the year 1992, 1998, and 2004.

Figure 4-1: Inflow into Germany from Hungary, Poland and Romania, 1989-2006, in thousands



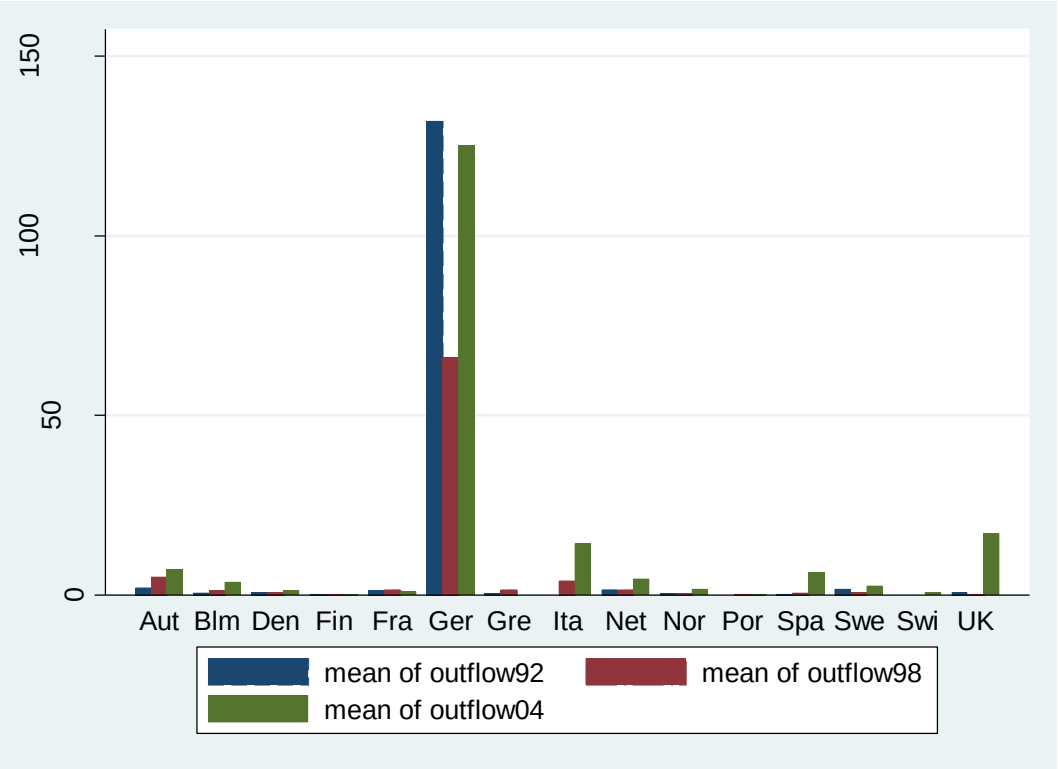
Source: Compiled from OECD, Eurostat and World Bank WDI.

Figure 4-2: Inflow into Austria, year 1996, 2001 and 2006, in thousands



Source: Compiled from OECD, Eurostat and World Bank WDI.

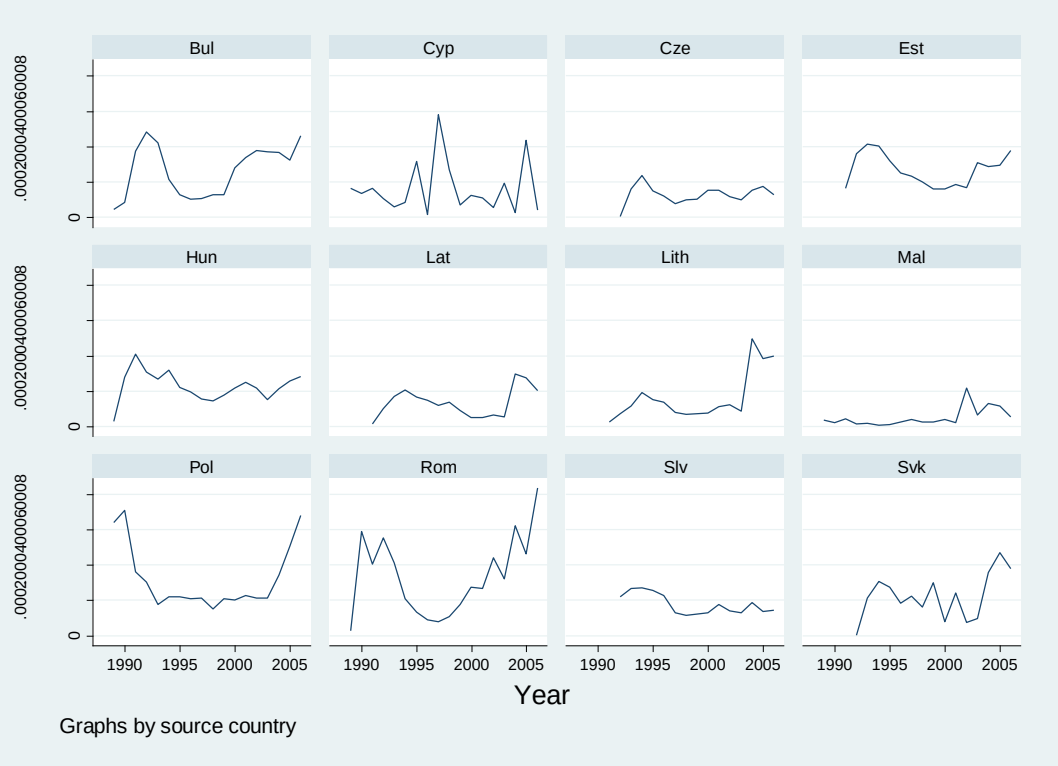
Figure 4-3: Outflow from Poland, year 1992, 1998 and 2004, in thousands



Source: Compiled from OECD, Eurostat and World Bank WDI.

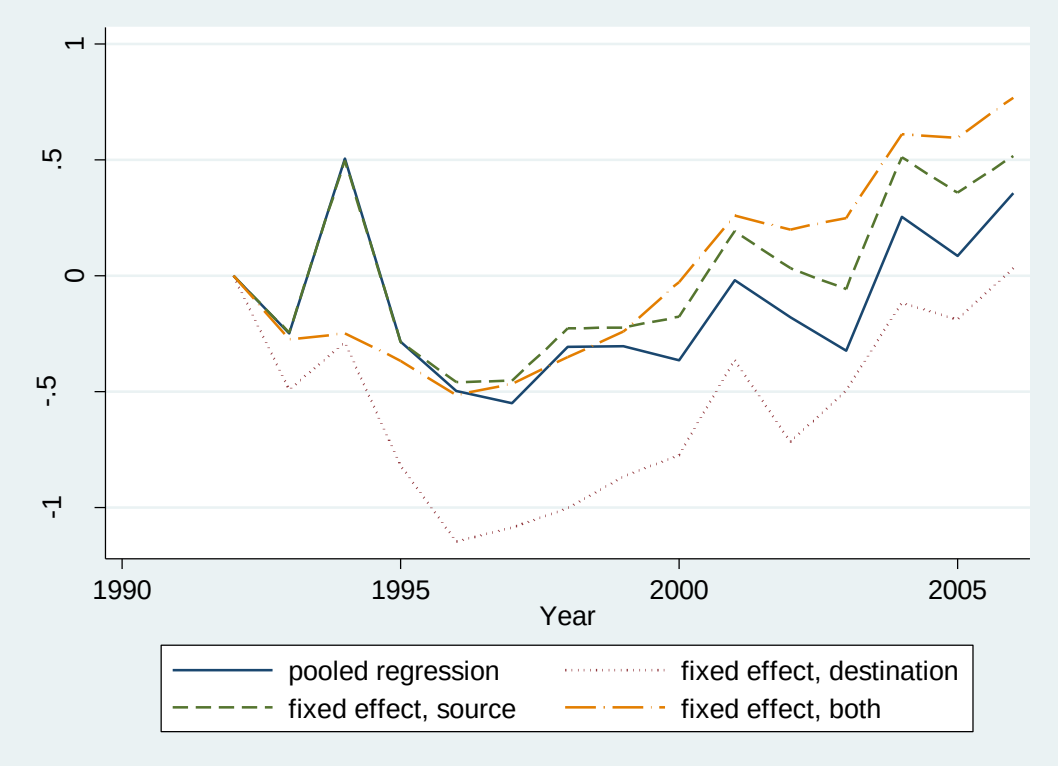
Since what we are going to use as the dependent variable in Chapter 5 is the bilateral migration flow rate, which literally is the specific bilateral migration flow scaled down by the population of the corresponding source country, we present here Figure 4-4 which illustrates the time-serie sequences of the average bilateral migration outflow rates of specific source countries. In addition, we also examine how the bilateral migration flow rate evolves during the period in discussion in a broader context of intra-Europe rather than from the perspective of specific sources countries. Figure 4-5 offers a glimpse into this evolution.

Figure 4-4: Average outflow rates of specific source countries, 1992-2006



Source: Compiled from OECD, Eurostat and World Bank WDI.
Note: The mean of outflow rate is calculated through summing the bilateral migration outflows of a specific source country over all destination countries in the available data and then dividing it by the population of that specific source country.

Figure 4-5: The evolution of bilateral migration flow rate during 1992-2006



Note: We run a simple regression and three regressions, controlling respectively for the fixed effect of destination country, that of source country, and that of both destination country and source country, of the bilateral migration flow rate or the rate of migration flow as what we define in the beginning of Chapter 5, in the logarithm form, on the year dummies for the period of 1992-2006. And we graph afterwards the coefficients on the year dummies yielded by those four regressions. The reasons why we choose the rate of migration flow in logarithm as the dependent variable and why we employ these four regression specifications are elaborated in the beginning of Chapter 5.

4.2 Welfare

We employ two measures of welfare benefits offered in those15 destination countries. The first one is the total expenditure on social protection, following the standard approach in the literature. To guarantee the comparability, as is illustrated in Table 4-1, we collect data on the percentage that the total expenditure takes up in the specific national GDP. The second measure of welfare benefits that we use is welfare generosity index, developed by Lyle Scruggs. The data that we compile encompass the welfare generosity index for 12 countries, with Portugal, Greece and Spain excluded, and for the period of 1989-2002 (see Table 4-2). We also draw a set of graphs integrating and comparing those two measures of welfare benefits by country (see Figure 4-6), which we will refer back to later.

Table 4-1: Total expenditure on social protection as a percentage of GDP for 15 developed European countries, 1990-2005

Year	1990	1991	1992	1993	1994	1995	1996	1997
Austria	26.1	26.3	26.8	28.1	28.8	28.8	28.7	28.6
Belgium	26.4	27	27.7	29.3	28.7	27.4	28	27.4
Denmark	28.2	29.1	29.7	31.5	32.5	31.9	31.2	30.1
Finland	24.6	29.2	33.1	34.2	33.7	31.5	31.4	29.1
France	27.3	27.9	28.7	30.4	30.2	30.3	30.6	30.4
Germany	25.4	25.7	27.2	27.9	27.8	28.2	29.3	28.9
Greece	22.9	21.5	21.2	22	22.1	19.9	20.5	20.8
Italy	24	24.4	25.5	25.7	25.3	24.2	24.3	24.9
Netherlands	31.1	31.1	31.6	32	31.4	30.6	29.6	28.7
Norway	25.8	26.8	28	27.9	27.4	26.5	25.8	25.1
Portugal	16.3	17.2	18.4	21	21.3	21	20.2	20.3
Spain	19.9	21.2	22.4	24	22.8	21.6	21.5	20.8
Sweden	33.1	34.3	37.1	37.9	36.5	34.3	33.6	32.7
Switzerland	19.5	21	23	24.7	24.8	25.6	26.4	27.3
U.K.	22.8	25.6	27.8	28.8	28.5	28	27.8	27.3
Year	1998	1999	2000	2001	2002	2003	2004	2005
Austria	28.3	28.7	28.1	28.4	29	29.3	29	28.8
Belgium	27.1	27	26.5	27.3	28	29.1	29.3	29.7
Denmark	30	29.8	28.9	29.2	29.7	30.9	30.9	30.1
Finland	27	26.2	25.1	24.9	25.6	26.5	26.6	26.7
France	30.1	29.9	29.5	29.6	30.4	30.9	31.3	31.5
Germany	28.8	29.2	29.3	29.4	30	30.3	29.6	29.4
Greece	21.7	22.7	23.5	24.1	23.8	23.6	23.6	24.2
Italy	24.6	24.8	24.7	24.9	25.3	25.8	26	26.4
Netherlands	27.8	27.1	26.4	26.5	27.6	28.3	28.3	28.2
Norway	26.9	26.9	24.4	25.4	26	27.2	25.9	23.9
Portugal	20.9	21.4	21.7	22.7	23.7	24.1	24.7	..
Spain	20.2	19.8	20.3	20	20.3	20.4	20.6	20.8
Sweden	32	31.7	30.7	31.2	32.2	33.2	32.7	32
Switzerland	27.3	27.3	26.9	27.6	28.5	29.1	29.3	29.2
U.K.	26.7	26.2	26.9	27.3	26.2	26.2	26.3	26.8

