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Abstract:

According to the "welfare magnet" hypothesis, migrants with a high likelihood of claiming benefits cluster in the most generous welfare systems. After the introduction of the freedom of movement for Eastern European workers, EU-15 countries can thus be expected to reduce public benefits in order to avoid becoming "welfare magnets". However, OECD data on benefits do not support the prediction of a race to the bottom in protection levels. Using data from the EU-LFS 2004 to 2011, I analyze the determinants of migration flows and find that, in contrast to theory, welfare state variables do not significantly affect migration flows when controlling for temporary political restrictions of the freedom of movement (*2+3+2 rule*). This explains why the pressure to modify national welfare spending is small. Furthermore, evidence is found that the restrictions completely offset the incentive effects of work-related pull factors and thereby hamper an efficient allocation of labor across national borders.

Keywords: Determinants of migration flows, EU enlargement, "welfare magnet"
JEL classification: F2, H2, J2, J5, J6

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1. Introduction

In December 2002, the European Council voted in favor of enlarging the EU by an additional 10 countries. The decision was approved by the EU parliament in April 2003. On the 1st of May 2004, these 10 countries, mainly situated in Eastern Europe (EU-10)[1], joined the Union. On the 1st of January 2007, Bulgaria and Romania (EU-2) followed. Together, this round of enlargement increased the size of the EU population from approximately 400 million to 500 million citizens (Eurostat, 2013). A central institutional change connected to the acceptance of the new member states in the European "club" was the introduction of the freedom of movement for workers. According to this legislation, every citizen in the EU can start working in another EU country without the need for a work permit. For potential migrant workers, this regulation significantly reduces the cost of moving abroad.

Within a common labor market, the size and composition of migration flows are not determined by the decisions of local immigration officers, but by the aggregate of individual migration decisions in the source regions. Thus, national governments partly delegate their sovereignty of determining the size and composition of the population to millions of potential migrant workers who can freely decide where to settle. Since the standard of living in the new member states was well below the average level in the old EU-15 member states[2] at the time the legislation was brought into force, the accession initiated a debate about the sustainability of the welfare state.

Sinn (2002) warned that the introduction of the freedom of movement for workers in combination with access to public benefits in the EU-15 would result in an erosion of protection levels. According to his reasoning, national governments could be expected to avoid inflows of migrants claiming welfare by reducing the generosity of benefits. A race to the bottom dynamic in the EU-15 could thus cause an erosive process. Kvist (2004) drew less drastic conclusions by arguing that the effects of "welfare migration" are too small to directly affect the decision making process on the national level. However, he also considered that governments in the EU-15 might engage in strategic interactions with respect to decisions on national social policies.

Certainly also as a result of these political controversies, the so-called *2+3+2 rule* found its way into the accession treaties. This rule concedes EU member states the right to postpone the realization of the freedom of movement for workers for up to 7 years after the accession. It applies to workers from the EU-8[3] and the EU-2 member states. With respect to workers from the EU-8, only Ireland, Sweden and the UK lifted restrictions immediately in May 2004. In contrast, Austria and Germany kept restricting the freedom of movement until the end of the

[1] EU-10: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia.

[2] EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden, United Kingdom.

[3] EU-8: EU-10 without Cyprus and Malta.

2+3+2 phase in May 2011. In January 2007, Finland and Sweden lifted restrictions for workers from the EU-2 while the other EU-15 countries kept their labor markets closed. In Spain, restrictions for workers from the EU-2 were lifted in January 2009 and partly reintroduced in July 2011. This exceptional step was justified by the extraordinarily difficult situation on the labor market and was not applied in any other EU-15 country. In summary, the option of applying the *2+3+2 rule* led to a very asymmetric opening of the labor markets in the EU-15 towards the East.

Ultimately, national decision makers in EU-15 countries were endowed with two policy instruments to potentially influence the inflow of workers: the generosity of the welfare state and the postponement of the labor market opening through the *2+3+2 rule*. The main goal of this study is to analyze how these political decisions influence the migration flows to the EU-15. How relevant is the "welfare magnet" effect in the EU-15? How did the "welfare magnet" effect interact with the application of the *2+3+2 rule*? Did a race to the bottom in the generosity of welfare states take place?

In a first step, I present the strategic instruments of the national policy makers in a stylized way. I illustrate the development of the welfare state in the different EU member states in the aftermath of the 2002 decision in Copenhagen. Several indicators characterizing welfare state generosity like the ratio of social expenditures to the GDP level, the social expenditures per capita and the net replacement rate that defines the out-of-work benefit level are described. In addition, the asymmetric application of the *2+3+2 rule* in the different countries is discussed. Secondly, an analysis of the effects of the policies in the EU-15 member states on the immigration flows is pursued. Using micro data from the EU Labor Force Survey (EU-LFS), I estimate the effects of a rich set of determinants that influence the individual migration decision and thus the migrant inflow to a destination country in the EU-15. The use of micro data allows for the inclusion of socio-economic characteristics as controls in the analysis.

A special focus is put on the "welfare magnet" effect since the significance and strength of this effect determines the magnitude of clustering in generous welfare states. The stronger the effect is the more intense should be the interaction of national governments in reducing social expenditures. As micro data from the EU-LFS are used, some light is shed on the effect of the composition of the diaspora and the source population on the migration flows. Information on socio-economic characteristics of the surveyed is included in the regressions which allows for a deeper analysis of the network relationship of the sending and receiving country.

The temporary restrictions on the freedom of movement are modeled as a migration regime that influences the marginal effects of the push and pull factor dynamics in the EU. Hence, the *2+3+2 rule* is considered as covariate in the regression. Furthermore, interaction terms with push and pull factors are constructed in order to control for the effect of restricted labor market access on the marginal effects of the determinants. In the empirical strategy, I thereby incorporate the implications of the recent findings by Razin and Wahba (2011) who argue that

empirical economists produce seriously flawed results by neglecting the effects of institutionally restricted labor mobility.

The paper is structured as follows. Section 2 gives an overview of the literature on "welfare migration" and the effects of networks and institutional restrictions on individual migration decisions. In Section 3, I present some stylized facts about the potential race to the bottom dynamics in the EU-15 after the enlargement decision of Copenhagen in 2002. The development of the welfare state generosity and the asymmetric application of the restrictions on the freedom of movement are shown and discussed as strategic instruments of national policy makers. Section 4 presents the data and a descriptive analysis of migration flows from the EU-10 and EU-2 member states. Section 5 is devoted to the empirical analysis of the determinants of migration flows using the EU-LFS and to the discussion of the major findings. Furthermore, I present results from a sensitivity analysis which includes alternative concepts of welfare state generosity and a comparison of the results with the previous findings. The last section concludes.

2. Literature review: "Welfare magnets" and the individual migration decision

The direction, size and composition of international migration flows are functions of the aggregate of millions of individual migration and remigration decisions. In turn, these decisions are determined by a rich variety of country- and individual-specific factors.[4] Zimmermann (1995) describes these individual choices as best answers to a complex system of push and pull factors. Pull factors are defined as determinants of a country that "pull" migrant flows into this specific destination, while push factors are conditions that describe the situation in the source countries potentially "pushing" people to emigrate. The push and pull factors span a net of migration incentives that determines the allocation of mobile labor across borders. Since the size and composition of migration inflows matter for the economic outcomes in the destination country, policy makers have a natural interest in the determinants of these decisions and the international structure of migration incentives.

Initially, the discussion of welfare state generosity as a pull factor goes back to the Roy model (Roy, 1951) that is applied to the case of migration decisions by Borjas (1994). It is usually referred to the Roy-Borjas model in the literature.[5] The central result of the model is that the self-selection of immigrants depends on wage dispersion in the source and destination country. Under the assumption that the skill rewards in both, destination and source country, are highly correlated, immigrants are positively selected if wage dispersion is higher in the destination than in the source country and negatively selected in the opposite case. According to this theory, immigrants, for example, from source countries in Eastern Europe in EU-15

[4] See Mayda (2010) and Zaiceva and Zimmermann (2008) for an overview.

[5] See Nannestad (2007) for a detailed discussion.

destination countries should be negatively selected as Western European welfare states are usually characterized by a smaller degree of wage dispersion than Eastern European economies.

Based on the implications of the theoretical model, Borjas (1999) develops the "welfare magnet" hypothesis. It consists of two parts: (1) states with high levels of social security attract more migrants in general (better insurance of unemployment risks as a pull factor) and (2) immigrant flows to these states are characterized by an over-proportionately high share of low-skilled migrants (negative selection). The first part addresses the issue of selection across alternative destinations while the second addresses the selection within the immigration flows. Borjas (1999) tests whether the hypothesis is supported by data on the patterns of immigration to US states. He finds empirical evidence that, relative to natives, benefit receiving immigrants to the US cluster in states where benefit levels are high. The native-immigrant gap is explained by the differences in migration costs. For immigrants, migration costs arise when they move to the US while the choice of a particular state does not result in additional costs. For natives, the move to another state induces costs which prevent them choosing the state with the highest benefit level.

However, several economists have challenged these findings. Kaushal (2005) does not find evidence that immigrants cluster in US states that are characterized by a high level of benefits. She shows that access to TANF, Medicaid and food stamps (means-tested programs) does not or only weakly change the location choice of low-skilled unmarried immigrant women. Since this is the group that is most likely to be dependent on welfare systems, she concludes that the "welfare magnet" hypothesis can be rejected. In her study, restrictions to welfare access are considered which is not done in previous analysis. Other authors argue that clustering of migrants is more likely caused by migrant network effects than by the welfare levels. Beine et al. (2011) use data of bilateral migration flows from 195 source to 30 OECD destination countries and find that the size of diasporas in destination countries have a positive effect on immigrant inflows and an adverse effect on the education level of the immigrants. In contrast, the benefit level does not appear to have a significant effect on the location choice across the countries.