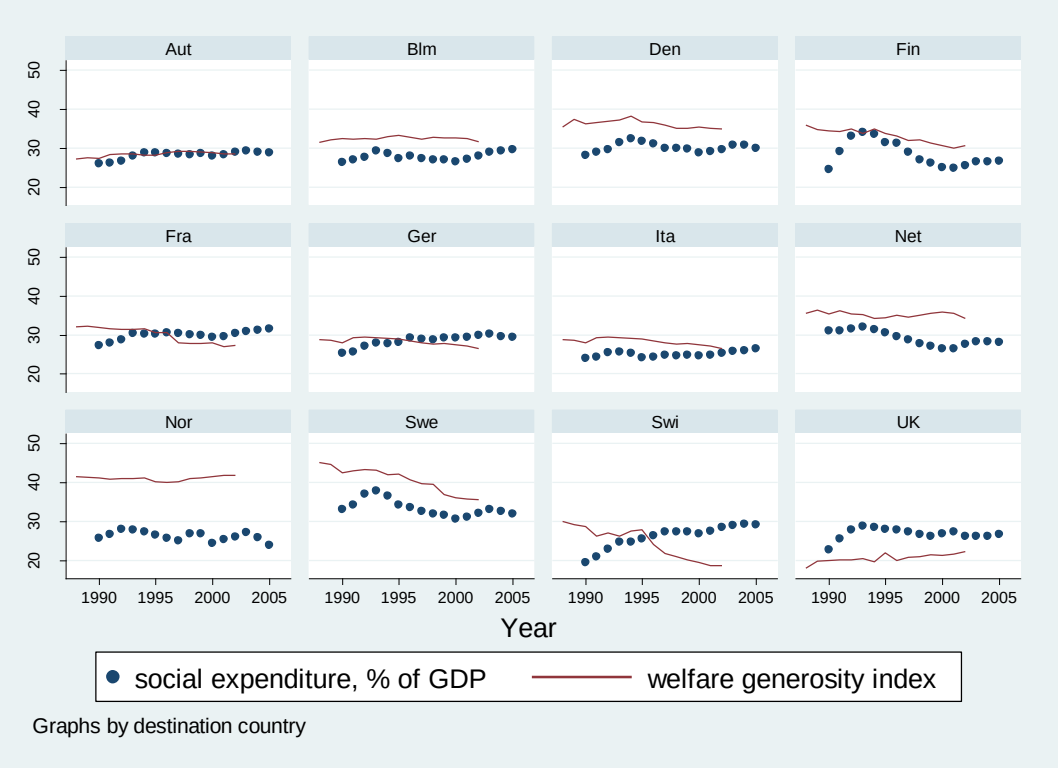
Source: Eurostat
Note: Germany includes ex-GDR from 1991.

Table 4-2: Welfare generosity index for 12 developed European countries, 1988-2002

Year	Austria	Belgium	Denmark	Finland	France	Germany
1988	27.2	31.5	35.4	35.9	32.1	28.8
1989	27.6	32.2	37.4	34.8	32.2	28.6
1990	27.4	32.5	36.3	34.4	31.9	27.9
1991	28.3	32.3	36.6	34.3	31.6	29.2
1992	28.5	32.5	36.9	35.0	31.5	29.5
1993	28.6	32.4	37.2	33.8	31.4	29.3
1994	28.2	32.9	38.2	34.9	31.6	29.1
1995	28.3	33.2	36.8	33.7	30.6	28.9
1996	28.9	32.8	36.5	33.1	30.6	28.5
1997	29.2	32.3	35.9	32.1	27.9	28.0
1998	29.2	32.8	35.1	32.2	27.8	27.5
1999	29.1	32.6	35.2	31.3	27.8	27.7
2000	28.9	32.6	35.4	30.7	28.0	27.5
2001	28.6	32.6	35.2	30.1	26.9	27.2
2002	28.6	31.7	35.0	30.7	27.3	26.6
Year	Italy	Netherlands	Norway	Sweden	Switzerland	U.K.
1988	22.3	35.4	41.5	45.1	30.1	18.0
1989	23.9	36.3	41.4	44.7	29.1	19.8
1990	21.3	35.4	41.1	42.5	28.7	20.0
1991	21.9	36.1	40.9	42.9	26.3	20.2
1992	23.7	35.4	40.9	43.2	27.0	20.2
1993	24.7	35.1	41.0	43.2	26.3	20.6
1994	24.0	34.2	41.2	42.0	27.5	19.7
1995	23.4	34.4	40.3	42.2	27.8	22.0
1996	24.4	35.0	40.1	40.7	24.1	19.9
1997	23.6	34.5	40.2	39.7	21.7	20.9
1998	23.7	35.0	41.0	39.6	20.9	20.9
1999	25.5	35.5	41.2	36.9	20.1	21.4
2000	26.7	35.8	41.6	36.2	19.6	21.4
2001	26.8	35.6	41.8	35.7	18.8	21.6
2002	27.3	34.2	41.8	35.7	18.6	22.3

Source: http://sp.uconn.edu/~scruggs/wp.htm

Figure 4-6: Total expenditure on social protection as a percentage of GDP versus welfare generosity index, by country



Source: Eurostat and http://sp.uconn.edu/~scruggs/wp.htm.

4.3 Economic variables

We also collect relevant data to reflect the general economic performance, the employment situation and the economic potential of those 27 countries. We use GDP per capita measured in PPP and dollars as the proxy of the pecuniary well-being and in a broader sense the current economic environment in the specific country.

Following the standard approach, employment situation is represented by the unemployment rate. However, we collect data on labor force in addition, which through providing information about the existing potential insider employees helps to reveal the employment opportunity margin faced by "newcomers". As to economic potential, we employ two sets of data, the GDP real growth rate and the GDP per capita growth rate, the latter of which is suggested by Alecke et al. (2001), to insinuate the momentum of economic growth, the extent to which the general well-being of residents would be improved in the near future and

hence literally the general scenario of the future economic performance in those countries in discussion.

4.4 Social variables

We include in our data set the country-specific stocks of migrants from 12 source countries in these 15 destination countries, which is generally agreed to be able to capture the effect of migration network in facilitating migration and in reducing the costs and risks that migrants care much, while taking into consideration the impact of past socioeconomic developments on migration (Jones, 1990). To calibrate other risks and costs that potential migrants usually take into consideration, we also compile data on the similarity of languages in destination and source region and on the geographic distance between the two. We construct a variable named language and assign to it values within a range of 0 to 5, which increases with the similarity of the languages in use in the receiving and the sending region. Table 4-3 shows in detail how the value for this variable is assigned. As to distance, following Van Wissen and Visser (1998), we use two variables. The former is a dummy variable called "common boundary" which takes the value of 1 if the two countries in discussion share a common border and 0 if otherwise. And the latter is the distance measured along a straight line between the capital cities of the two countries in concern in centimeters on a map with a scale of 1:10 million.

Table 4-3: Values of the variable measuring similarity of languages

Group	Value	Example
Same language	5	Greece and Cyprus
English	4	U.K. and any other country in discussion
Within the same subfamily or subdivision, the same branch and the same large language	3	Italy and Romania Finland and Estonia
Within the same branch of language family	2	France and Romania Finland and Hungary
Within the same big language family	1	Poland and Germany, etc.
Not in the same language	0	Finland and Bulgaria, etc.

5. Empirical Analysis

Based on the theoretical and empirical discussion in Chapter 2, the semi-dynamic migration model in Chapter 3 and the data described in Chapter 4, we formulate the following regression equation:

$$\ln(M/P_{sdt}) = \varphi_1\ln(GDPpc_{t-1d}) + \varphi_2\ln(GDPpc_{t-1s}) + \varphi_3\ln(u_{t-1d}) + \varphi_4\ln(u_{t-1s}) + \varphi_5\ln(SE_{t-1d}) + \varphi_6\ln(Stock_{t-1sd}) + \varphi_7\ln(LF_{t-1d}) + \varphi_8\ln(LF_{t-1s}) + \varphi_9\ln(dist_{sd}) + \varphi_{10}lan_{sd} + \varphi_{11}combou_{sd} + \varphi_{12}\ln(GDPgr_{t-1d}) + \varphi_{13}\ln(GDPgr_{t-1s}) + \varphi_{14}(GDPpcgr_{t-1d})^2 + \varphi_{15}(GDPpcgr_{t-1s})^2 + \xi_t \quad (19)$$

where M/P_{sdt}, the dependent variable, denotes the ratio in per cent of the gross number of migrants that flow from the source country s to the destination country d to the population in the source country s, in the time period t[3]. $GDPpc_{t-1d}$ and $GDPpc_{t-1s}$ represents GDP per capita[4], and u_{t-1d} and u_{t-1s} the unemployment rate, in the time period t-1, in the destination country and the source country respectively. SE_{t-1d} measures welfare benefits in destination country in time period t-1, which in most cases below is represented by the total expenditure on social protection as a percentage of GDP which boasts better data in terms of neatness and coverage. $Stock_{t-1sd}$ is the stock of foreign population from the source country s in destination country d in time period t-1. Lan_{sd} and $dist_{sd}$ stand for the similarity of languages and the distance between the destination country d and the source country s. Combou is a dummy variable examining whether the source country s and the destination country d share a common border. And ξ is the error term.

The independent variables illustrated so far correspond literally to the explanatory factors for the notional supply of migrants postulated in equation (16). Notwithstanding, we have in addition LF, GDPgr and GDPpcgr, which denote labor force, GDP growth rate and GDP per capita growth rate respectively. Apart from the effect it may have on the labor demand for migrants in destination country, which we have discussed at the end of Chapter 3, the variable of labor force is relevant to our study for the following reasons. During the process of migration decision, agents can be myopic, caring more about the size of employment

[3] We will refer to this variable as "the rate of migration flow" in the discussion that follows.

[4] There is a considerable discussion on whether income or wage indicators should be included in a migration equation (Hatton and Williamson, 1993). Faini and Venturini believe that, for medium and long-run migrations, income data may provide a better indication of the earning potentials of prospective migrants. Empirically, the use of either indicator does not seem to make much difference (Gould, 1979).

opportunity than the probability, or they might appear to be very far-sighted, studying the extent of competition they are going to face in the respective labor markets in the destination country and the source country. Including the lagged variable of labor force, which not only reflects the size of employment opportunity in general but also hints in particular the margin of employment opportunities in the destination country that will be left to the potential migrants, into the set of explanatory variables helps us take into consideration this myopia and farsightedness of the decision-making agents. In addition, the variable of labor force can also capture implicitly the information regarding the size of the destination country and the source country and thereby the effect of "scale" in attracting and in pushing out would-be migrants.

We have discussed the role of labor demand for migrants in destination country in determining the actual amount of migrants and hence stressed the role of GDP growth rate in destination country therein. Yet, we have to admit that the actual amount of migrants may not stand clear of the labor demand in home country and hence of the GDP growth rate there. Therefore, to be on a safer ground, we include both $GDPgr_{t-1d}$ and $GDPgr_{t-1s}$, the growth rate of GDP in time t-1 in the destination country and the source country.

In the context of east-west European migration, where it is well-recognized that there exists a sizable expectation of convergence of Eastern and Central Europe and West Europe in terms of economy and many other aspects, precipitated by EU enlargement and other campaigns of support and aids, we find it also necessary to consider the "option of waiting" discussed in Chapter 2. Following Alecke et al. (2001), we include the squared per capita GDP growth rate, $(GDPpcgr_{t-1d})^2$ and $(GDPpcgr_{t-1s})^2$, to measure this "option of waiting".

It should be noticed that except those three that are constant over the time, all the independent variables are one period forward than the dependent variable. This is to a large extent due to our attempt to model migration from the perspective of individual rational decision[5]. Yet it also follows from the concern to circumvent the relative infeasibility of measuring explanatory variables in the beginning of the period when the counter effect of

[5] The individual judgment regarding whether to migrate is normally not an *ad hoc* decision where present variables are taken into account. It is rather a longer-term process where expectations about potential costs and benefits are formed by carefully evaluating past income and expenditure experiences and assessing ties to existing migrant networks (Hille and Straubaaar, 2001).

migration hasn't been exerted, which is suggested by Greenwood and Sweetland (1972) to handle the problem of downward biased estimates using the end-of-period measures.

Most of the independent variables in our regression equation are specified in logarithms. Many empiricists hold that double-logarithmic formulation boasts several statistical advantages in the discussion of migration. For one thing, it fits better to capture the non-linear reaction of migration to the changes in the independent variables. Migration, when in the context of relatively free flow in particular, is believed to follow kind of saturation pattern and binded by an upper threshold (Hille and Straubhaar, 2001). For another, the double-logarithmic form can explain a larger share of the variance than other forms do. Besides, it is easier to interpret the coefficients since they stand for the elasticities with respect to each of the independent variables. Yet, apart from the consideration about what is mentioned above, our deployment of this log-log formulation stems also from our specification trial. Amongst linear form, log-linear form, linear-log form and several others, the log-log form stands relatively better, in terms of the significance of coefficients, the fit of the model and the behavior of the residual, the latter of which refers to the property of normal distribution in particular. Hence, considering in addition our theoretical model presented in Chapter 3, which also lends support thereupon, we utilize double-logarithmic formulation throughout the regressions.

For regression tools, we use both pooled OLS and panel data regression. In the context of panel data, we try three approaches, i.e. grouping data by destination of flow, by source of flow and by the combination of destination and source of the flow. Running Hausman test on those three approaches yields that fixed-effect formulation is universally better. Hence, in the context of panel data regression, we employ fixed-effect analysis throughout. We also conduct other diagnostic tests to check autocorrelation, heteroscedasticity and normality of residuals in all specifications. The Jarque-Bera statistic provides generally satisfactory evidence that the residuals are normally distributed, which constitutes a proper justification for the hypothesis testing and statistical reference that follow. And the results from the autocorrelation and heteroscedasticity tests lead us to choose to run robust regressions on all specifications.

In all, we try 28 specifications. Those specifications can be allocated into four big categories, the one with year dummies, the one with break and break interactions, the one using

different measures of welfare benefits, and the one with the exclusion of three outliers, namely, Greece, Portugal and Spain. Each category contains specifications using pooled data and the panel data grouped in three different ways. We will discuss those four categories subsequently down below.

Before we go further into details about the regression results, we would like to present a summary table about all the variables that we are going to use in the regressions. Despite that the dependent variable and most of the independent variables in the regressions in the later section are formulated in logarithms, we describe here the relatively original data whose values are easier to interpret than otherwise. Note that except the last three variables that are mostly constant over time, most of the other independent variables are in lagged form.

Table 5-1: Descriptions of variables

Variable	Unit	Obs	Mean	Std. Dev.	Min	Max
Rate of migration flow		614	0.000242	0.0006	2E-07	0.0061
GDP per capita source	PPP in dollars, lagged	614	14216.81	6448.968	5225	32702
GDP per capita destination	PPP in dollars, lagged	614	28539.38	4948.222	16939	41327
Unemployment rate source	%, lagged	614	10.9171	4.596284	3.3	20.9
Unemployment rate destination	%, lagged	614	7.020847	3.119975	2.1	22.9
Social protection extenditure destination	% of GDP, lagged	614	28.04202	2.905728	20	37.9
Welfare generosity index destination	lagged	381	32.33855	6.062025	18.63	43.178
Stock of migrants destination	thousands, lagged	614	12.57817	41.33895	0.005	326.6
Labor force source	thousands, lagged	614	6159.497	6053.294	152	17814
Labor force destination	thousands, lagged	614	10142.14	11804.44	2182	40992
GDP growth rate source	%, lagged	614	4.750798	2.073083	0.2	10.8
GDP growth rate destination	%, lagged	614	2.53241	1.512733	0.1	15.5
Per capita GDP growth rate source	%, lagged	614	4.892541	2.396677	-2.14	12.37
Per capita GDP growth rate destination	%, lagged	614	1.940277	1.308552	-2.56	5.88
BREAK	dummy	614	0.267101	0.442806	0	1
Distance	centimeters	614	13.70879	7.431975	0.6	34.9
Common border	dummy	614	0.037459	0.190039	0	1
Language		614	0.851792	0.748585	0	4

5.1 Determinants of migration flows

The four specifications in this category are based on the regression equation down below:

$$\ln(M/P_{sdt}) = \varphi_1\ln(GDPpc_{t-1d}) + \varphi_2\ln(GDPpc_{t-1s}) + \varphi_3\ln(u_{t-1d}) + \varphi_4\ln(u_{t-1s}) + \varphi_5\ln(SE_{t-1d}) + \varphi_6\ln(Stock_{t-1sd}) + \varphi_7\ln(LF_{t-1d}) + \varphi_8\ln(LF_{t-1s}) + \varphi_9\ln(dist_{sd}) + \varphi_{10}lan_{sd} + \varphi_{11}combou_{sd} + \varphi_{12}\ln(GDPgr_{t-1d}) + \varphi_{13}\ln(GDPgr_{t-1s}) + \varphi_{14}(GDPpcgr_{t-1d})^2 + \varphi_{15}(GDPpcgr_{t-1s})^2 + \sum\varphi_t YD_t + \S_t \quad (20)$$

where YD_t is the year dummy to control for the fixed year effect for the period 1992-2006 and § the error term[6].

The results are reported in Table 5-2. Column 1 presents results from the regression on pooled data, while the rest three columns focus respectively on results yielded by the regressions on panel data grouped by destination country, by source country and by the combination of destination country and source country. Since panel data regression is literally equivalent to introducing fixed effect of the group variable into pooled regression, it is not surprising that, in model 2, where the fixed effect of destination country is already controlled for, some of the explanatory variables that are related to destination country, for example, unemployment rate in destination country, stand insignificant, whereas in model 3, where the fixed effect of source country is controlled for instead, most of the explanatory variables that are related to source country turn insignificant. The reason for this is that, take model 3 as an example, the fixed effect of source country might have already captured part of the mechanism between migration flow and the explanatory variables that are related to source country.

While controlling for the fixed effects of the respective group variables, those three panel data regressions also insinuate certain interpretations of interest. The results from model 3 which controls for the fixed effect of source country tend to reflect the mechanism that determines the direction of migration flow at the macro level and the destination choice of migrants at the micro level. By contrast, the results from model 2 that controls for the fixed effect of destination country instead reveal to a certain extent the source composition of migration flow. Model 4, based on the regression with the fixed effect of destination country and source country in addition controlled for, discusses specific migration flows and hence focuses more on the effects of different explanatory variables on the intensity of migration

[6] To avoid multicollinearity, here we introduce 14 year dummies with the year 1992 as the reference year.

flow[7]. In the following section, when discussing specific independent variables, we will refer back to these interesting interpretations.

Not only do conventional economic variables stand significant in our context, their effects also have expected signs[8]. GDP per capita in source country imposes a negative effect on migration flow, both in general terms and in terms of the source composition of migrants in destination country. Given other variables unchanged, a 1% increase in GDP per capita in source country will lead to approximately a 0.3% decrease in the rate of migration flow in general. With other variables unchanged, given a specific destination country, a 1% increase in GDP per capita in source country will result in approximately a 0.4% decrease in the rate of migration flow into that destination country. This tends to imply that, the better economic well-being a source country boasts, the fewer of its residents would bother to flow out, and hence that each destination country has more migrants from source countries with lower income level. The coefficient on GDP per capita in destination country stands positive both in the regression controlled for the fixed effect of destination country and that controlled for the fixed effect of both destination country and source country. With other factors unchanged, given a specific destination country, a 1% increase in its GDP per capita will bring about a 5% increase in the rate of migration flow from all source countries in general and approximately a 8% increase in the rate of each source-specific migration flow into that destination country. This indicates that the attracting power of each destination country, with respect to the whole source group in general or to specific members of that group, grows with its GDP per capita. Yet, interestingly, the insignificant coefficient in the regression controlled for the fixed effect of source country seems to show that GDP per capita might have no impact on the destination choice of migrants. This tends to insinuate that would-be migrants may not employ GDP per capita in destination country as a criterion when choosing where to move, yet they will migrate more if GDP per capita in those places that they choose as destination increases. As to the effect of employment opportunities, unemployment rate in source country affects migration flow positively, both in general terms and in terms of the source composition of migrants in destination country and the intensity of specific migration flow as well. The higher the unemployment rate in a source country becomes, the more

[7] By "specific", we emphasize the source and the destination of the migration flow. For example, each destination country will have 12 "specific" migration flows, from 12 source countries respectively, and vice versa.

[8] By conventional economic variables, we refer to income, i.e. GDP per capita, and the probability of employment opportunity, i.e. unemployment rate.

would-be migrants would be “pushed” out. Destination countries boast more migrants from source countries with higher unemployment rate, with a 1% increase in unemployment rate associated with a 0.3% increase in the rate of migration flow, and even more if the unemployment rate in those countries rises, with a 1% increase equivalent to another 0.3% increase in the rate of the specific migration flow. In the same vein, unemployment rate in destination country imposes a negative impact on migration flow. With other variables unchanged, a 1% increase in unemployment rate in destination country will lead to a 0.5% decrease in the rate of migration flow in general. Would-be migrants tend to choose those places with lower unemployment rate, with a 1% decrease in unemployment rate in destination country associated with a 0.5% increase in the rate of migration flow.

The coefficient on social expenditure stands negative both in the pooled regression and in the regression using source country fixed effect. With other variables unchanged, a 1% increase in the percentage that total expenditure on social protection takes up in GDP in destination country will result in approximately a 1.4% decrease in the rate of migration flow in general. With other variables unchanged, given a specific source country, a 1% increase in the percentage that total expenditure on social protection takes up in GDP in destination country will lead to approximately a 1.3% decrease in the rate of migration flow of that source country. Therefore, interestingly, welfare benefits are inconducive to migration flow and people move to places with lower welfare benefits.

Confirming the consensus regarding the effect of migration network, the coefficient on stock of migrants is positive throughout. With other variables unchanged, a 1% increase in the source-specific stock of migrants will bring about a 0.8% increase in the rate of migration flow in general, and in the case of a specific destination country, this results in a 0.7% increase in the rate of migration flow into that destination country, while in the case of a specific source country, this contributes to a 0.8% increase in the rate of migration flow of that source country. This implies that stock of migrants is generally favorable to migration. For a destination country, which source country it attracts migrants from and how large is the attracted group depend on the composition of its existing stock of migrants. As to the destination choice of individuals, migrants prefer places with higher stock of their folk people and tend to migrate more if the relevant stock in those places increases.