Pedersen et al. (2008) analyze flows from 126 countries to 26 OECD destination countries. Their results are in line with the findings of Beine et al. (2011). While Beine et al. (2011) have information on the education level[6] of the surveyed and thus are able to directly test the effect of the welfare level on the skill composition of the flows, Pedersen et al. (2008) proxy the skill level by the GDP of the source country. The latter study finds weak evidence for a U-shaped relationship between the welfare level in the destination and the GDP per capita in the source. Migrants of relatively poor or of relatively rich countries in terms of GDP per capita

[6] They use the database by Docquier et al. (2007) which provides information on immigrant stocks in OECD countries by education level. The data are based on census and register data for the years 1990 and 2000.

are most attracted to destination countries with high benefit levels. The authors further conclude that a restrictive migration policy often prevents the adverse selection of migrants.

Empirical studies with a cross-country focus on Europe are relatively scarce. De Giorgi and Pellizzari (2009) analyze panel data from the European Community Household Panel (ECHP) and find a significant effect of the net replacement income[7] in the destination country on migration decisions. However, the effect is small compared to the incentive from a higher annual compensation of employees. In their study, a higher compensation has a 10 times larger effect on the likelihood of migrating to a destination than an increase in the net replacement income. Brücker et al. (2002) finds support for the thesis that welfare generosity implies negative sorting of migrants in Europe. The study shows that high-skilled migrants prefer countries with low benefits and taxes, while the low-skilled cluster in countries with a high benefit level.

However, since the EU-15 countries are conceded the right to temporarily restrict the freedom of movement it is difficult to clearly disentangle the "welfare magnet" effect from other institutional factors influencing migration flows. In a recent paper, Razin and Wahba (2011) provide an explanation why most empirical studies do not find evidence for the "welfare magnet" hypothesis. Introducing different migration regimes, they show why "welfare migration" should only prevail in common labor markets without mobility restrictions. It is argued that, for example, in the common EU labor market with free movement for workers the benefit level should act as a pull factor, while this need not be the case for countries with a migration regime that restricts the entry or the access to welfare for migrants. In their model, the effect of the welfare system on migration decisions is interacted with the migration regime in place. Consequently, Razin and Wahba (2011) point out that empirical analysis should carefully consider the differential effects of migration regimes on the validity of the "welfare migration" hypothesis.

To summarize the current state of research, two determinants besides the differences in the skill rewards should be named that "compete" for being the more important explanatory variable for migrant clustering: the network effect and the "welfare magnet". While some studies emphasize the clustering effect through networks (Beine et al., 2011; Kaushal, 2005; Pedersen et al., 2008), other authors point out the importance of the welfare level (Borjas, 1999; Brücker et al., 2002; De Giorgi and Pellizzari, 2009). However, these studies only partially control for the differential effect of migration regimes that might reduce or completely eliminate the marginal effects of the push and pull factors. Especially in the case of "welfare migration", this point should be stressed as many regimes explicitly restrict access

[7] The net replacement income is defined as the income that the government pays to an unemployed after the job loss. It is calculated as the product of the net replacement rate (NRR) and the regular income of the worker before unemployment.

to the welfare state. A further weakness of most studies[8] is the use of bilateral macro flow data that do not allow for the analysis of the composition of the diaspora and the population in the source region. Migrant stocks are treated as black boxes so that incentives due to socio-economic characteristics are to be ignored in the analysis.

3. Strategic interaction in the EU-15: Is there evidence for a race to the bottom?

According to the non-discrimination principle in the European treaties, every EU citizen can claim benefits in another EU member state after a short period of employment. Authors like Sinn (2002) and Kvist (2004) have thus warned that the EU enlargements in 2004 and 2007 might lead to a race to the bottom in welfare state protection.[9] In a common EU labor market, a reform of national welfare institutions does not only affect the economic outcomes via the local labor market but may also affect the migration incentives for potential workers from other EU countries as the attractiveness of a destination country changes *ceteris paribus*. A policy maker who wants to maximize the utility of a country or its electorate in the EU-15 therefore considers the effects of a parameter change on the individual migration likelihood of workers in the EU-10 or EU-2 countries.

Razin and Wahba (2011) emphasize that governments can reduce the pressure from potential "welfare migration" by introducing restrictions on labor mobility. In the case of the EU enlargements in 2004 and 2007, these restrictions are defined under the *2+3+2 rule*. The relevance of the pull effect of the welfare state generosity in an EU-15 member state thus depends on the level of the public benefits and the application of the *2+3+2 rule*. Both decisions at the national level potentially create policy externalities on other member states as migration flows to other destinations and their skill composition might be diverted as a result. But is there evidence for a race to the bottom after the decision in Copenhagen in 2002? Has the EU enlargement initiated strategic behavior between the different EU-15 countries?

Figure 1 below shows the development of the ratio of public social expenditures relative to the GDP level in the EU-15 member states after 2002. The year 2002 is chosen as a starting point since the decision to enlarge the EU took place in that year. Hence, potential adjustments of welfare states directly after the final enlargement decision are considered in the analysis. The measurement is normalized to 1 in each country for the reference year 2004.

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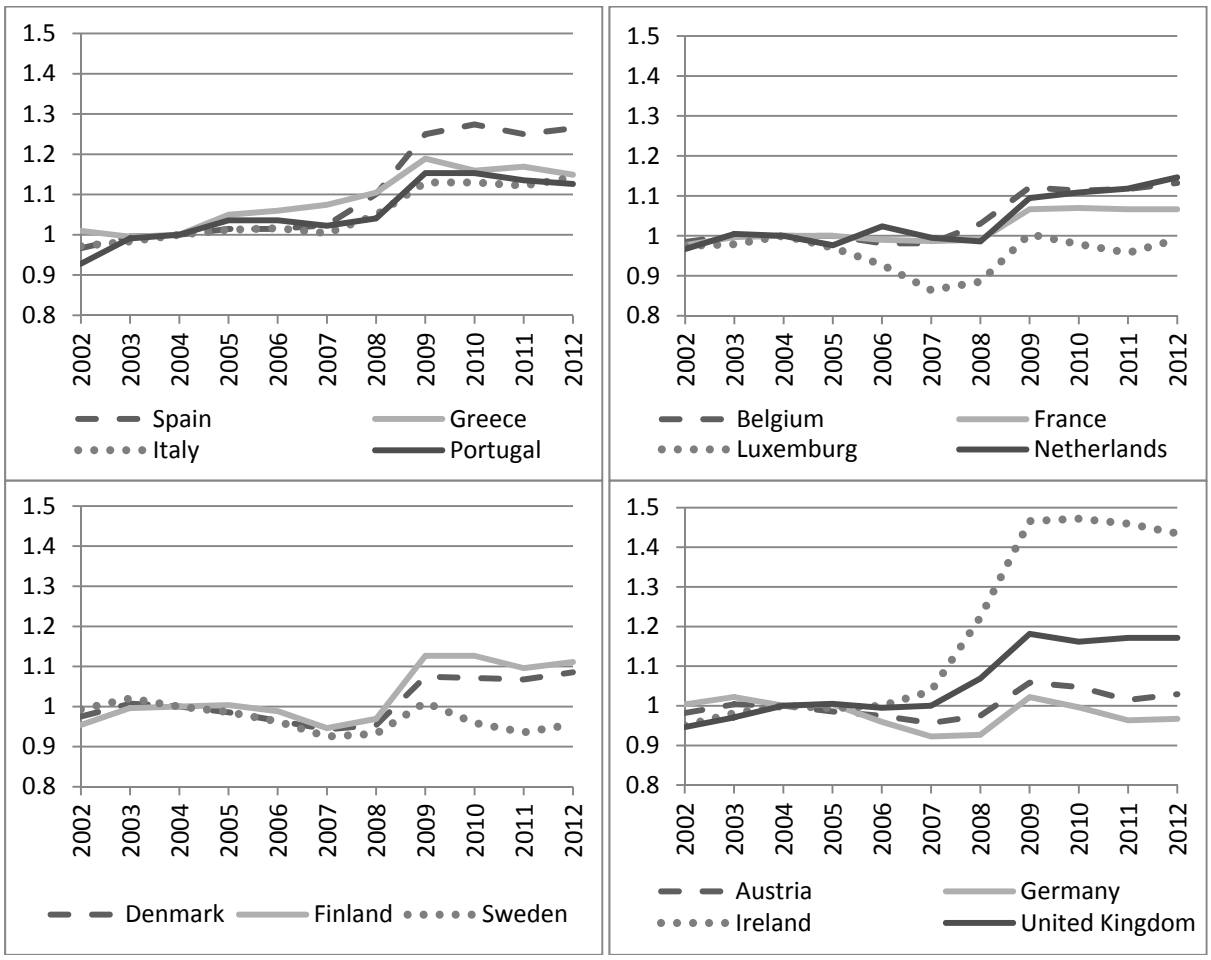
[8] To my knowledge, only De Giorgi and Pellizzari (2009) use micro data from the ECHP, while all other studies focusing on Europe are based on macro data from central registers or national census and treat the composition of the population in terms of socio-economic characteristics as a black box.

[9] Sinn (2002) argues in favor of the home country principle with respect to benefit claims. He prefers an opening of the labor markets under the condition that benefits are provided by the home countries of the migrants. This would allow reaping the benefits of labor mobility without the disadvantages of efficiency-distorting "welfare migration". By the combination of the freedom of movement for workers and the restricted access to benefits in the destination countries, migrants are expected to move in order to maximize the compensation of their labor endowment and not due to differentials in benefit levels.

Figure 1: Ratio of public social expenditures to GDP in the EU-15 countries, 2002 - 2012 (measurement normalized to 1 in 2004)



Source: OECD Social Expenditure Database (SOCX).

The numbers are based on detailed OECD data for 2002 to 2009 and projections of the aggregated spending for the years 2010 to 2012. Cash benefits and benefits in kind are included. Data are collected from the OECD Social Expenditure Database (SOCX).[10] For the countries in the South (Greece, Italy, Portugal and Spain), an upward trend in the relative importance of the social expenditures can be observed until 2009. From the year 2009 onwards, the ratios stay relatively constant despite the abolishment of restrictions towards workers from the EU-2 in Greece, Portugal and Spain. The ratios of Belgium, France and the Netherlands also show an upward trend during the portrayed period. In Luxemburg, the ratio declined from 2004 to 2007, but then returned back to the level of 2004 although the labor market restrictions for workers from the EU-8 were lifted in 2007.

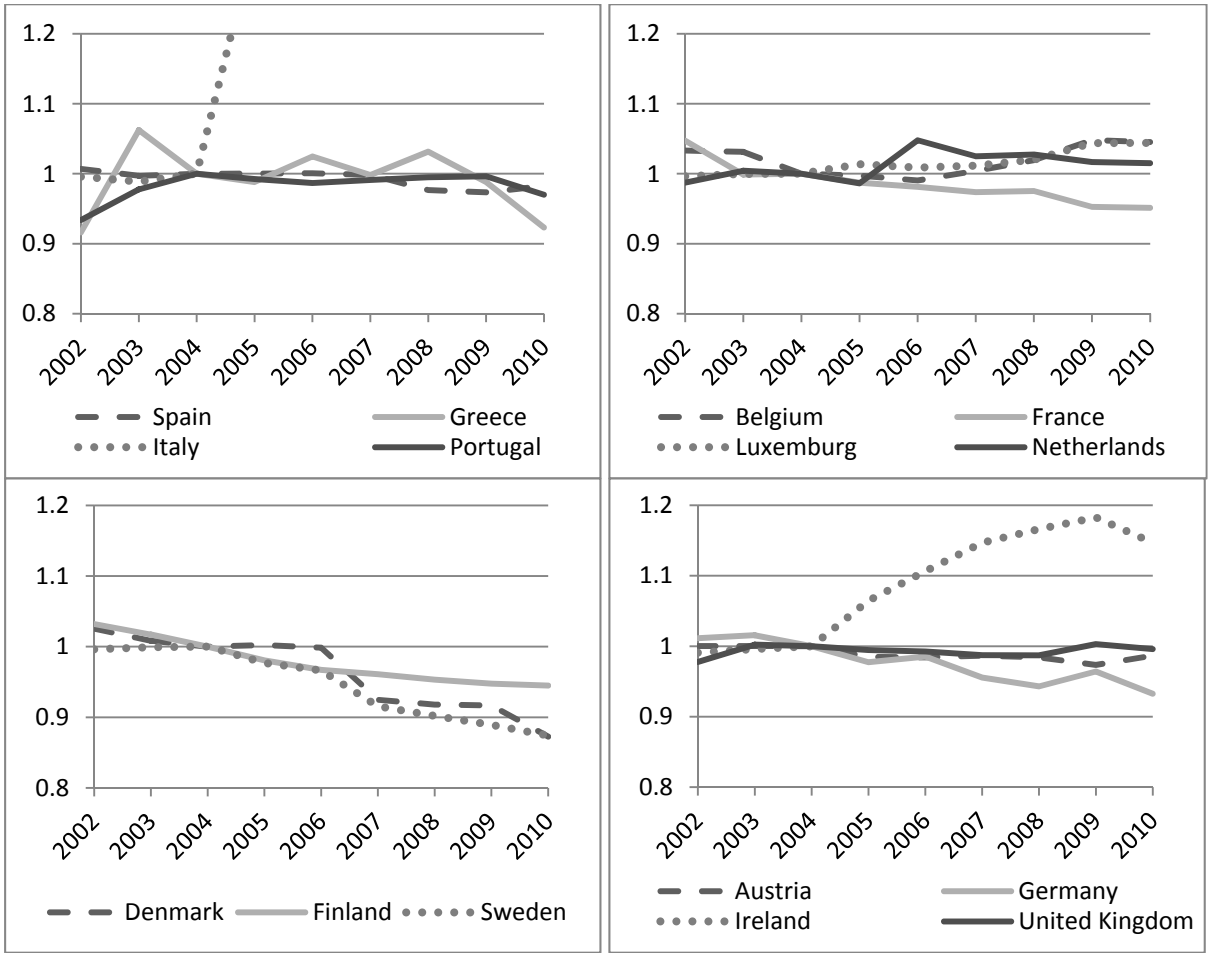
[10] Giulietti and Wahba (2012) give a detailed description of the composition of social expenditures in OECD countries based on the SOCX database. They also compare the level of the net replacement rates and the ratios of social expenditures to GDP and conclude that the measurements significantly differ across countries. The difference is explained by nationally diverting demographic patterns that influence the relevance of pension payments in the statistics.

Denmark, Finland and Sweden are characterized by weak declines in the relative expenditures until 2007. However, in Denmark and Finland, these declines are more than offset by increases in the measurement from 2007 to 2012. Only in Sweden, the ratio in 2012 stays below the value of 2004. For Austria and Germany, the development shows a stable pattern over time, the levels in 2012 are close to the levels reported in 2004. The numbers for Ireland and the UK indicate a tremendous increase. In Ireland, the ratio in 2012 is about 40% larger than in 2004. For the UK, an increase of about 20 % is reported. Despite the opening of the borders for the workers from the EU-8 in 2004, no evidence for a relative decline in public social expenditures can be found in the two countries. In fact, data on public social expenditures per capita in purchasing power do also not support the race to the bottom hypothesis. In Figure 1A of the appendix, the development of the purchasing power adjusted expenditures per capita is illustrated. It shows that in all EU-15 countries the expenditures per capita increased during the period from 2004 to 2009.

One might argue that relative or per capita measurements cannot account for increases in the number of recipients, for example, in the case of increasing unemployment rates. Obviously, numbers on the expenditures per recipient would be the most accurate measurement of the welfare state generosity. Unfortunately, data that are internationally comparable are not available. However, the OECD Benefits and Wages database provides internationally comparable information on the net replacement rate (NRR). This rate measures the ratio of the replacement income in the case of unemployment relative to the average income of the worker before unemployment. Figure 2 below depicts the development of the net replacement rate which is constructed as an unweighted average based on 4 family types (single person without children, one-earner married couples without children, lone parent with 2 children and one-earner married couple with 2 children) and 2 income levels (67% and 100% of the average wage). The rate is calculated as an average over a five year period following unemployment. Again, the measurement is normalized to 1 in 2004 for each EU-15 country.

Here, the picture is less clear than in the case of the ratio of social expenditures to GDP. In Portugal and Spain, the net replacement rate stays relatively constant over time. In Greece, the rate strongly oscillates around the value of 2004. Italy represents an exceptional case as considerable modifications of the rate over the short time period of observation can be found in the data. The net replacement rate fluctuates between 6% (normalized 1) in 2004 and 11% (normalized 1.83) in 2009. In the Benelux countries, the replacement rate weakly increased in the observed period, while a small decrease can be discovered for France. In contrast, in the Nordic countries, significant decreases in the NRR can be identified. In Denmark and Sweden, the rate was reduced by more than 10 % from 2004 to 2010. The Finish replacement rate was reduced by about 5 %. In Austria, the replacement rate remained relatively constant, while in Germany, it decreased by more than 5 %. For the UK, no clear change can be reported. In contrast, in Ireland, the rate increased by more than 10 %.

Figure 2: Development of the average net replacement rate over a five year period following unemployment, 2002 - 2010 (unweighted average over 4 family types and 2 income levels, measurement normalized to 1 in 2004)



Source: OECD Benefits and Wages: Statistics, Benefit generosity.
Note: Italy is only depicted until 2004 as the ratio of the country shows much larger fluctuations over time than the other countries. The NRR in Italy increased from 6% (normalized 1) in 2004 to 11% (normalized 1.83) in 2009 and 9% (normalized 1.5) in 2010. Therefore, the development of the rate is not completely covered in the graphic.

Besides the decision on the design of the welfare state, an EU-15 country had a second policy instrument for strategic interaction: the *2+3+2 rule*. In Table 1 below, the application of the rule is presented. Three countries opened the labor market for workers from the EU-8 from May 2004 onwards: Ireland, Sweden and the United Kingdom. Two years later, Greece, Italy, Portugal and Spain followed. Belgium, France, Luxemburg and the Netherlands lifted restrictions between 2006 and 2008, while Austria and Germany restricted the freedom of movement until the end of the *2+3+2 period* in May 2011. In the case of the workers from the EU-2, most EU-15 countries kept restrictions until 2012 or later. Only Finland and Sweden established the freedom of movement for the EU-2 in 2007. Denmark, Greece, Portugal and Spain implemented the EU legislation in 2009. Though, Spain partly reintroduced restrictions in 2011 due to extraordinarily severe conditions on the labor market.

Table 1: Application of the *2+3+2 rule*: year when freedom of movement for workers from the EU-8 and EU-2 is realized in the EU-15 countries

Country	EU-8	EU-2
Austria	2011	Restrictions
Belgium	2009	Restrictions
Denmark	2009	2009
Finland	2006	2007
France	2008	Restrictions
Germany	2011	Restrictions
Greece	2006	2009
Ireland	2004	2012
Italy	2006	2012
Luxemburg	2007	Restrictions
Netherlands	2007	Restrictions
Portugal	2006	2009
Spain	2006	2009 / restrict. reintroduced in 2011
Sweden	2004	2007
United Kingdom	2004	Restrictions

Source: EU Commission (DG Employment), Holland et al. (2011).
Note: Restrictions means that in the third phase of the transitional periods (1st January 2012 to 31st of December 2013), the freedom of movement is not fully realized yet.