Table 5-2: Regressions results from models with year dummies for 1992-2006

Dependent variable: The rate of migration flow (logarithm)	Model 1 pooled OLS	Model 2 fixed effect, destination	Model 3 fixed effect, source	Model 4 fixed effect, both
GDP per capita source	-0.277***	-0.306***	0.107	-0.381
(logarithm, lagged)	(0.0918)	(0.0829)	(0.484)	(0.536)
GDP per capita destination	-0.0289	5.231**	0.0588	7.588***
(logarithm, lagged)	(0.734)	(2.033)	(0.715)	(1.949)
Unemployment rate source	0.223***	0.277***	0.112	0.327**
(logarithm, lagged)	(0.0775)	(0.0707)	(0.178)	(0.139)
Unemployment rate destination	-0.449***	0.132	-0.442***	0.2
(logarithm, lagged)	(0.149)	(0.224)	(0.146)	(0.218)
Social protection expenditure,% of GDP	-1.345***	-0.908	-1.243***	0.805
(logarithm, lagged)	(0.43)	(1.237)	(0.411)	(0.932)
Stock of foreign population	0.784***	0.661***	0.788***	0.557**
(logarithm, lagged)	(0.0392)	(0.041)	(0.0497)	(0.228)
Labor force source	-0.738***	-0.691***	0.208	-0.425
(logarithm, lagged)	(0.0464)	(0.0445)	(1.043)	(0.738)
Labor force destination	0.482***	1.41	0.485***	3.126*
(logarithm, lagged)	(0.0607)	(2.332)	(0.0681)	(1.892)
GDP growth rate source	-0.0332	-0.0477	-0.0309	-0.00319
(logarithm, lagged)	(0.0742)	(0.0702)	(0.0732)	(0.0494)
GDP growth rate destination	0.0533	0.013	0.0662	0.0236
(logarithm, lagged)	(0.0544)	(0.0542)	(0.0531)	(0.0447)
Per capita GDP growth rate source	0.00511***	0.00599***	-0.000565	-0.00148
(squared, lagged)	(0.00175)	(0.00162)	(0.00208)	(0.00139)
Per capita GDP growth rate destination	-0.00288	0.00822	-0.00254	0.00931*
(squared, lagged)	(0.008)	(0.00773)	(0.0079)	(0.0054)
Distance	-0.248***	-0.324***	-0.324***	
(logarithm)	(0.0658)	(0.0594)	(0.0864)	
Common border	0.0907	-0.0215	-0.00352	
(dummy)	(0.132)	(0.129)	(0.134)	
Similarity of languages	0.034	0.204***	0.0148	
	(0.0568)	(0.0496)	(0.0562)	
Year dummies	YES	YES	YES	YES
_cons	-0.91	-63.96*	-12.74	-110.1***
	(8.677)	(38.19)	(10.33)	(29.41)
F-statistics testing coefficients on year dummies (p-value)	3.03 (0.002)	2.66 (0.0012)	2.53 (0.0022)	3.36 (0.0001)
N	614	614	614	614
adj. R-sq	0.868	0.758	0.873	0.514

Note: 1, Standard errors are given in parentheses under coefficients. 2, Individual coefficients are statistically significant at the *10% level, **5% level or ***1% level (two-side test). 3, The F-statistics test the joint hypothesis that coefficients on year dummies are all zero. P-values are given in parentheses under F-statistics.

The effect of distance is statistically significant throughout and, as is expected, stands negative, while that on the dummy variable regarding the existence of common border is insignificant throughout. This indicates that it is mainly the geographic distance that matters, in the general migration flow, in the source composition of migrants in destination country, and in the destination choice of migrants. Would-be migrants do prefer places that are not so far way and hence in the realized rate of migration flow, for each destination country, there is a bigger cluster of migrants from source countries in a shorter distance, while whether there exists any common border is not so relevant. The coefficient on similarity of languages is only statistically significant in the regression using destination country fixed effect. This tends to imply that destination countries may have more migrants from countries with which they share similar languages. Combing the coefficients on those three variables, we can claim that as is unanimously-agreed, costs and risks have a negative impact on migration flow and that their effect thereon is generally better captured by the variable of distance.

The coefficient on labor force in source country is negative in the pooled regression and in the regression using destination country fixed effect. With other factors unchanged, a 1% increase in labor force in source country will lead to approximately a 0.7% decrease either in the rate of migration flow in general or in the rate of migration flow in the case of specific destination country. This means that, generally the larger a source country is, the fewer of its residents would choose to flow out, and that the source composition of migrants in each destination country is thereby relatively skewed to smaller source countries. This finding tends to coincide with that of Van Wissen and Visser (1998), who point out there exists a negative relationship between emigration rate and the size of the region, due to the fact that the probability of finding a destination within the same region increases with the size. By contrast, except in the regression controlled for the fixed effect of destination country, where variables related to destination country turn more often insignificant, the coefficient on labor force in destination country is positive throughout. Given other variables unchanged, a 1% increase in the labor force in destination country will lead to approximately a 0.5% increase either in the rate of migration flow in general or in the rate of migration flow in the case of specific source country. This tends to indicate that migrants flow into bigger destination countries and hence in general larger destination countries boast higher rate of migration flow. Combining this coefficient with that on labor force in source country, we can at least claim that there exists a “scale” effect in attracting migration from the side of destination country and an “anti-scale” effect in pushing out people from the side of source country. In

light of the discussion regarding the implication of the variable of labor force in the beginning of this chapter, we may argue that these two effects, though opposite in direction, both stem from individuals' consideration over the size of employment opportunity. The bigger employment opportunity they deem in their own countries, the less they are prone to flow out. On the contrary, the bigger employment opportunity they perceive in those destination countries, the more they are inclined to migrate. Therefore, referring back to the pair of coefficients on unemployment rate in destination country and in source country, which also stand in opposite direction, we posit that during migration decision, apart from the probability of employment opportunity, would-be migrants consider the size of employment opportunity as well.

The effect of the GDP growth rate is statistically insignificant in general, while the effect of the square of GDP per capita growth rate in source country stands statistically significant in the pooled regression and in the regression controlled for the fixed effect of destination country, though mathematically very small. This tends to imply that would-be migrants do consider "option of waiting" in migration decision, though the weight that they attach to it might be small.

All in all, we conclude from the regression results of the specifications with year dummies that: 1) economic incentive plays a relative decisive role in migration flow in our context. During the migration decision, would-be migrants consider income or wages together with the probability of and the size of employment opportunity. Lower expected income or wages, either due to lower income or wages or higher unemployment rate, and fewer employment opportunities in their home countries tend to push them out, while higher expected income or wages, i.e. higher income or wages or lower unemployment rate, and bigger size of employment opportunity in destination country are pulling them away. Furthermore, when choosing places to migrate, it seems that agents consider more about employment opportunity, either the probability or the size, than the income or wages, and quite obviously, they flow into those countries with better employment opportunity. 2) Surprisingly, welfare benefits in destination country, measured by the total social protection expenditure as a percentage of GDP, affect migration flow negatively. Would-be migrants move to places with lower welfare benefits. 3) Stock of migrants is conducive to migration flow. Migrants tend to flow into places with higher stock of their folk people and migrate more if the relevant stock in those places increases. 4) Costs and risks rendered by distance and

language affect migration flow negatively. 5) Option of waiting does have its certain place in migration flow, yet its effect is small.

5.2 Effect of change in migration regime

In 2004, the 12 transition countries, except Bulgaria and Romania which became new EU member states until 2007, were acceded into EU. We wonder whether this big change, which alleviated understandably many barriers in migration and facilitated free flow of labor in a more literal sense, exerts any impact on migration flow. Examining the evolution of the rate of migration flow in general during 1992-2006 illustrated in Figure 4-5, we believe that the year 2004, 2005 and 2006 should belong to the same club. Therefore, we introduce into our regression a variable called BREAK which for all source countries except Bulgaria and Romania takes the value of 0 before 2004 and the value of 1 for the year 2004, 2005 and 2006 and for Bulgaria and Romania takes the value of 0 throughout, to look into the effect of the accession on migration flow in a more formal approach.

The four specifications in this category are based on the following regression equation:

$$\ln(M/P_{sdt}) = \varphi_1\ln(GDPpc_{t-1d}) + \varphi_2\ln(GDPpc_{t-1s}) + \varphi_3\ln(u_{t-1d}) + \varphi_4\ln(u_{t-1s}) + \varphi_5\ln(SE_{t-1d}) + \varphi_6\ln(Stock_{t-1sd}) + \varphi_7\ln(LF_{t-1d}) + \varphi_8\ln(LF_{t-1s}) + \varphi_9\ln(dist_{sd}) + \varphi_{10}lan_{sd} + \varphi_{11}combou_{sd} + \varphi_{12}\ln(GDPgr_{t-1d}) + \varphi_{13}\ln(GDPgr_{t-1s}) + \varphi_{14}(GDPpcgr_{t-1d})^2 + \varphi_{15}(GDPpcgr_{t-1s})^2 + \varphi_{16}BREAK + \varphi_{17}BREAK * \ln(GDPpc_{t-1d}) + \varphi_{18}BREAK * \ln(GDPpc_{t-1s}) + \varphi_{19}BREAK * \ln(u_{t-1d}) + \varphi_{20}BREAK * \ln(u_{t-1s}) + \varphi_{21}BREAK * \ln(SE_{t-1d}) + \varphi_{22}BREAK * \ln(Stock_{t-1sd}) + \varphi_{23}BREAK * \ln(LF_{t-1d}) + \varphi_{24}BREAK * \ln(LF_{t-1s}) + \varphi_{25}BREAK * \ln(GDPgr_{t-1d}) + \varphi_{26}BREAK * \ln(GDPgr_{t-1s}) + \varphi_{27}BREAK * (GDPpcgr_{t-1d})^2 + \varphi_{28}BREAK * (GDPpcgr_{t-1s})^2 + \Theta_t \quad (21)$$

where interactions between BREAK and the other explanatory variables are included in addition and Θ is the error term.

The results are reported in Table 5-3. The coefficient on the variable BREAK is negative in both pooled regression and in the regression controlled for the fixed effect of source country. This indicates that the advent of accession decreases migration flow in general and the migration outflow from each specific source country.

Table 5-3: Regression results from models with break and break interactions during 1992-2006

Dependent variable: The rate of migration flow (logarithm)	Model 5 pooled OLS	Model 6 fixed effect, destination	Model 7 fixed effect, source	Model 8 fixed effect, both
GDP per capita source	-0.232**	-0.308***	-0.466	-1.648**
(logarithm, lagged)	(0.0996)	(0.0923)	(0.324)	(0.677)
GDP per capita destination	0.512	1.959***	0.067	3.263***
(logarithm, lagged)	(0.542)	(0.428)	(0.676)	(0.971)
Unemployment rate source	0.127	0.206**	-0.158	-0.0314
(logarithm, lagged)	(0.101)	(0.0893)	(0.19)	(0.15)
Unemployment rate destination	-0.412***	0.0274	-0.502***	-0.306*
(logarithm, lagged)	(0.149)	(0.16)	(0.153)	(0.158)
Social protection expenditure,% of GDP	-1.626***	-1.670**	-1.653***	-0.322
(logarithm, lagged)	(0.488)	(0.84)	(0.42)	(0.581)
Stock of foreign population	0.848***	0.692***	0.807***	0.586**
(logarithm, lagged)	(0.0461)	(0.0506)	(0.0531)	(0.229)
Labor force source	-0.799***	-0.744***	-2.993***	-1.669*
(logarithm, lagged)	(0.0611)	(0.059)	(1.034)	(0.865)
Labor force destination	0.407***	0.84	0.457***	-0.265
(logarithm, lagged)	(0.0694)	(2.24)	(0.0698)	(2)
GDP growth rate source	-0.163	-0.167	-0.163	-0.101
(logarithm, lagged)	(0.121)	(0.101)	(0.114)	(0.0724)
GDP growth rate destination	0.0831*	0.0101	0.0757	0.0154
(logarithm, lagged)	(0.0479)	(0.0496)	(0.0469)	(0.0461)
Per capita GDP growth rate source	0.00745***	0.00739***	-0.0002	-0.000299
(squared, lagged)	(0.00288)	(0.00242)	(0.00257)	(0.0017)
Per capita GDP growth rate destination	-0.0000868	0.00959	0.00191	0.00586
(squared, lagged)	(0.00713)	(0.00664)	(0.00684)	(0.0048)
Distance	-0.133	-0.271***	-0.361***	
(logarithm)	(0.085)	(0.0736)	(0.102)	
Common border	0.25	0.0538	0.0603	
(dummy)	(0.186)	(0.176)	(0.164)	
Similarity of languages	0.0468	0.179***	0.00303	
	(0.0779)	(0.0667)	(0.0749)	
BREAK	-23.13**	6.337	-35.32***	-18.31*
(dummy)	(11.48)	(12.01)	(12.42)	(11)
Break interactions				
*GDP per capita source	-1.347***	-1.717***	-0.668	-0.476
	(0.431)	(0.451)	(0.508)	(0.397)
*GDP per capita destination	2.326**	0.617	2.753**	1.981**
	(1.058)	(1.057)	(1.096)	(0.903)

*unemployment rate source	-0.0612	-0.306*	0.189	0.219
	(0.188)	(0.183)	(0.229)	(0.189)
*unemployment rate destination	0.502**	0.0188	0.670***	-0.108
	(0.238)	(0.248)	(0.228)	(0.261)
*social protection expenditure,% of GDP	2.305***	0.554	2.446***	0.602
	(0.824)	(0.893)	(0.766)	(0.818)
*stock of foreign population	-0.221***	-0.106	-0.169**	0.0405
	(0.0769)	(0.0765)	(0.0793)	(0.036)
*labor force source	0.156*	0.145	0.155*	0.0588
	(0.0923)	(0.0898)	(0.092)	(0.0491)
*labor force destination	0.351***	0.173	0.291**	-0.0067
	(0.127)	(0.137)	(0.13)	(0.109)
*GDP growth rate source	0.246	0.224	0.196	0.0746
	(0.157)	(0.144)	(0.157)	(0.107)
*GDP growth rate destination	-0.237**	0.0323	-0.226*	0.00231
	(0.119)	(0.131)	(0.121)	(0.136)
*per capita GDP growth rate source	-0.00564	-0.00642*	-0.00248	-0.00227
	(0.00363)	(0.00345)	(0.00319)	(0.00268)
*per capita GDP growth rate destination	0.00865	0.00706	0.00293	0.00611
	(0.019)	(0.01949	(0.019)	(0.0172)
*distance	-0.168	-0.00778	0.102	
	(0.136)	(0.13)	(0.138)	
*common border	0.262	0.225	0.537**	
	(0.262)	(0.245)	(0.239)	
*similarity of languages	0.0596	0.113	0.112	
	(0.0924)	(0.0916)	(0.0883)	
_cons	-4.613	-23.43	21.18	-10.68
	(6.82)	(18.36)	(13.13)	(19.55)
N	614	614	614	614
adj. R-sq	0.868	0.758	0.881	0.554

Note: 1, Standard errors are given in parentheses under coefficients. 2, Individual coefficients are statistically significant at the *10% level, **5% level or ***1% level (two-side test). 3, In the group of break interactions, *GDP per capita source denotes the interaction term between BREAK and GDP per capita in source country, and so forth.