The findings of the descriptive analysis above show that there is no clear evidence for a race to the bottom after the decision on EU accession in 2002. Social expenditures relative to GDP rather show an increasing trend until 2012 which might be explained by increasing unemployment rates that outweigh the effects of EU enlargement. This finding is supported by Gaston and Rujaguru (2013) who report a positive relationship between the ratio of social expenditures to GDP and the change in immigration relative to the native population. The development of the net replacement rate that determines the out-of-work benefits of an unemployed person also does not support the hypothesis of an erosion of welfare state protection driven by EU enlargement.

However, a central question remains unanswered: did the restrictions on the freedom of movement eliminate the pressure to reduce welfare levels or was the "welfare magnet" effect too weak to significantly influence policy making on the national level? This question is addressed in the following sections which are dedicated to the empirical analysis of the determinants of migration flows and their interaction with the migration regime in place.

4. Data and descriptives: Estimating migrant stocks and flows with the EU-LFS

4.1. The dataset

With the European Labor Force Survey (EU-LFS), Eurostat provides data from the national micro census surveys for all 27 EU member states containing information on demographic characteristics and the job situation of the surveyed. Due to the standardization of the

questionnaire, the data are comparable and can be used for cross country comparisons. In spite of the comparability across countries, the EU-LFS dataset and household survey data in general are still seldomly used for the estimation of international migration flows (Rendall, Tomassini and Elliot, 2003). It is argued that the estimates are often imprecise due to several problems regarding the representation of migrants in survey data.[11] Rendall, Tomassini and Elliot (2003) use the EU-LFS information on the place of residence of the surveyed one year before the interview and compare the estimated migration flows from the continental EU to the UK and vice versa. The authors come to the conclusion that, on average, the LFS underestimates the size of the migration flows by around 15 to 25 per cent compared to data from the UK's port survey, the International Passenger Survey and the UK censuses.

Martí and Ródenas (2007) confirm these results. In their study, a comparison of official register and census statistics with the estimations based on the EU-LFS is conducted. The annual migration flows that are calculated based on the EU-LFS information on the place of residence one year before the survey strongly divert from the official national statistics.[12] However, with respect to migrant stock estimates based on the self-reported nationality, Martí and Ródenas (2007) report that the EU-LFS numbers coincide with the official statistics from immigration registers or censuses in most EU-15 countries. Only for Greece and Spain do numbers show significant divergences.[13] Other examples for studies on immigration based on information from the LFS are Blanchflower and Shadforth (2009), Drinkwater et al. (2009), Dustmann et al. (2009) and Gilpin et al. (2006). After the discussion of the weaknesses of the data, Dustmann et al. (2009) who use the UK LFS emphasize that "despite these limitations, the LFS remains the best available source of data on immigrant stocks […]" (p. 7). Relying on data from the same source, Longhi and Rokicka (2012) expect the survey to offer a precise picture of the immigrants that live in the UK including the self-employed.

To my knowledge, there is no analysis of determinants of migration flows across EU countries based on EU-LFS data. Beine et al. (2011) take cross section data on two years (1990 and 2000) from the Docquier and Marfouk (2007) database. Changes affecting migration incentives and flows in the 10-year-period between 1990 and 2000 cannot be

[11] Maybe the most important reason for the rare use is the problem of small sample sizes which is not an issue when using administrative data. Migrants from a specific source country usually constitute a small group relative to native households in most EU countries and thus are only represented in small numbers in samples of household surveys. In addition, Gilpin et al. (2006) and Drinkwater et al. (2009) emphasize that migrants might be underrepresented in surveys as they less likely live at private addresses. Johnson et al. (2002) add that migrants tend to refuse to answer survey questionnaires more often than natives.

[12] The annual flow variable is constructed based on the EU-LFS question on the country of residence one year before the survey interview. The information on this variable provided by Eurostat is characterized by many missing values so that the variable does not seem to be suitable to estimate actual annual gross inflows of migrants.

[13] For the year 2001, the estimations for the non-national population stock in Greece based on the EU-LFS is 45.38 percent of the number that is reported by the Greek census data. For Spain, the estimation from the EU-LFS is about 43.62 percent of the number reported by the Spanish population register in 2001. For the other EU-15 countries, numbers range from 71.39 percent (Portugal) to about 100.29 percent for Luxemburg which can be considered as a reasonably good accuracy in order to conduct an empirical study on migrant stocks.

considered. Pedersen et al. (2008) also use data from 1990 and 2000 from statistical offices of 26 OECD countries. Consequently, the same problem as in Beine et al. (2011) applies. De Giorgi and Pellizzari (2009) use micro data from the European Community Household Panel (ECHP). The authors can thus control for the effects of the socio-economic background of the immigrants. However, the study suffers from possible imprecision due to small sample sizes as the samples of the ECHP are considerably smaller than samples of the micro census. The reasons why I use EU-LFS data are the availability of socio-economic information and the large number of observations. Only with micro data, it is possible to shade light on the black box of socio-economic backgrounds and to draw a more detailed picture of the interaction between the diaspora network and the population in the source region.

4.2. Migrant stocks in EU-15 countries after 2004

In this study, information on self-reported nationality in the EU-LFS dataset is used to measure the immigrant stock in an EU-15 destination country.[14] This procedure has two advantages over the alternative country of birth principle: 1) nationality defines an immigrant's status in official statistics of most EU member states and 2) the institutional restrictions on the freedom of movement (*2+3+2 rule*) which are applied on the basis of the worker's nationality can be considered in the empirical analysis. Unfortunately, information on the origin of the surveyed are highly aggregated in the scientific use files. For the years 2004 to 2011, the self-reported EU nationalities are subsumed in three country groups: EU-15, EU-10 and EU-2. Since, before 2004, data on nationality are even less precise[15], the analysis exclusively relies on EU-LFS data from 2004 to 2011. Denmark, Finland and Sweden group EU-10 and EU-2 nationalities under the single category EU-12. As this does not allow for the consideration of differential effects through the *2+3+2 rule*, these countries are excluded from the analysis.[16] In Figure 3 below, the development of the EU-10 migrant stocks in the EU-15 countries is presented. It shows that the increases were modest in most countries. Nonetheless, some countries experienced larger inflows than expected before accession.[17]

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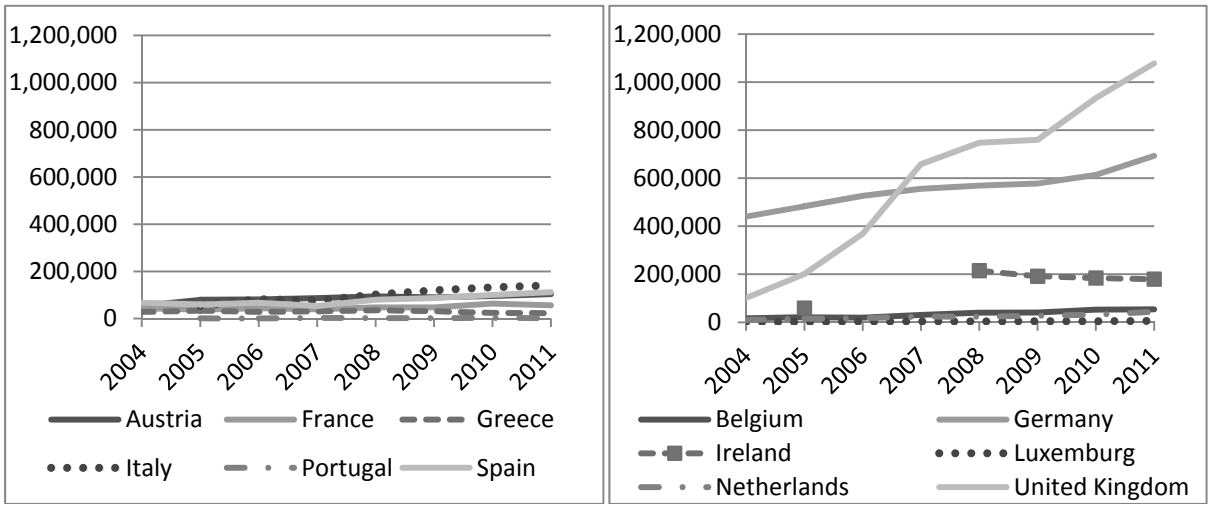
[14] In the economic literature, there is no consensus on the definition of an immigrant. Pedersen et al. (2008) report that, in official publications, some countries make use of the country of birth or origin principle and define a migrant as a person that is born in another country than the current place of residence (for example, Australia, Canada, the Netherlands, New Zealand, Poland, the Slovak Republic and the United States). On the contrary, countries like Austria, the Czech Republic, Denmark, Finland, Greece, Italy and Sweden define an immigrant by the citizenship. Belgium, France, Hungary, Germany, Japan, Luxemburg, Portugal, Spain, Switzerland and the United Kingdom use information on the self-reported nationality.

[15] In the surveys before 2004, it is distinguished between EU-15 and NON-EU-15 nationalities.

[16] Unfortunately, all three countries are characterized by high levels of welfare state protection so that excluding them might bias the estimation of the "welfare magnet" effect. However, the number of migrants that moved to these destinations after 2004 is relatively small. Hence, the estimated coefficients should overestimate the true impact of the public benefits when these countries are excluded. The estimates thus represent an upper bound of the effect in reality.

[17] In the run-up to the EU enlargement, great uncertainty about the numbers of workers coming from the accession countries to the EU-15 persisted. See Baas and Brücker (2010) for an overview of studies on migration potentials from the new member states which were conducted before enlargement in 2004.

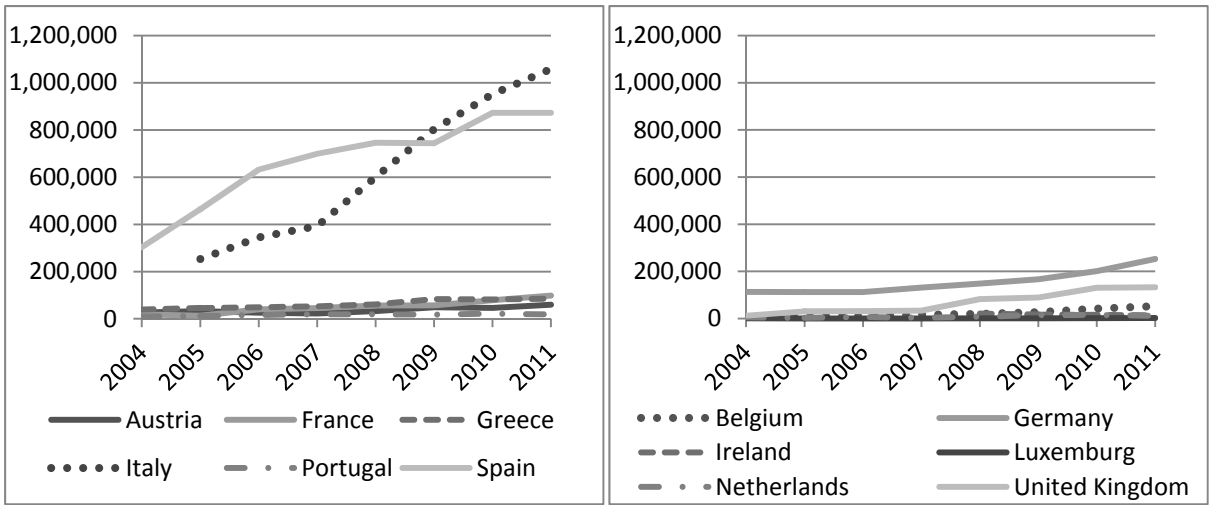
Figure 3: Number of migrants with an EU-10 nationality in the EU-15 countries (2004 - 2011)



Source: EU-LFS (2004-2011), for Germany: Central Register of Foreigners, Federal Office of Administration Germany (2004-2011).

Notes: Denmark, Finland and Sweden are excluded. Ireland only provides data for the years 2005 and 2008 to 2010. Italy does not deliver data for 2004. The estimate for Belgium in 2004 is based on 44 obs., for Luxemburg in 2004 on 47 obs. Portugal does not deliver data for 2004. The estimates for Portugal from 2005 to 2011 are based on the following numbers of obs.: 15/13/34/21/28/38/26. All other estimates are based on more than 50 observations. EU-LFS population weights are used.

Figure 4: Number of migrants with an EU-2 nationality in the EU-15 countries (2004 - 2011)



Source: EU-LFS (2004-2011), for Germany: Central Register of Foreigners, Federal Office of Administration Germany (2004-2011).

Notes: Denmark, Finland and Sweden are excluded. Ireland only provides EU-LFS data for the years 2005 and 2008 to 2010. The estimates for Belgium in 2004 are based on 18 obs. For Germany in 2007, the number is calculated with 32 obs., for France in 2004 with 24 obs. For Luxemburg in 2004, the number of obs. is 32, in 2007, it is 22, in 2008, it is 12 and in 2009, it is 41. For the Netherlands, the respective number in 2004 is 21, from 2006 to 2008, it is 40, 19, 41, for 2011, it is 30. The estimate for Portugal in 2004 is based on 36, in the UK in 2004 on 23 and in 2006 on 48 obs. All other estimates are based on more than 50 observations. EU-LFS population weights are used.

In Germany and the UK, the number of EU-10 nationals increased significantly from 2004 to 2011. Ireland also experienced large inflows. The stock of migrants from the EU-10 countries expanded from about 59,000 persons in 2005 to about 180,000 in 2011. In the other EU-15 countries, the increases are less pronounced in absolute terms. Figure 4 above illustrates that migration from the EU-2 to the EU-15 countries followed a different pattern. The flows were concentrated on Italy and Spain. In Italy, the number of EU-2 nationals increased from about 350,000 persons in 2005 to over 1,000,000 persons in 2011. Spain experienced an increase from around 300,000 (2004) to around 870,000 persons (2011). EU-LFS data for the other countries report a much smaller increase in the size of the stocks.[18] Due to the small size of the German EU-LFS samples after 2005, the numbers for Germany in Figure 3 and 4 rely on data from the Central Register for Foreigners and are not calculated with LFS data.[19]

5. Empirical analysis

The aim of the following empirical analysis is to quantify (1) the effect of different levels of welfare state protection and (2) the effect of the *2+3+2 rule* on the annual migration flows into an EU-15 destination country. Besides these two policy instruments of decision makers in the destination countries, I control for a rich variety of other economic and non-economic determinants that might influence the individual decision making process of potential migrants.[20] I consider destination country-specific factors like the annual average nominal net wage per worker and the size of the diaspora, but also socio-economic characteristics like the education levels in the diaspora and the source country population. These factors are treated as "endogenous" controls in the model besides the policy variables.

5.1. Constructing age-specific diaspora ratios

As dependent variable for the regression analysis, I define ratios of the total number of migrants in an EU-15 country relative to the number of persons in the source country group (EU-15, EU-10 and EU-2).[21] In the following, I will refer to these ratios as diaspora ratios since they represent the proportion of nationals that live in the diaspora relative to the persons that did not leave the source country. The micro structure of the dataset allows for a further distinction of these ratios with respect to the age of the migrants. I therefore construct three age groups: the 15-24 year old, the 25-34 year old and the 35-44 year old persons. Since

[18] In the appendix, a further graphic showing the numbers of migrants from other EU-15 countries is presented.

[19] According to Regulation (EC) No 2257/2003, EU countries have the right to provide Eurostat with subsamples from the national micro census. Germany makes use of this regulation and provides 10% subsamples of the annual census data from the year 2006 onwards. In result, the numbers of individual observations of migrants for these years are drastically reduced and do not allow for a reliable estimation of the migrant stocks.

[20] For an overview of the factors, see Zaiceva and Zimmermann (2008).

[21] This is a standard approach in the literature. See, for example, Pedersen et al. (2008).

studies show that migrants tend to move in their early life, individuals older than 44 years are not considered in the analysis.[22] As I consider three source country groups (EU-15, EU-10, EU-2) and three age groups, nine cohorts are built per year and destination country. Using weights provided by Eurostat, I then calculate the size of these nine diaspora cohorts and the size of the respective nine source cohorts. Finally, I build the diaspora ratios as the proportion of the size of the diaspora cohort to the size of the source cohort. Theoretically, for each destination country, 72 ratios could be constructed for the eight years from 2004 to 2011. In fact, the number of ratios considered in the analysis is smaller than 72 per destination since some countries do not deliver LFS data for each of the years under observation.[23]

Table 2: Number of non-nationals in EU-15 destination countries per 100 persons in the source country groups EU-15, EU-10 and EU-2 (%, 2010)

Cohort	1	2	3	4	5	6	7	8	9
Origin	EU-15	EU-15	EU-15	EU-10	EU-10	EU-10	EU-2	EU-2	EU-2
Age band	15-24	25-34	35-44	15-24	25-34	35-44	15-24	25-34	35-44
in Austria	0.05	0.07	0.07	0.09	0.22	0.22	0.19	0.35	0.20
in Belgium	0.10	0.15	0.18	(0.04)	0.15	0.13	0.12	0.35	0.20
in Germany	0.43	0.66	0.77	(0.64)	1.32	1.55	(0.65)	(0.97)	(1.02)
in Spain	0.14	0.25	0.33	(0.13)	(0.30)	(0.32)	3.58	6.40	5.67
in France	0.16	0.26	0.44	(0.02)	0.20	0.11	0.24	0.66	0.40
in Greece	(0.01)	0.01	0.01	0.06	0.05	0.06	0.21	0.53	0.46
in Ireland	0.03	0.05	0.05	0.26	0.79	0.25	0.06	0.14	0.09
in Italy	0.01	0.05	0.07	0.10	0.40	0.31	3.07	7.24	5.43
in Luxemb.	0.04	0.06	0.06	(0.00)	(0.01)	0.01	(0.01)	(0.02)	(0.01)
in Netherl.	0.03	0.06	0.08	(0.05)	(0.11)	(0.08)	(0.04)	(0.16)	(0.08)
in Portugal	0.01	0.01	0.01	(0.00)	(0.02)	(0.00)	0.10	0.18	0.10
in the UK	0.28	0.43	0.37	1.51	3.63	1.24	(0.63)	1.49	(0.42)
in all 12 EU countries	1.29	2.06	2.44	2.90	7.20	4.28	8.90	18.49	14.08

Source: Own calculations based on the EU-LFS 2010.
Notes: Estimations in brackets are based on less than 50 observations in the numerator (estimation of migrant stock).

Table 2 above shows the diaspora ratios for the different destination countries for the year 2010. In 2010, for example, 6.4 out of 100 or 6.4 % of the 25-34 year old persons with EU-2 nationality lived in Spain; 18.49 % of this cohort lived in one of the selected 12 EU-15 countries.

[22] It is argued that gains from migration are largest for young migrants as this group profits the most from a higher remuneration of human capital over the life time. Thus, at a certain age, a move abroad is not advantageous anymore as the fixed costs of migration exceed the expected gains from a larger compensation of the human capital.

[23] Table 1A in the appendix shows the size of the diasporas in the 12 destination countries for the year 2010. In addition, I calculate the population sizes of the cohorts in the source regions in 2010 which are presented in Table 2A of the appendix.