Assigning 1992-2003 and 2004-2006 to be the first and the second period respectively, we can conclude from the coefficients on those interaction terms that the mechanism that determines migration flow does not follow exactly the same pattern across periods. Variables that exert similar effects on migration flow throughout the two periods are unemployment rate in source country, labor force in source country, distance, similarity of languages, as well as GDP growth rate and per capita GDP growth rate both in destination country and in source country.

Unemployment rate in source country continues to affect migration flow positively, though its effect is significant in fewer specifications compared to what is in the previous model with year dummies, and with a smaller magnitude. With other factors unchanged, given a specific destination country, a 1% increase in unemployment rate in source country will bring about a 0.2% increase in the rate of migration flow for that destination country. Hence, in terms of the rate of migration flow, the source composition of migrants in destination country is still skewed to source countries with higher unemployment rate, and remains so across periods. The coefficient on labor force in source country in the present context is negative throughout the four specifications. Destination countries still attract more migrants from countries with smaller labor force, with a 1% decrease in labor force in source country associated with a 0.8% increase in the rate of migration flow for specific destination countries, and tend to attract more if the labor force in those countries decreases, with a 1% decrease leading to a 1.7% increase in the rate of specific migration flow. Therefore, to conclude, throughout the two periods, employment opportunity in source country, either the probability or the size, affects migration flow negatively.

As is in the previous model with year dummies, the coefficient on similarity of languages is positive, while that on distance stands negative. This indicates, costs and risks continue to affect migration flow negatively, which doesn't differ across periods either. As to the other four variables, throughout the two periods, the effect of GDP growth rate, either in destination country or in source country, and that of GDP per capita growth rate in destination country still stand insignificant, while the existence of the effect of the option of waiting, captured by GDP per capita growth rate in source country, is still supported, though mathematically small.

The existence of behavior disparity across periods lies in the effects of income or wages, either in destination country or in source country, employment opportunity in destination country, either the probability or the size, the percentage that total expenditure on social protection takes up in GDP in destination country, the stock of source-specific migrants in destination country, and the dummy variable concerning the existence of common border in addition. The signs of the coefficients on GDP per capita in source country and on labor force in destination country are quite similar across periods, yet they seem to exert bigger impacts in absolute terms in the second period. For instance, labor force in destination

country still affects destination choice of migrants positively. Yet, with other variables unchanged, given a specific source country, a 1% increase in labor force in destination country leads to a 0.5% increase in the rate of migration flow from that source country in the first period, while that in the second period is associated with a 0.7% increase instead. GDP per capita in source country also imposes a bigger influence in the second period on the rate of migration flow in general and the source composition of migrants in destination country as well, with a 1% increase in GDP per capita in source country associated with a 1.6% decrease and a 2% decrease respectively, as is compared with the decreases of 0.2% and 0.3% respectively in the first period. However, its effect on the intensity of migration flow doesn't differ across period, either in terms of sign or in terms of magnitude. This pattern of similar sign but a bigger magnitude of effect in the second period also finds in the effect of GDP per capita in destination country. Yet, it is worth noticing that in the second period, GDP per capita in destination country begins to matter in the destination choice of migrants. With other factors unchanged, given a specific source country, a 1% increase in GDP per capita in destination country will bring about a 2.8% increase in the rate of migration flow from that source country. Hence, after the accession, individuals start to manifest preference over destination countries with better income or wages during migration decision.

The biggest disparity across periods in the set of economic variables stands in the case of unemployment rate in destination country. In the first period, the coefficient on unemployment rate in destination country is negative in the pooled regression and in the regression controlled for the fixed effect of source country, while that in the second period turns out to be positive instead though mathematically small, 0.09 and 0.068 respectively. Therefore, interestingly, in the first period, agents dislike high unemployment rate in destination country and hence choose to migrate into countries with lower unemployment rate, while, in the second period, it is shown that high unemployment rate stands no longer despicable and that migrants move to places with higher unemployment rate and thus with a bigger shortage of jobs instead. These two contradicting behavior patterns of migrants with regard to unemployment rate in destination country can find their respective support from empirical findings in the literature, though the former (Eriksson, 1989; Faini and Venturini, 1994; Hartog and Vriend, 1989; Lundborg, 1991a; Poot, 1995) more overwhelming than the latter (Katseli and Glytsos, 1989). Yet, we find it hard to explain why agents' preference shifts across periods.

The effect of welfare benefits in destination, represented by the total social protection expenditure as a percentage of GDP, manifests the biggest disparity across periods.
In the first period, while standing insignificant in the last specification controlled for the fixed effect of both destination country and source country, the coefficient on the total social protection expenditure as a percentage of GDP in destination country is negative in the pooled regression, in the regression controlled for the fixed effect of destination country and that controlled for the fixed effect of source country. This implies that in the first period, welfare benefits are inconducive to migration flow in general, that would-be migrants flow to places with lower welfare benefits, that each destination country attracts more migrants from the group of source countries in general if its welfare benefits as is measured by the total social protection expenditure as a percentage of GDP decreases, and yet whether they will attract more from each source country is ambiguous. Take the destination choice of migrants for instance, with other variables unchanged, given a specific source country, a 1% decrease in the total social protection expenditure as a percentage of GDP in destination country will bring about a 1.6% increase in the rate of migration flow from that source country. By contrast, in the second period, the effect of this very variable turns positive in the pooled regression and in the regression controlled for the fixed effect of source country, while remaining the same as in the first period in the other two specifications. This insinuates that in the second period, welfare benefits offered in destination country instigates migration flow, that migrants now tend to choose places with higher welfare benefits instead, yet that contradictorily they are prone to migrate more if welfare benefits in those places decreases, and that the effect of welfare benefits on the intensity of specific migration flow is still inconclusive. Take again the destination choice of migrants as a example, in the second period, with other factors unchanged, given a specific source country, a 1% increase in the total social protection expenditure as a percentage of GDP in destination country will lead to a 0.8% increase in the rate of migration flow from that source country.

Stock of migrants in destination country affects migration flow positively across periods. It encourages migration flow in general and promotes the intensity of specific migration flow. Migrants move to places that boast higher stock of their “folk people” and tend to migrate more if this relevant stock grows. However, it seems that in the second period, the effect of the stock of migrants on the migration flow in general and on the destination choice of migrants is reduced. For instance, with other factors unchanged, given a specific source country, a 1% increase in the stock of migrants in destination country will lead to a 0.8%

increase in the rate of migration flow from that source country in the first period, while that is associated with a 0.6% increase instead in the second period. Reasons for the smaller impact in the second period can be various. For instance, the fewer barriers in the second period might induce would-be migrants to be less dependent on the existence of their folk people in funneling information, in providing necessary support and in reducing certain risks. The consequently smaller weight that they attach to the stock of their folk people might lead to the smaller effect of this variable in the second period captured in our regression.

Period also seems to matter in the effect of the dummy variable checking the existence of common border. As is in the previous model with year dummies, the coefficient on this variable in the first period is insignificant throughout. However, in the second period, the existence of common border begins to affect the destination choice of migrants. In other words, in addition to places in the shorter distance, migrants in the second period also prefer those that share a common border with their home country.

In short, we conclude: 1) the accession and hence the change in migration regime do exert a substantial impact on migration flow. It not only affects the level of migration flow, but also changes the pattern of the mechanism of migration. This result is consistent with the finding of Bruecker et al. (2002). 2) Economic variables seize a relative decisive place in the context of east-west internal European migration. Generally speaking, they tend to exert a bigger impact in the second period. GDP per capita in destination country in particular, begins to matter in the destination choice of migrants. 3) Interestingly, the effect of welfare benefits offered in destination country, as is measured by the total social protection expenditure as a percentage of GDP differs widely across period. Their impact on migration flow in the first period is generally negative, as is in the previous model with year dummies, while in the second period, it turns to be positive in the case of migration flow in general and in the context of destination choice of migrants. Hence, in terms of the destination of migration flow, while people in the first period head for places with lower welfare benefits, they follow an opposite direction in the second period. 4) Stock of source-specific migrants in destination country affects migration flow positively, while costs and risks rendered by distance and language affects negatively, the former of which manifests a small disparity across periods in that the magnitude of the effect in the second period is smaller, while the latter doesn't follow suit generally. 5) A close comparison between behavior patterns across periods will yield a suspicion that individuals' rational incentive begins to have a bigger play

in the second period. For instance, as is mentioned earlier in this paragraph, the impact of economic variables increases in the second period. Furthermore, in terms of destination choice, the realized migration begins to respond to GDP per capita in destination country and to respond in a more reasonable manner to welfare benefits in destination country in the second period. Therefore, we tentatively argue that after the change in migration regime, the mechanism that determines migration flow is more genuinely revealed and that it's the existence of the barriers forged by policies before the accession that probably constituted bondages for would-be migrant and thereby restrained the realized migration flow from reflecting the true rationale of agents' migration decision in the first period.

5.3 Two different measures: welfare generosity index versus total social protection expenditure

In those previous regressions, we employ the percentage that total expenditure on social protection takes up in GDP as the measure for welfare benefits. However, this standard approach doesn't win a unanimous applause. Some scholars argue that social protection expenditure data may not constitute a good indicator for welfare benefit level. They point out in particular that the time serie data of social protection expenditure as a percentage of GDP do not necessarily correspond to the trend of welfare benefits closely. One major problem is that a negative shock to economy may render a rise in the total expenditure on social protection, which does not necessarily indicate an improvement of the benefit level in the design of welfare system. Examining Figure 4-1, which juxtaposes total expenditure on social protection as a percentage of GDP against another measure of welfare benefits, the welfare generosity index developed by Lyle Scruggs, this accusation doesn't seem to be ungrounded. Total expenditure on social protection as a percentage of GDP does show certain spikes during the time period of our discussion. Hence, to be on a safer ground, we run two sets of regressions using respectively the new measure, welfare generosity index, and the previous measure, social protection expenditure, as the indicator for welfare benefits. Note that due to the unavailability of welfare generosity index for Greece, Portugal and Spain and for the period of 2004-2006, the regressions down below are for those 12 destination countries during the period 1992-2003. The regression equation is as follows:

$$\ln(M/P_{sdt}) = \varphi_1 \ln(GDPpc_{t-1d}) + \varphi_2 \ln(GDPpc_{t-1s}) + \varphi_3 \ln(u_{t-1d}) + \varphi_4 \ln(u_{t-1s}) + \varphi_5 \ln(WB_{t-1d}) + \varphi_6 \ln(Stock_{t-1sd}) + \varphi_7 \ln(LF_{t-1d}) + \varphi_8 \ln(LF_{t-1s}) + \varphi_9 \ln(dist_{sd}) + \varphi_{10} lan_{sd} + \varphi_{11} combou_{sd} + \varphi_{12} \ln(GDPgr_{t-1d}) + \varphi_{13} \ln(GDPgr_{t-1s}) + \varphi_{14} (GDPpcgr_{t-1d})^2 + \varphi_{15} (GDPpcgr_{t-1s})^2 + \sum \varphi_t YD_t + \epsilon_t \quad (22)$$

where WB denotes welfare benefits and corresponds to welfare generosity index and total social protection expenditure as a percentage of GDP respectively. YD_t is the year dummy to control for the fixed year effect for the period 1992-2003 and ϵ the error term[9].