5.2. Identification strategy

Two approaches for estimating the determinants of migration flows dominate the literature: the dynamic stock model and the static flow model.[24] These two approaches differ with respect to the modeling of the adjustment to a new steady state after a change in the migration environment, for example, through the reduction of migration costs after EU accession. The first approach, the dynamic stock model, relies on the assumption that potential migrants are heterogeneous. In the case of an opening of the borders, the adjustment process ends in a new steady state if the migrant for whom the step to migrate is marginally advantageous moves to the destination. Implicitly, the existence of a steady state for the stock is assumed. A change in an explanatory variable leads to a new steady state level, which initiates a temporary adjustment process with positive net migration flows until the new steady state is found.

The second approach, the static flow model, depends on the assumption that the potential migrants are homogeneous so that a permanent flow of migrants can be observed. As dependent variable, the change in the migration stock is used instead of the migrant stock itself. A change in an explanatory variable affects the (annual) change rate of the migrant stock. Thus, for example, a *ceteris paribus* increase in the wage level is expected to lead to an increase in the annual change rate of the migrant stock.

I estimate parameters for both model approaches. However, in the case of the dynamic stock model, the estimations indicate a dynamically instable model so that I reject the validity of the approach.[25] Hence, only the results of the static flow model are presented and interpreted in the next sections. The model is based on the assumption that migrants choose the destination country that maximizes their utility. This utility and thus the decision is determined by many different factors, be they destination country-, source country- or individual-specific. In the following, j denotes the 12 EU-15 destination countries ($j = 1,\ldots,12$)[26], i the source cohort ($i = 1,\ldots,9$) and t the time period ($t = 1,\ldots,8$, from 2004 to 2011). The identification strategy is given by Equation (1) which is estimated by using pooled OLS:

$$\Delta m_{ij,t} = \alpha_0 + \beta_1 D_{j,t-1} + \beta_2 N_{ij,t-1} + \beta_3 S_{i,t-1} + \beta_4 I_{ij,t-1} + \beta_5 T_t + \beta_6 c_i + \varepsilon_{ij,t} \qquad (1)$$

[24] Alvarez-Plata et al. (2003), Boeri et al. (2001), Fertig (2001) and Flaig (2001) apply a dynamic stock model while Dustmann et al. (2003) and Hille and Straubhaar (2001) use a static flow model approach. See Baas and Brücker (2010) for a discussion of the alternative approaches.

[25] The estimated coefficients for the lagged migrant stock suggest that the migrant stock in the destination countries grows without boundaries as it takes a value which is larger than one. Hence, the model specification cannot be appropriate to explain the adjustment process at least in the short-run after the EU enlargement. The identification strategy for the dynamic stock model and the results of the estimations are presented in the appendix.

[26] One might argue that, without including the EU-10 and EU-2 member states as destination countries, an incomplete picture of the migration dynamics in the EU is drawn. However, empirical studies of migration flows to the EU-10 or EU-2 or between the two regions come to the conclusion that these movements are marginal in size and can thus be neglected in the analysis of European migration flows (Holland et al. 2011).

Like in Pedersen et al. (2008), the dependent variable $\Delta m_{ij,t}$ denotes the annual change in the diaspora ratio.[27] It describes a net change since the remigration decision is considered. Applying this definition has an advantage over the analysis of gross changes. It accounts for the fact that, for example, a change of the net wage in a destination country does not only affect the gross inflow of migrants, but at the same time has an effect on the remigration from the diaspora. Without death and naturalization, the change in the diaspora ratio measures the annual net emigration of the selected group from the source.

A challenge of analyzing determinants of migration flows is defining a strategy that is robust to possible estimation biases through reverse causality. An increase in the nominal net wage level might deliver a good explanation for an increase in the migrant stock as the destination country becomes more attractive due to the improved employment conditions. However, there might be an alternative, reverse explanation: migrants bring capital into the destination country and thereby increase the nation-wide capital to labor ratio. The increase in the compensation of human capital might thus be the result of the immigrant inflow rather than the cause of it. In order to address these possible endogeneity issues through reverse causality, I regress the current change rate in the diaspora ratio on explanatory variables that are lagged by one period. This procedure does not guarantee strict exogeneity, but it assures predeterminancy of the regressors (Mayda, 2010).

$D_{j,t-1}$ is a vector that consists of the destination country-specific factors influencing the migration and remigration decision. It contains the annual nominal net wage in 10,000 Euro, the unemployment rate in % and the size of the population in million persons in the destination. In addition, a Southern European country dummy which takes the value 1 if the destination country is located in Southern Europe[28] and a migration regime dummy which takes the value 1 if the freedom of movement for workers is restricted according to the *2+3+2 rule* are included. Last, but not least, the ratio of the public social expenditures to the GDP level in the destination countries is added as a measurement for the generosity of the welfare state. $N_{ij,t-1}$ consists of the source-destination-specific network effects. It does not only account for the size of the diaspora (number of persons in million) in the destination, but also for its composition as it includes the average education level, the proportion of females and the employment rate in the diaspora cohort as regressors. $S_{i,t-1}$ represents a vector describing the socio-economic characteristics of the source population. It includes two variables, the average education level and the proportion of employed persons in the source cohort.[29]

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[27] In contrast to the numbers in Table 2, which are in percent, it measures the number of migrants per 1000 persons in the source.

[28] The dummy takes the value 1 if the destination country is Greece, Italy, Portugal or Spain and 0 for the other eight destination countries. It is assumed that the four Southern countries are characterized by a favorable climate which acts as a pull factor. For a discussion of the climate as a pull factor, see Graves (1980).

[29] A detailed description of the variables included and their data sources can be found in the appendix.

The education level is measured based on the International Standard Classification of Education (ISCED). In order to facilitate the comparison and in line with the literature[30], the educational achievements are categorized in three groups (low, medium and high) taking the values 1, 2 and 3. The low education group comprises of the ISCED levels 0 to 2 (early childhood education to lower secondary education). The medium level covers the ISCED levels 3 to 4 (upper secondary education to short-cycle tertiary education) while the high education level subsumes the ISCED levels 5 and 6 (bachelor or equivalent to doctoral or equivalent).

Finally, $I_{ij,t\text{-}1}$ contains interaction effects of all push and pull factors ($D_{j,t\text{-}1}$, $N_{ij,t\text{-}1}$, $S_{i,t\text{-}1}$) with the migration regime dummy (*2+3+2 rule*) for the destination country. By including this vector, the differential effects of the migration determinants under the temporary restriction of the freedom of movement are controlled for. c_i is a source cohort fixed effect. It controls for unobserved heterogeneity of the age groups in the different groups of source countries. Further, in all regressions, time dummies for each period are included, which are represented by the vector T_t. In contrast to, for example, Pedersen et al. (2008), I do not include destination (c_j) or destination-source pair (c_{ij}) fixed effects. The destination country fixed effects would "eat up" the effect of the observed destination country-specific pull factors that do not show considerable variation over time (for example, the country's ratio of social expenditures to GDP).[31] The error term $\varepsilon_{ij,t}$ is assumed to be normally distributed and clustered over time periods and destination countries. The clustering problem is addressed by the estimation of cluster robust standard errors. I apply the STATA routine provided by Cameron, Gelbach and Miller (2011) that accounts for non-nested two-way clustering in error terms.[32]

5.3. Regression results

Table 3 below shows the results of the pooled OLS regression analysis. The number of cell entries in the country panel is reduced as some diaspora ratios are constructed based on less than 50 individual observations in the EU-LFS sample. These estimates are presumably biased and thus are excluded. After dropping the data points, on average, each diaspora cohort is constructed based on 466 individual observations in the EU-LFS sample. The number of

[30] I reduce the dimension of the classification to three groups as this is done in most applications (see, for example, Pedersen et al., 2008, or Beine et al., 2011). It is distinguished between a high, medium and low level of education which are denoted on a scale from 1 to 3.

[31] This well-known problem in the literature is described by Pedersen et al. (2008). Since it also applies to estimations that make use of the country panel structure of the constructed data set, I do not present results from FE panel estimations.

[32] Since potential clustering of the cohorts from one group of source countries in a destination is nested in the clustering over the destination country itself, there is no need to additionally adjust the error terms. This cluster effect is also captured by clustering the error terms with respect to the destination countries. For a discussion of the different treatment of nested and non-nested multi-way clustering, see Cameron, Gelbach and Miller (2011) or Thompson (2011).

constructed cohort observations is 432.[33] In the appendix, I also present the regression results with diaspora ratios that are constructed based on at least 10 individual observations.[34] Since the results of both estimations do not significantly differ, I expect the bias from the exclusion of ratios to be negligible. In the first four specifications (1) - (4), I model the effect of the *2+3+2 rule* in a very simple manner by the inclusion of a dummy variable that takes the value 1 if the freedom of movement is restricted and the value 0 if not. In specification (5), the model structure becomes more sophisticated as, in addition, interaction effects of the migration regime dummy with the other push and pull factors are added. In the following interpretation, I first explain the results of specification (1) to (4) and then focus separately on the fifth specification.

As expected, the annual nominal net wage in 10,000 Euro positively affects the annual migration inflows to a destination. In specification (1) to (4), the coefficient is significant at the 1 % level and ranges between values of 1.792 and 2.143. The effect of the unemployment rate in % is less clear cut since the estimated coefficients are all insignificant at the 10 % level. However, the negative signs are line with economic theory. Larger unemployment rates should imply smaller numbers of immigrant inflows. With respect to the employment opportunities, migrants seem to put more weight on the expected compensation of labor than on the unemployment likelihood approximated by the unemployment rate.

The size of the destination country measured by the population in million persons seems to have a positive effect on immigration. The value of the coefficients ranges from 0.003 to 0.017. However, the effect is only significant at the 5 % level in specification (1). I further control for the attractiveness of a destination country in terms of the geographic position by including a dummy for the Southern European countries. The dummy takes the value 1 if the destination country is Greece, Italy, Portugal or Spain and 0 otherwise. Although this classification is arguably arbitrary, the significance of the estimated effects in all specifications at the 1 % level gives strong support for the idea that destination countries in the South are endowed with unobserved factors that attract migrants. These might be non-economic factors like a mild climate or a high quality of life (Graves, 1980). In specification (1) to (4), the restrictions of the freedom of movement are modeled with a dummy variable that takes the value 1 if a restriction is in place and 0 if not.[35] Surprisingly, the coefficients of the migration regime dummy show a positive sign in the first four specifications, but the standard errors indicate that the coefficients are not significantly different from 0.

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[33] The mean of the number of individual observations per cohort is 466.49, the standard deviation is 700.22. The smallest number of observations per cohort is 51, the largest is 5884.

[34] In this case, the number of constructed cohort observations is 621. The mean number of individual observations per cohort is reduced to 339.36. The standard deviation is 615.16, the minimum value 10 and the maximum value 5884.

[35] Unfortunately, I cannot distinguish between the source countries Cyprus and Malta that were not affected by the restrictions and the Eastern European member states (EU-8). However, since the population in Cyprus and Malta is relatively small, it is arguable that the effects of the transitional periods on the immigration flows from these countries can be neglected.

Table 3: Static flow model estimates for 12 EU-15 destination countries (*j*) and 9 source cohorts (*i*)

Explanatory variables	**Dependent variable:** $\Delta m_{ij,t}$ = annual change in the diaspora ratio				
	(1)	(2)	(3)	(4)	(5)
Destination country variables $D_{i,t-1}$					
Annual nominal net wage	1.792***	1.967***	1.992***	2.143***	4.508**
in 10,000 Euro in *j*	(0.347)	(0.487)	(0.563)	(0.576)	(1.952)
Unemployment rate in % in *j*	-0.040	-0.072	-0.084	-0.082	-0.329***
	(0.043)	(0.056)	(0.082)	(0.101)	(0.119)
Population in destination	0.017**	0.003	0.006	0.003	0.029
country *j* in mio. persons	(0.008)	(0.015)	(0.015)	(0.013)	(0.025)
Southern European	2.762***	3.317***	3.535***	3.948***	7.926***
country (0/1)	(0.399)	(0.681)	(0.935)	(0.939)	(1.936)
Regime dummy (restricted	0.822	0.934	0.969	0.873	-10.436
freedom of m.) in *j* (0/1)	(0.729)	(0.782)	(0.789)	(1.146)	(10.500)
Public social expenditures	2.322	4.988	9.493**	12.829***	5.897
/ GDP in *j*	(5.179)	(5.691)	(4.410)	(4.855)	(10.227)
Source-destination (network) effects $N_{ij,t-1}$					
Diaspora stock in *j* in mio.		1.171	0.848	0.986	1.132
persons		(0.949)	(1.047)	(0.920)	(3.055)
Education level (ISCED)			0.660	1.120	3.890
in age-specific diaspora			(1.031)	(0.955)	(2.918)
Proportion of females			-4.303*	-5.050*	-2.731
in age-specific diaspora			(2.543)	(2.925)	(3.534)
Proportion of employed			0.318	0.557	-2.855
in age-specific diaspora			(2.571)	(2.645)	(3.599)
Source specific factors $S_{i,t-1}$					
Education level (ISCED) in			3.579	1.001	-4.271
source cohort			(3.416)	(7.327)	(5.739)
Proportion of employed in			-5.603	-19.142*	-17.305**
source cohort			(8.846)	(10.111)	(8.650)
Interaction of push-pull factors and the migration regime $I_{ij,t-1}$[a]					
Annual nominal net wage					-3.479*
x regime dummy					(2.004)
Unemployment rate					0.438**
x regime dummy					(0.194)
Public social expenditures /					-5.147
GDP x regime dummy					(10.730)
Diaspora stock in *j* in mio.					-1.996
persons x regime dummy					(4.239)
Proportion of employed in					-5.890
source x regime dummy					(16.186)
Time dummies	yes	yes	yes	yes	yes
Age and source dummies	yes	yes	yes	no	no
Source cohort dummies	no	no	no	yes	yes
Constant included	yes	yes	yes	yes	yes
R-squared	0.286	0.298	0.315	0.338	0.474
Number of observations	432	432	432	432	432

* p<0.10, ** p<0.05, *** p<0.01. Standard errors that are clustered by destination country and time periods are shown in parentheses. I use the STATA routine by Cameron, Gelbach and Miller (2011) to control for two-way clustered error terms. In all regressions, time dummies and a constant are included. [a] Further variables are included: see Appendix for a table with all covariates. All explanatory variables are lagged by one year except for the migration regime dummy.

According to economic theory, the dummy should enter the equation with a negative sign as the introduction of a restriction on the free movement for workers increases migration costs and should, consequently, result in a decrease of the migration inflow. The regression results though give an indication for the need of a more sophisticated modeling of the restricted freedom of movement as suggested by Razin and Wahba (2011).

A potential "welfare magnet" effect is modeled by the inclusion of the ratio of public social expenditures to GDP as a covariate. While in (1) and (2), the level of social expenditures relative to the GDP does not have a statistically significant effect on the diaspora ratio, the coefficients in (3) and (4) have a positive sign and are significant at the 1 % respective 5 % level. These results give an indication that the generosity of the welfare state measured by the ratio of public social expenditures to the GDP might represent a pull factor for potential migrants. Furthermore, it seems to be the case that the pull effect of the benefits cannot be identified if the socio-economic characteristics in the diaspora cohorts are not controlled for. After including these additional controls, the "welfare magnet" can be disentangled from the pull effects of the diaspora characteristics.

The vector $D_{j,t\text{-}1}$ that represents the destination specific pull factors is included in all regressions. In specification (1), the annual change in the diaspora ratio is exclusively regressed on these destination specific variables. Specification (2) differs from (1) as the size of the diaspora from the same group of source countries in million persons is added as a regressor. The inclusion weakly increases the explanatory power of the model to an R-squared value of 0.298. The coefficients of the diaspora stock effect are positive in (2) to (4), but the reported standard errors indicate insignificance of the effects. In contrast to the findings of Beine et al. (2011) and Pedersen et al. (2008) who identify significant effects of the diaspora size on migration decisions in OECD countries, I do not find empirical support for the network effect in the EU-15.

In specification (3), the regression is enriched by the inclusion of further variables measuring the source-destination network effect. The average education level, the proportion of employed and the proportion of females in the diaspora cohorts are added. However, only the proportion of females has a negative, significant effect on the annual change of the diaspora ratio. This observation might be explained by migration patterns that reflect a traditional division in gender roles within families. If men tend to migrate before their wives due to job-related incentives, for instance, a small share of females in the diaspora corresponds to a large potential of female partners in the source. On the way to the "new equilibrium" which is characterized by female migration due to family reunification, the potential for further migration deteriorates. This phenomenon finds its expression in a decreasing effect of the proportion of females in the diaspora on the annual change rate in the diaspora ratio.

Furthermore, two source-specific factors are considered: the average education level and the proportion of employed in the source cohort. While no evidence is found that the average

education level in the source has an impact on the dependent variable, the proportion of employed in the source cohort seems to negatively affect the annual change in the diaspora ratio. For specification (4), a significant negative effect with a coefficient value of -19.142 is reported. This is in line with the economic intuition. An increase in the employment rate of a source country has a positive effect on the employment opportunities of the workers. Hence, the incentive to emigrate for job reasons diminishes if the employment rate expands. Overall, the additional covariates in (3) improve the explanatory power to an R-squared value of 0.315. While in specification (1) to (3), age and source country group dummies are included separately, in specification (4), I use a dummy for each source cohort. Again, this leads to a weak increase in the explanatory power of the model to an R-squared value of 0.338.

Finally, in specification (5), vector $I_{ij,t\text{-}1}$ is considered for the first time. This vector accounts for the recent findings by Razin and Wahba (2011). It contains interaction effects of the migration regime dummy with all push and pull factors. The explanatory power of the model increases to an R-square value of 0.474 indicating a significant improvement of the identification strategy. The coefficient of the annual nominal net wage effect in the destination country has a value of 4.508 which is 2 to 3 times the size of the coefficients in (1) to (4). For the interaction effect of the wage variable with the *2+3+2 rule* dummy, a coefficient of -3.479 is reported. The application of the rule reduces the wage effect from 4.508 to 1.029 which leads to the conclusion that the restriction of the freedom of movement is binding with respect to the net wage as a pull factor.

The dummy variable for Southern European destination countries also increases significantly in (5) under a scenario where the freedom of movement is not restricted. It takes a value of 7.926 compared to values of 2 to 4 in specification (1) to (4). The effect is completely offset in the case of a restricted freedom of movement for workers. In addition, the direct effect of the migration regime dummy variable becomes negative even though the estimator is insignificant. It has a coefficient value of -10.436 which has a reducing the effect on the constant. As expected, the application of restrictions on the mobility of workers reduces the migration incentive in addition to the interaction effects with the other pull factors.

The coefficient of the social expenditure variable decreases to a value of 5.897 and is not significant. This result stands in contrast to the findings of Razin and Wahba (2011) who argue that the "welfare magnet" effect should increase in size and significance when the differential effect of the migration regime is controlled for. The comparison of specification (3) and (4) in which the migration regime is controlled for solely by the inclusion of a dummy variable delivers interest insights. In these cases, the benefits seem to act as a pull factor. However, by modeling the effects of the restricted freedom of movement more realistically with interaction effects, the significance of the welfare state as pull factor disappears while the coefficient of the unemployment rate in the destination becomes significant. The integration of the interaction effects further reveals the dominance of work over public benefit incentives.