The results are reported in Table 5-4 and Table 5-5. From those two tables, denoting the set of regressions using welfare generosity index as case one and the one using social protection expenditure as case two, we can see that the coefficients on the variables other than welfare benefits are in general quite similar between the two cases, both in terms of sign and of significance level, though the magnitudes of the effects might differ slightly. This seems to imply that which measure we take to represent welfare benefits does not much affect or undermine our model in capturing the effects of other variables on migration flow. Hence, it justifies the use of total social protection expenditure in terms of GDP as the indicator for welfare benefits in our regression models in section 5.1 and 5.2 for the period 1992-2006, for which the welfare generosity index is not available throughout.

A close look at the regression results regarding welfare benefits yields that the choice of measure does make a difference. Except in the regression controlled for the fixed effect of source country, where the coefficient on the very variable stands positive, the impact of the total social protection expenditure as a percentage of GDP is yielded to be generally insignificant. Yet the case with regard to welfare generosity index is utterly the reverse, with the coefficient in the regression controlled for the fixed effect of source country insignificant and those in the rest three specifications positive. This implies that when employing welfare generosity index as the measure for welfare benefits, welfare benefits appear to elicit migration flow and that the attracting power of destination countries, either to the whole source group as a whole or to the specific members of the group, grows with its welfare benefit level. For instance, with other factors unchanged, given a specific destination country, a 1% increase in welfare generosity index will lead to a 2.1% increase in the rate of migration flow into that destination country. And with other factors unchanged, as far as a specific migration flow is concerned, a 1% increase in welfare generosity index will bring about a 2.2% increase in the rate of the specific migration flow.

[9] Here, we introduce 11 year dummies keeping again the year 1992 as the reference category.

Table 5-4: Regression results from models using welfare generosity index and year dummies for 1992-2003

Dependent variable: The rate of migration flow (logarithm)	Model 9 pooled OLS	Model 10 fixed effect, destination	Model 11 fixed effect, source	Model 12 fixed effect, both
GDP per capita source	-0.155*	-0.241***	-0.151	-0.113
(logarithm, lagged)	(0.0914)	(0.078)	(0.546)	(0.3629
GDP per capita destination	2.473***	7.179***	2.687***	5.706***
(logarithm, lagged)	(0.682)	(2.557)	(0.649)	(1.736)
Unemployment rate source	0.166*	0.225***	-0.153	0.0645
(logarithm, lagged)	(0.0849)	(0.0729)	(0.189)	(0.137)
Unemployment rate destination	-0.1	0.358	-0.0614	0.00669
(logarithm, lagged)	(0.135)	(0.235)	(0.125	(0.153
Welfare generosity index	0.413*	2.115**	0.318	2.256***
(logarithm, lagged)	(0.243)	(0.91)	(0.206)	(0.635)
Stock of foreign population	0.699***	0.536***	0.725***	0.264**
(logarithm, lagged)	(0.0381)	(0.0364)	(0.0539)	(0.104)
Labor force source	-0.690***	-0.612***	-3.062**	-3.027***
(logarithm, lagged)	(0.0537)	(0.0496)	(1.273)	(0.75)
Labor force destination	0.643***	-4.267	0.602***	-4.265**
(logarithm, lagged)	(0.0656)	(2.721)	(0.0748)	(2)
GDP growth rate source	-0.233**	-0.242***	-0.159	-0.0877
(logarithm, lagged)	(0.109)	(0.0896)	(0.106)	(0.0564)
GDP growth rate destination	-0.0152	-0.0736	-0.00956	-0.0542
(logarithm, lagged)	(0.0619)	(0.0603)	(0.0564)	(0.042)
Per capita GDP growth rate source	0.00950***	0.0105***	0.0015	0.000386
(squared, lagged)	(0.00275)	(0.00217)	(0.00249)	(0.0012)
Per capita GDP growth rate destination	-0.00275	0.00123	-0.00217	0.00239
(squared, lagged)	(0.00814)	(0.00714)	(0.0077)	(0.00429)
Distance	-0.402***	-0.425***	-0.488***	
(logarithm)	(0.0802)	(0.0659)	(0.108)	
Common border	0.217	-0.0246	-0.0007	
(dummy)	(0.161)	(0.264)	(0.156)	
Similarity of languages	-0.0134	0.227***	-0.0305	
	(0.0804)	(0.0563)	(0.0784)	
Year dummies	YES	YES	YES	YES
_cons	-34.87***	-45.18*	-15.69	-11.67
	(7.279)	(26.11)	(12.42)	(18.53)
F-statistics testing coefficients on year dummies (p-value)	1.71 (0.0763)	1.68 (0.0836)	2.47 (0.0078)	1.05 (0.4046)
N	381	381	381	381
adj. R-sq	0.885	0.762	0.902	0.468

Note: 1, Standard errors are given in parentheses under coefficients. 2, Individual coefficients are statistically significant at the *10% level, **5% level or ***1% level (two-side test). 3, The F-statistics test the joint hypothesis that coefficients on year dummies are all zero. P-values are given in parentheses under F-statistics.

Table 5-5: Regression results from models using total expenditure on social protection as a percentage of GDP and year dummies for 1992-2003

Dependent variable: The rate of migration flow (logarithm)	Model 13 pooled OLS	Model 14 fixed effect, destination	Model 15 fixed effect, source	Model 16 fixed effect, both
GDP per capita source	-0.145	-0.236***	-0.184	-0.0779
(logarithm, lagged)	(0.0914)	(0.0789)	(0.544)	(0.394)
GDP per capita destination	3.414***	2.159	3.764***	2.335
(logarithm, lagged)	(0.955)	(2.689)	(0.901)	(1.749)
Unemployment rate source	0.168**	0.225***	-0.117	0.0653
(logarithm, lagged)	(0.0832)	(0.0738)	(0.186)	(0.143)
Unemployment rate destination	0.0268	0.475**	0.0971	0.122
(logarithm, lagged)	(0.171	(0.238	(0.156	(0.153
Social protection expenditure,% of GDP	0.897	-1.355	1.012**	-0.275
(logarithm, lagged)	(0.555)	(1.232)	(0.512)	(0.822)
Stock of foreign population	0.680***	0.543***	0.694***	0.316***
(logarithm, lagged)	(0.0396)	(0.037)	(0.0572)	(0.109)
Labor force source	-0.674***	-0.615***	-2.947**	-2.899***
(logarithm, lagged)	(0.0534)	(0.0492)	(1.266)	(0.802)
Labor force destination	0.655***	-0.369	0.638***	-0.313
(logarithm, lagged)	(0.0738)	(2.2)	(0.0859)	(1.394)
GDP growth rate source	-0.228**	-0.237**	-0.143	-0.0889
(logarithm, lagged)	(0.109)	(0.0924)	(0.104)	(0.0609)
GDP growth rate destination	-0.00729	-0.0241	-0.0102	-0.0103
(logarithm, lagged)	(0.0581)	(0.0614)	(0.0537)	(0.0442)
Per capita GDP growth rate source	0.00953***	0.0104***	0.00142	0.00044
(squared, lagged)	(0.00273)	(0.00223)	(0.00243)	(0.00126)
Per capita GDP growth rate destination	-0.00247	0.00462	-0.00186	0.00505
(squared, lagged)	(0.00813)	(0.00726)	(0.00764)	(0.0044)
Distance	-0.416***	-0.422***	-0.526***	
(logarithm)	(0.079)	(0.0663)	(0.109)	
Common border	0.2	-0.0265	-0.00647	
(dummy)	(0.166)	(0.264)	(0.164)	
Similarity of languages	-0.0142	0.229***	-0.027	
	(0.0831)	(0.0576)	(0.0802)	
Year dummies	YES	YES	YES	YES
_cons	-46.36***	-18.03	-30.00*	-5.732
	(11.54)	(32.2)	(15.66)	(22.16)
F-statistics testing coefficients on year dummies (p-value)	2.11 (0.0234)	1.41 (0.1725)	1.48 (0.1451)	1.44 (0.1628)
N	381	381	381	381
adj. R-sq	0.885	0.759	0.902	0.431

Note: 1, Standard errors are given in parentheses under coefficients. 2, Individual coefficients are statistically significant at the *10% level, **5% level or ***1% level (two-side test). 3, The F-statistics test the joint hypothesis that coefficients on year dummies are all zero. P-values are given in parentheses under F-statistics.

Comparing the coefficients on welfare generosity index in case one and those on the total social protection expenditure as a percentage of GDP in case two, we may suspect that the insignificance of welfare benefits in those three specifications in case two might be ascribed to the alleged flaw of the total social protection expenditure as a percentage of GDP as a measure for welfare benefits. The possible negative correlation of this measure with the macroeconomic environment, instigated by the positive relationship between macroeconomic environment and migration flow, may blur the true effect of welfare benefits on migration flow. Referring back to the case regarding the behavior pattern in the second period in model 5-8, we might get another support for this suspicion. The two positive coefficients on welfare benefits represented by the total social protection expenditure as a percentage of GDP in model 5 and model 7, indicating that welfare benefits elicit migration flow in general and that migrants are attracted to place with higher welfare benefits in the second period, contradict the negative coefficient in model 6, which implies that migrants tend to migrate less if the welfare benefits in destination places increase. This contradiction might find its root in the interaction between the total social protection expenditure and the macroeconomic stances which does not necessarily have something to do with welfare benefits per ce. It is possible that migrants do deem higher welfare benefits as attractive, and that the reason why they migrate less when the total social protection expenditure is higher is that they are discouraged by the deteriorated economic situation which most likely gives rise to the increase in the total social protection expenditure.

However, considering the fact that the effects of welfare benefits captured by those two measures respectively seem to complement each other, we may not stand in the position to draw any conclusion regarding which measure is superior. And one reason for this is that those two measures both may fall into another pitfall. It is widely admitted that countries that are generous in welfare benefits usually are reluctant to have influx of migrants. The thereby devised unfavorable policies and practices of migration control which stems from this reluctance may dampen the migration flow. Hence, on the one hand, higher welfare benefits may elicit migration; on the other hand, higher welfare benefits may often get associated with stricter migration control and thus hamper migration at the same time. The fact that neither of these two measure can filter the second auxiliary effect through the impact of policy and practices away from the first genuine effect of welfare benefits may render that drawing any firm conclusion regarding the effect of welfare benefits on migration flow

based on the results of regressions employing those two measures as the indicator might appear indiscreet.

Notwithstanding, considering that there is yet no widely-agreed better measure of welfare benefits, we may combine the coefficients regarding welfare benefits in those two cases together and argue that as far as the migration flow from 12 “east” countries into 12 “west” countries (which do not include Greece, Portugal and Spain) between 1992-2003 is concerned, there is a high possibility that welfare benefits impose a positive impact on migration flow. In other words, in our present context, welfare benefits may constitute magnets, in that migrants are attracted to places with higher welfare benefits and tend to migrate more when welfare benefits in those places grow.

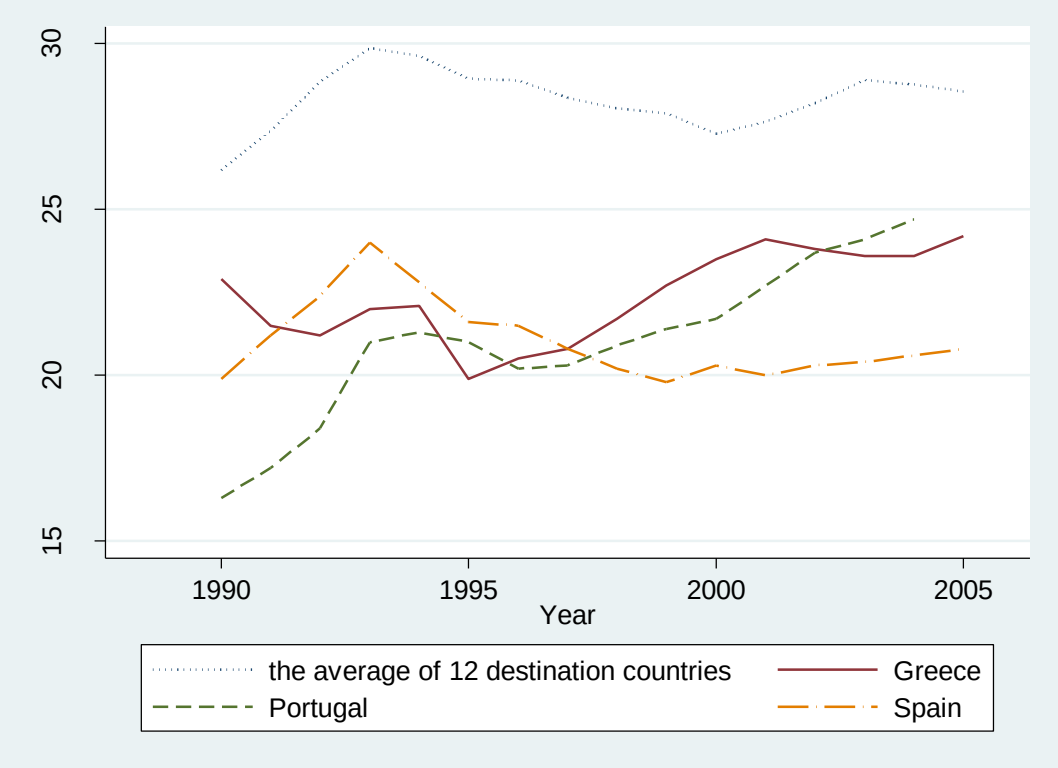
5.4 The role of outliers

From the case two in section 5.3, we find that migrants are attracted to places with higher welfare benefits. Yet in model 3 where the model setting is almost the same and where the same measure of welfare benefits is employed, we pin down a reverse result. Even if one argues that model 15 is based on the period of 1992-2003 and that the positive effect of welfare benefits on the destination choice of migrants might only finds in that period, then model 7 with break and break interactions yields that in the first period, which is literally 1992-2003, welfare benefits affect the destination choice of migrants negatively. Therefore, we are obliged to examine whether it is the exclusion of Greece, Portugal and Spain in model 15 that creates this puzzle. Hence, we run through the regressions in model 1-4 and model 5-8 again on the data set where those three countries are gleaned out and the regressions in model 12-16 again with those three countries included.

The results are reported in Table 5-6, Table 5-7 and Table 5-8 respectively. Like the case in model 1-4, the coefficients on welfare benefits, as is measured by the total social protection expenditure as a percentage of GDP, yielded from the pooled regression and from the regression controlled for the fixed effect of source country stand statistically significant. Yet, now we have positive signs instead. Welfare benefits in destination country elicit migration flow, with a 1% increase in the total social protection expenditure in terms of GDP associated with a 0.7% increase in the rate of migration flow in general. Would-be migrants tend to choose those places with higher welfare benefits. With other factors unchanged,

given a specific source country, a 1% increase in the total social protection expenditure in terms of GDP in destination will bring about a 0.9% increase in the rate of migration flow from that source country. Likewise, the positive coefficient on welfare benefits in model 15 turns negative in model 27 where we include those three countries. These results to a certain extent confirm our suspicion that it's those three outliers that blur the interaction between welfare benefits and migration flow and distort the regression result. One reason for the trick of those three outliers might be that due to certain historical relations or because of the relative loose migration control, the latter of which those three outliers have certain reputation in, would-be migrants tend to move to these three countries, even though the welfare benefits there are not so generous (see Figure 5-1). Hence, while a large part of migrants do flow into places with better welfare benefits, another portion of migrants come to those three countries with relatively lower welfare benefits. The true mechanism between welfare benefits and migration flow is thereby disguised.

Figure 5-1: Total social protection expenditure as a percentage of GDP, Greece, Portugal and Spain versus the rest 12 destination countries, 1990-2005



Source: Compiled from Eurostat.

Table 5-6: Regression results from models with year dummies for 1992-2006 and without Greece, Portugal and Spain

Dependent variable: The rate of migration flow (logarithm)	Model 17 pooled OLS	Model 18 fixed effect, destination	Model 19 fixed effect, source	Model 20 fixed effect, both
GDP per capita source	-0.199***	-0.279***	0.738*	0.334
(logarithm, lagged)	(0.0716)	(0.0614)	(0.396)	(0.34)
GDP per capita destination	2.648***	4.507***	2.898***	5.783***
(logarithm, lagged)	(0.656)	(1.631)	(0.659)	(1.381)
Unemployment rate source	0.272***	0.316***	0.239	0.428***
(logarithm, lagged)	(0.0679	(0.0605)	(0.146)	(0.109)
Unemployment rate destination	-0.0583	0.232	-0.00641	0.314*
(logarithm, lagged)	(0.121)	(0.188)	(0.119)	(0.168)
Social protection expenditure,% of GDP	0.662*	-0.868	0.872**	0.602
(logarithm, lagged)	(0.395)	(1.051)	(0.392)	(0.812)
Stock of foreign population	0.691***	0.601***	0.671***	0.529***
(logarithm, lagged)	(0.0321)	(0.0312)	(0.0436)	(0.0996)
Labor force source	-0.678***	-0.651***	-0.285	-0.467
(logarithm, lagged)	(0.0409)	(0.0391)	(0.824)	(0.605)
Labor force destination	0.621***	-0.737	0.651***	1.106
(logarithm, lagged)	(0.058)	(1.606)	(0.0678)	(1.439)
GDP growth rate source	-0.0273	-0.0288	-0.0175	0.0247
(logarithm, lagged)	(0.07)	(0.0659)	(0.0705)	(0.0458)
GDP growth rate destination	-0.0458	-0.00782	-0.0422	-0.0163
(logarithm, lagged)	(0.049)	(0.0517)	(0.0468)	(0.0411)
Per capita GDP growth rate source	0.00509***	0.00543***	-0.000638	-0.00146
(squared, lagged)	(0.00155)	(0.00146)	(0.00175)	(0.00109)
Per capita GDP growth rate destination	-0.00199	0.00555	-0.00221	0.00492
(squared, lagged)	(0.00748)	(0.00714)	(0.00719)	(0.00481)
Distance	-0.402***	-0.408***	-0.510***	
(logarithm)	(0.0586)	(0.0531)	(0.0806)	
Common border	0.102	-0.0805	0.0529	
(dummy)	(0.122)	(0.131)	(0.126)	
Similarity of languages	0.0302	0.180***	0.0334	
	(0.052)	(0.0437)	(0.0516)	
Year dummies	YES	YES	YES	YES
_cons	-37.52***	-39.1	-51.52***	-80.67***
	(7.782)	(26.1)	(10.03)	(23.77)
F-statistics testing coefficients on year dummies (p-value)	2.99 (0.0003)	2.02 (0.0177)	3.08 (0.0002)	2.99 (0.0003)
N	590	590	590	590
adj. R-sq	0.892	0.788	0.899	0.531

Note: 1, Standard errors are given in parentheses under coefficients. 2, Individual coefficients are statistically significant at the *10% level, **5% level or ***1% level (two-side test). 3, The F-statistics test the joint hypothesis that coefficients on year dummies are all zero. P-values are given in parentheses under F-statistics.

Table 5-7: Regression results from models with break and break interactions during 1992-2006 and without Greece, Portugal and Spain

Dependent variable: The rate of migration flow (logarithm)	Model 21 pooled OLS	Model 222 fixed effect, destination	Model 23 fixed effect, source	Model 24 fixed effect, both
GDP per capita source	-0.199**	-0.256***	-0.919***	-0.543
(logarithm, lagged)	(0.0821)	(0.071)	(0.31)	(0.336)
GDP per capita destination	1.616***	2.440***	1.887***	2.275***
(logarithm, lagged)	(0.381)	(0.381)	(0.609)	(0.602)
Unemployment rate source	0.211**	0.253***	-0.0333	0.127
(logarithm, lagged)	(0.0851)	(0.0736)	(0.156)	(0.111)
Unemployment rate destination	-0.222**	0.144	-0.225**	-0.0962
(logarithm, lagged)	(0.096)	(0.136)	(0.112)	(0.111)
Social protection expenditure,% of GDP	0.226	-1.163	0.218	-0.428
(logarithm, lagged)	(0.399)	(0.788)	(0.401)	(0.536)
Stock of foreign population	0.725***	0.602***	0.688***	0.475***
(logarithm, lagged)	(0.0386)	(0.0364)	(0.0454)	(0.0822)
Labor force source	-0.705***	-0.667***	-1.367	-1.251**
(logarithm, lagged)	(0.0554)	(0.0502)	(0.905)	(0.629)
Labor force destination	0.573***	-1.997	0.629***	-2.440*
(logarithm, lagged)	(0.0651)	(1.609)	(0.0682)	(1.391)
GDP growth rate source	-0.0856	-0.13	-0.0714	-0.0351
(logarithm, lagged)	(0.104)	(0.0856)	(0.1)	(0.063)
GDP growth rate destination	0.0653	-0.0125	0.0444	-0.0372
(logarithm, lagged)	(0.0463)	(0.0463)	(0.0449)	(0.0403)
Per capita GDP growth rate source	0.00517**	0.00650***	-0.000627	-0.000348
(squared, lagged)	(0.00231)	(0.00189)	(0.00207)	(0.00122)
Per capita GDP growth rate destination	-0.00102	0.00293	0.000395	0.0025
(squared, lagged)	(0.00656)	(0.00583)	(0.00629)	(0.00423)
Distance	-0.365***	-0.401***	-0.561***	
(logarithm)	(0.0768)	(0.0637)	(0.0962)	
Common border	0.091	-0.056	-0.029	
(dummy)	(0.16)	(0.179)	(0.148)	
Similarity of languages	-0.00338	0.152**	-0.0297	
	(0.0714)	(0.0592)	(0.0674)	
BREAK	-3.218	13.24	-10.78	-11.08
(dummy)	(10.52)	(11.82)	(11.61)	(10.19)
Break interactions				
*GDP per capita source	-1.381***	-1.676***	-0.830*	-0.453
	(0.428)	(0.449)	(0.467)	(0.362)
*GDP per capita destination	1.221	0.268	1.272	1.425*
	(0.986)	(1.049)	(1.044)	(0.864)

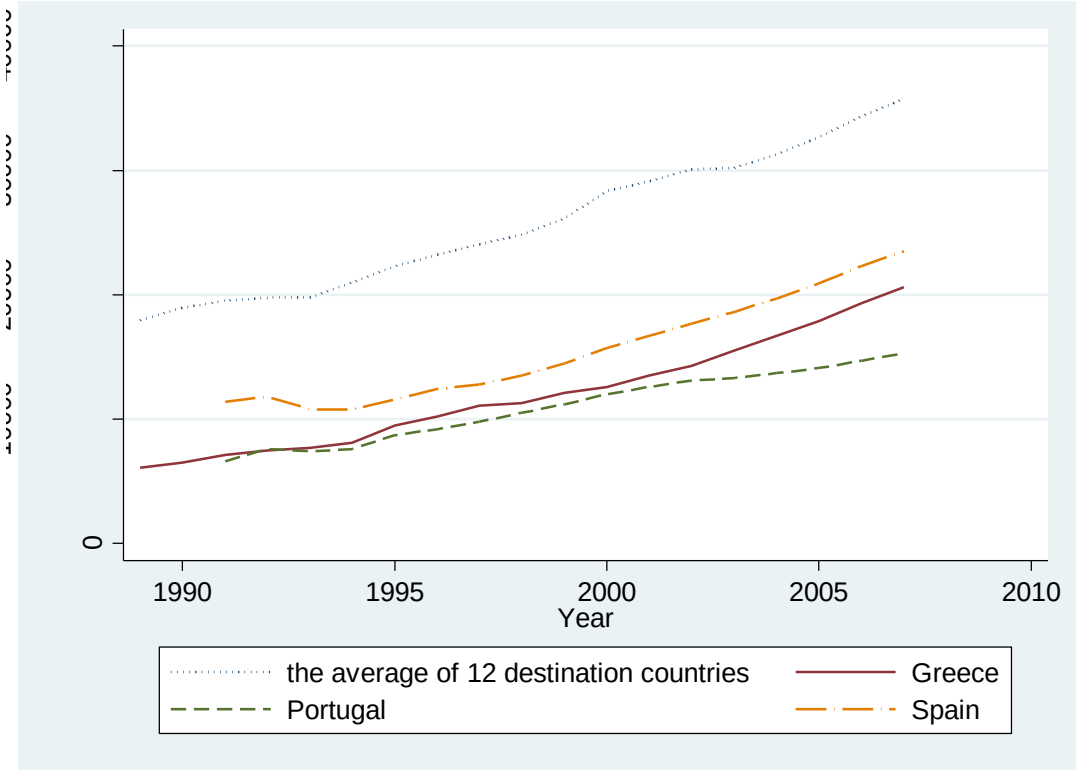
*unemployment rate source	-0.145	-0.329*	0.11	0.263*
	(0.18)	(0.176)	(0.215)	(0.154)
*unemployment rate destination	0.311	-0.167	0.444**	-0.29
	(0.209)	(0.237)	(0.203)	(0.247)
*social protection expenditure,% of GDP	0.453	-0.0759	0.682	0.21
	(0.775)	(0.863)	(0.753)	(0.799)
*stock of foreign population	-0.0984	-0.0169	-0.0637	0.0238
	(0.0727)	(0.0696)	(0.0741)	(0.0312)
*labor force source	0.0622	0.0686	0.0816	0.0487
	(0.0887)	(0.0854)	(0.0888)	(0.0462)
*labor force destination	0.185	0.0635	0.148	-0.0145
	(0.125)	(0.132)	(0.124)	(0.105)
*GDP growth rate source	0.168	0.193	0.111	0.00587
	(0.144)	(0.134)	(0.146)	(0.0987)
*GDP growth rate destination	-0.219*	0.0455	-0.17	0.0794
	(0.119)	(0.13)	(0.117)	(0.127)
*per capita GDP growth rate source	-0.00336	-0.00557*	0.00119	-0.00263
	(0.00321)	(0.00313)	(0.00292)	(0.00231)
*per capita GDP growth rate destination	0.00959	0.015	0.00237	0.00832
	(0.0188)	(0.0191)	(0.0186)	(0.0163)
*distance	0.0636	0.108	0.266**	
	(0.131)	(0.125)	(0.132)	
*common border	0.421*	0.255	0.632***	
	(0.245)	(0.244)	(0.221)	
*similarity of languages	0.11	0.117	0.144*	
	(0.0871)	(0.086)	(0.0823)	
_cons	-24.52***	-6.42	-14.44	4.072
	(5.017)	(12.7)	(11.99)	(14.09)
N	590	590	590	590
adj. R-sq	0.892	0.794	0.902	0.591

Note: 1, Standard errors are given in parentheses under coefficients. 2, Individual coefficients are statistically significant at the *10% level, **5% level or ***1% level (two-side test). 3, In the group of break interactions, *GDP per capita source denotes the interaction term between BREAK and GDP per capita in source country, and so forth.

It is interesting to note that the inclusion of those three outliers not only makes a difference in the manifested effect of welfare benefit, but also in the manifested impact of GDP per capita in destination country. From model 19, the full model with year dummies, model 23, the model with break and break interactions, and model 27, the limited model with year dummies, we can see that after the exclusion of Greece, Portugal and Spain, GDP per capita in destination country begins to matter in the destination choice of migrants. Migrants do tend to be attracted to places with better income or wages. And we suspect again that this is

due to the fact that those three countries, though with relatively lower income or wages, stand attractive to migrants for historical reasons, policy and practices and so forth (see Figure 5-2). This thereby generated migration flow coexists with other migration flows that follow the more reasonable and rational direction into places with better economic stances and may mess up the manifested interaction between migration flow and GDP per capita in destination country.

Figure 5-2: GDP per capita, Greece, Portugal and Spain versus the rest 12 destination countries, 1989-2007



Source: Compiled from Eurostat.

In short, if we have to draw a preliminary conclusion regarding the effect of welfare benefits on migration flow at this point, we can at least claim there probably exists welfare magnets, since after the inclusion of those three countries, which are suspected of stirring up the true mechanism, regression results from most of the specifications indicate a positive impact of welfare benefits on migration flow. However, considering that the role of welfare benefits in migration flow can be so easily disguised or distorted, as in the case where several "not-so-properly-behaved" countries are included, we are to a certain extent prone to believe the

effect of welfare magnets is at least not robust, which we figure is also denoted by the insignificant coefficients in model 21-24. In other words, we hold that welfare benefits do affect migration flow positively, yet the influence is not robust, so that in some cases it may yield to the impact of other more important factors and hence become more obscure.

Table 5-8: Regression results from models with year dummies for 1992-2003 and with Greece, Portugal and Spain

Dependent variable: The rate of migration flow (logarithm)	Model 25 pooled OLS	Model 26 fixed effect, destination	Model 27 fixed effect, source	Model 28 fixed effect, both
GDP per capita source	-0.254**	-0.282***	-1.159*	-1.401*
(logarithm, lagged)	(0.101)	(0.091)	(0.647)	(0.753)
GDP per capita destination	-0.0889	0.725	0.135	2.938
(logarithm, lagged)	(0.775)	(1.83)	(0.74)	(1.939)
Unemployment rate source	0.132	0.190**	-0.297	-0.0684
(logarithm, lagged)	(0.0988)	(0.0894)	(0.219)	(0.177)
Unemployment rate destination	-0.459***	-0.128	-0.434***	-0.390*
(logarithm, lagged)	(0.16	(0.23	(0.152	(0.2
Social protection expenditure,% of GDP	-1.637***	-1.644	-1.587***	0.436
(logarithm, lagged)	(0.474)	(1.25)	(0.425)	(0.892)
Stock of foreign population	0.824***	0.656***	0.856***	0.563**
(logarithm, lagged)	(0.0486)	(0.0538)	(0.0618)	(0.286)
Labor force source	-0.784***	-0.715***	-3.064**	-2.842**
(logarithm, lagged)	(0.0611)	(0.0601)	(1.508)	(1.151)
Labor force destination	0.407***	0.683	0.380***	0.908
(logarithm, lagged)	(0.0726)	(2.895)	(0.0789)	(2.115)
GDP growth rate source	-0.231*	-0.244**	-0.183	-0.129*
(logarithm, lagged)	(0.12)	(0.106)	(0.117)	(0.0767)
GDP growth rate destination	0.067	0.0319	0.0836	0.0644
(logarithm, lagged)	(0.0589)	(0.0611)	(0.0551)	(0.0502)
Per capita GDP growth rate source	0.00795***	0.00953***	0.000679	-0.000586
(squared, lagged)	(0.00295)	(0.00257)	(0.00287)	(0.00194)
Per capita GDP growth rate destination	-0.0068	0.00387	-0.00499	0.00503
(squared, lagged)	(0.00856)	(0.0078)	(0.00832)	(0.00464)
Distance	-0.196**	-0.302***	-0.271**	
(logarithm)	(0.087)	(0.0774)	(0.113)	
Common border	0.168	-0.116	-0.0398	
(dummy)	(0.181)	(0.184)	(0.166)	
Similarity of languages	0.0333	0.201***	-0.00678	
	(0.0796)	(0.0689)	(0.0758)	
Year dummies	YES	YES	YES	YES
_cons	2.322	-9.325	28.40*	-12.44
	(9.347)	(38.06)	(15.46)	(27.74)
F-statistics testing coefficients on year dummies (p-value)	2.33 (0.0088)	1.14 (0.3314)	0.82 (0.6198)	1.61 (0.0934)
N	450	450	450	450
adj. R-sq	0.857	0.701	0.875	0.454

Note: 1, Standard errors are given in parentheses under coefficients. 2, Individual coefficients are statistically significant at the *10% level, **5% level or ***1% level (two-side test). 3, The F-statistics test the joint hypothesis that coefficients on year dummies are all zero. P-values are given in parentheses under F-statistics.

6. Conclusion

Migration is unanimously believed to be triggered by regional difference. This regional difference may spread itself over economy (for example, income and employment opportunity), welfare benefits, culture, and so forth. Yet the literature of migration research concentrates mostly on the regional difference in economy, with the effect of welfare benefits on migration failing to draw its due attention. While being relatively more frequently discussed in the context of the internal American migration, the role of welfare benefits is nearly absent from the mainstream discussion on migration in the context of intra-European migration.

To confront this black hole, this paper probed into the impact of welfare benefits on the east-west internal European migration. Based on the existing theoretical discussions, we presented a migration model where welfare benefit stands amongst the key factors. Combining this with the compiled data from Eurostat, OECD and World Bank WDI, we conducted an empirical analysis afterwards on the migration flow from 12 "east" countries to 15 "west" countries during the period of 1992-2006. Limited by the availability of related data, we only examined the effect of the welfare benefits offered in the "west" countries on the migration flow in discussion.

We conducted four groups of regressions on the data set. Results from the first group, the full models with year dummies, yielded that surprisingly the welfare benefits in destination country, as is measured by the total social protection expenditure as a percentage of GDP, affect migration flow negatively. Welfare benefits discourage migration flow in general and migrants tend to be attracted to places with lower welfare benefits. This surprising result coincided with the outcome regarding the behavior pattern in the first period from the second group of regressions that include break and break interactions. Yet, interestingly, it was revealed that in the second period welfare benefits represented by the total social protection expenditure as a percentage of GDP do have an expected eliciting power in migration flow and that migrants now are driven to places with higher welfare benefits instead. Despite this one step closer to the commonsense belief regarding the effect of welfare benefits,

throughout the two periods, migrants keep migrating less when the welfare benefits represented by the total social protection expenditure as a percentage of GDP in those destination place increase.

Puzzled by those contradictory and bewildering results from the first two groups of regressions, we began to wonder whether we had employed an unsatisfactory measure for welfare benefits. Hence, we tried another measure, welfare generosity index, to calibrate for welfare benefits, and carried out the third group of regressions comparing those two measures on the data set for the period 1992-2003 and with Greece, Portugal and Spain for which the welfare generosity index is not available excluded. These regressions pined down to a certain extent a positive impact of welfare benefits on migration flow instead. Welfare benefits induce migration flow; migrants flow into places with higher welfare benefits and migrate more if the welfare benefits in those places grow. As to the issue of measures, we found certain evidence for that welfare generosity index is a better measure for welfare benefits than the total social protection expenditure as a percentage of GDP in that the latter often gets intertwined with economic stances. Yet, we still suspected that welfare generosity index can not constitute a very good measure for welfare benefits either, since, together with the total social protection expenditure as a percentage of GDP, it also can not manage to filter out the effect of policies and practices that are related to welfare regime design.

To be more prudent, we further looked into whether it's the exclusion of Greece, Portugal and Spain that gives rise to the more reasonable results in the third group of regressions. Hence, we ran the first two groups of regressions again with those three countries excluded from the data set, and model 12-16 again with those three countries included. The regression results confirmed our suspicion. With the exclusion of Greece, Portugal and Spain, most of the specifications pined down a positive effect of welfare benefits in destination country on migration flow, even if we still employed the total social protection expenditure in terms of GDP as the measure. We thereby argued that welfare benefits in destination country probably impose a positive impact on migration flow, yet its influence, judging from the fact that it is prone to be disguised or distorted, is not robust.

In short, we can draw the following three conclusions. 1) There exist so-called welfare magnets in the context of east-west internal European migration flow. Welfare benefits induce migration flow in general. Migrants move to places with higher welfare benefits and

might tend to migrate more if the welfare benefits in those destination countries increase. 2) Yet, the effect of this welfare magnet is not robust, since its coefficient in our regressions is in general quite sensitive to the specification and the choice of countries that we include in discussion. 3) Generally speaking, after the change in migration regime, i.e. the accession, the role of welfare benefits begins to have a bigger play. The reason for this might be that with the lift-up of barriers and hence smaller attention thereto from migrants, the realized migration flow starts to reflect the individuals' incentive or rational behavior more genuinely. Hence, migrants' preference regarding welfare benefits in destination country comes one step forward in the spotlight. However, we would like to stress that due to the unsatisfactoriness regarding the quality of those two measures as the indicator for welfare benefits which we discussed in section 5.3 and summed up earlier in this chapter, the conclusion that we draw above based on the regressions using those two measures might not be able to stand on a very firm ground.

As to the effects of other variables in the context where the impact of welfare benefits is considered, we can make the following claims. 1) Economic variables have a relatively big role in the context of east-west internal European migration flow. People move to places where there find bigger employment opportunity and better expected income, i.e. higher income or wages or lower unemployment rate. 2) Migration network prompts migration flow. Migrants tend to consider the role of network during migration decision and prefer those places with higher stock of their folk people. 3) Costs and risks rendered by distance, information and language affect migration flow negatively. 4) Change in migration regime, which is more often closely related to the presence or absence of barriers incurred by political factors such as policies, influences migration flow both in absolute terms and with respect to its behavior pattern. Generally speaking, the lift-up of barriers not only reduces migration, but also renders that the realized migration flow reflects the individuals' rational choice or behavior more genuinely.

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