For the interaction effect of the "welfare magnet" variable with the *2+3+2 rule* dummy, a coefficient value of -5.147 is found. A potential pull effect of the welfare state variable would be almost completely offset by the application of the *2+3+2 rule*. Since I find rather mixed evidence with respect to the "welfare magnet" effect, the next section is devoted to a sensitivity analysis with alternative measurements for the welfare state.

5.4. Alternative modeling of the welfare state

In specification (1) to (5), the welfare state is modeled by including the ratio of public social expenditures to GDP as covariate which is also done in the studies by Beine et al. (2011) and Pedersen et al. (2008). However, there are other measurements for the welfare state generosity that are applied in the literature. De Giorgi and Pellizzari (2009), for instance, calculate the net replacement income in purchasing power and include it in the regressions to identify a potential "welfare magnet" effect. In the following section, I thus perform estimations with alternative measurements of the generosity of welfare states as robustness checks.

In Table 4 below, I modify specification (5) shown in Table 3. The ratio of social expenditures to GDP is replaced by the net replacement rate in (6) and by the nominal replacement income in (7). The net replacement rate is calculated as the ratio of annual net earnings and out-of-work income for a single person without children (100 % average wage) in each destination country while the nominal replacement income measured in 10,000 Euro is the annual out-of-work income for a single person without children earning 100% of the average wage. Housing benefits are included. Both measurements are provided by the OECD Statistics Out of Work Tax / Benefit.

In specification (6), the coefficient of the annual nominal net wage is comparable in size to the estimation in specification (5) and significant at the 1 % level. The unemployment rate enters with a negative sign and with a significance level of 1 %. Furthermore, the dummy indicating a Southern European destination country has a slightly larger effect than in (5) with a significant, positive coefficient at the 1 % level. The alternative measurement of the welfare state generosity, the net replacement rate in % in the destination country, does not seem to have an effect on the immigration flows since the standard errors indicate an insignificance of the effect. However, the coefficient has a positive sign which is in line with expectation.

In specification (7), the net wage effect is also relatively similar in size compared to the other setups. However, the estimator for the coefficient is only significant at the 10 % level. The coefficient for the net replacement income has a value of 1.546, but is insignificant according to the calculated standard errors. One explanation for the low significance levels of both, the net wage and the net replacement income effect, might be a multi-collinearity phenomenon since the replacement income is per construction highly correlated with the nominal net wage.

Table 4: Static flow model estimates with alternative measurements for the welfare state

Explanatory variables	**Dependent variable:** $\Delta m_{ij,t}$ = annual change in the diaspora ratio	
	(6)	(7)
Destination country variables $X_{i,t-1}$		
Annual nominal net wage in 10,000 Euro in *j*	5.108***	4.391*
	(1.610)	(2.467)
Unemployment rate in % in *j*	-0.401***	-0.420***
	(0.098)	(0.115)
Population in destination country *j* in mio. persons	0.038*	0.039**
	(0.020)	(0.019)
Southern European country (0/1)	9.272***	9.305***
	(1.722)	(1.704)
Regime dummy (restricted freedom of m.) in *j* (0/1)	-11.059	-9.450
	(7.794)	(8.401)
Net replacement rate in % in *j*	2.770	
	(4.860)	
Annual replacement income in 10,000 Euro in *j*		1.546
		(2.971)
Source-destination (network) effects $N_{ij,t-1}$		
Diaspora stock in *j* in mio. persons	0.508	0.710
	(2.842)	(2.844)
Education level (ISCED) in the age-specific diaspora	2.964	3.043
	(1.845)	(1.950)
Proportion of females in the age-specific diaspora	-1.532	-1.592
	(3.130)	(3.241)
Proportion of employed in the age-specific diaspora	-3.480	-3.716
	(4.150)	(4.055)
Source specific factors $S_{i,\,t-1}$		
Education level (ISCED) in the source cohort	-3.515	-3.584
	(4.237)	(4.327)
Proportion of employed in the source cohort	-18.296**	-18.679**
	(8.632)	(8.133)
Interaction of push-pull factors and the migration regime $I_{ij,t-1}$ [a]		
Annual nominal net wage x regime dummy	-4.129**	-3.200
	(1.606)	(2.531)
Unemployment rate x regime dummy	0.505***	0.537***
	(0.145)	(0.149)
Diaspora stock in *j* in mio. persons x regime dummy	-1.393	-1.595
	(3.860)	(3.891)
Net replacement rate x regime dummy	-2.668	
	(4.487)	
Annual replacement income x regime dummy		-1.925
		(2.852)
Proportion of unemployed in the source cohort x regime dummy	-4.262	-3.813
	(16.629)	(16.311)
Source cohort dummies	yes	yes
R-squared	0.475	0.475
Number of observations	432	432

* p<0.10, ** p<0.05, *** p<0.01. Standard errors that are clustered by destination country and time periods are shown in parentheses. I use the STATA routine provided by Cameron, Gelbach and Miller (2011) to control for two-way clustered error terms. In all regressions, time dummies and a constant are included. [a] Further variables are included: see Appendix for a table with all covariates. All explanatory variables are lagged by one year except for the migration regime dummy.

5.5. Comparison of effects

The magnitude of the effects is difficult to evaluate since the dimensions of the explanatory variables differ. So how can we interpret the coefficients in order to draw conclusions about their relevance? In Table 5 below, I compare a selection of economic effects that seem to have a major impact on the migration flows in the EU-15. The effects are made comparable by presenting the change of the dependent variable after a change in the explanatory variable by 1 standard deviation of the mean. In the second column, the standardized measurement for a change in the explanatory variable is introduced. In column 3, the coefficients of the direct effect and of the interaction effect with the migration regime dummy are shown. Column 4 presents the change of the dependent variable for the free movement scenario after a standardized increase in the explanatory variable. Equivalently, in column 5, the changes of the dependent variable for the restricted movement scenario are summarized.

Table 5: Comparison of the economic effects on migration flows in the EU-15

Explanatory variable	**Δ of 1 standard dev. from mean of the expl. var.**	**Coefficients: Direct effect / interaction effect**	**Δdiaspora ratio: no restriction**	**Δdiaspora ratio: with restriction**	**Differential effect of restriction**
Annual nominal net wage in 10,000 Euro in destination	0.614 (6140 Euro)	(4) 2.143*** / none (5) 4.508** / -3.479* (6) 5.108*** / -4.129** (7) 4.391* / -3.200	(4) 1.316 (5) 2.768 (6) 3.136 (7) 2.696	- (5) 0.632 (6) 0.601 (7) 0.731	- (5) 2.136 (6) 2.537 (7) 1.965
Unemployment rate in the destination country	2.996 (2.996 %-points)	(4) -0.082 / none (5) -0.329*** / 0.438** (6) -0.401***/0.505*** (7) -0.420***/0.537***	(4) -0.246 (5) -0.986 (6) -1.201 (7) -1.258	- (5) 0.327 (6) 0.312 (7) 0.351	- (5) -1.313 (6) -1.513 (7) -1.609
Proportion of employed in the source cohort	0.056 (5.6 %-points)	(4) -19.142* / none (5) -17.305** / -5.890 (6) -18.296** / -4.262 (7) -18.679** / -3.813	(4) -1.072 (5) -0.969 (6) -1.025 (7) -1.046	- (5) -1.299 (6) -1.263 (7) -1.260	- (5) 0.330 (6) 0.238 (7) 0.214
Social expenditures / GDP in the destination country	0.033 (3.3 %-points)	(4) 12.829*** / none (5) 5.897 / -5.147	(4) 0.423 (5) 0.195	- (5) 0.025	- (5) 0.170
Net replacement rate in % in the destination country	0.181 (18.1 %-points)	(6) 2.770 / -2.668	(6) 0.501	(6) -0.018	(6) 0.519
Annual replacement income in 10,000 Euro in destination	0.580 (5800 Euro)	(7) 1.546 / -1.925	(7) 0.897	(7) -0.220	(7) 1.117

In specification (5), a standardized increase in a destination country's annual net wage (6,140 Euro) increases the annual change in the diaspora ratio by 2.768.[36] This translates into about 2.8 additional persons out of 1000 persons in the source migrating to the destination per year. The effect is reduced to about 0.6 persons per 1000 if the freedom of movement is restricted.[37]

[36] 6,140 / 10,000 x 4.508 = 2.768 (see column 4).
[37] 6,140 / 10,000 x (4.508 – 3.479) = 0.632 (see column 5).

Applying a restrictive migration regime thus has a differential effect of about 2.1 persons per 1000 persons in the source on the annual change in the diaspora ratio.[38] The effects of the unemployment rate in a destination country are less strong. In specification (6) and (7), for the free movement scenario, a decrease in the dependent variable of about 1.2 is reported after an increase in the unemployment rate by 2.996 percentage points. In the restricted freedom of movement scenario, a slightly positive effect is found which is not extremely different from the expected maximum value of 0 (column 5). If the proportion of employed in a source cohort increases by 5.6 percentage points, the annual change in the diaspora ratio decreases by about 1 in the free movement scenario. The effects in the case of the restricted migration regime are insignificant. This might be an indicator that the push effects are not affected by the application of restrictions in a single destination while the pull effects are more or less exactly offset by the application of the *2+3+2 rule*.

In specification (4), an increase in the ratio of the social expenditures to the GDP level by 3.3 percentage points results in an increase in the dependent variable of 0.423. This much larger effect than in (5) is significant at the 1 % level. However, with respect to the magnitude, it is still of minor importance. The effect of both, the nominal net wage in a destination and the proportion of employed in the source cohort, is twice to three times as large as the "welfare magnet" effect. For specification (5), a hypothetical change in the dependent variable of 0.195 is reported for the free movement scenario and almost no effect for the restricted movement regime (column 5). Though, the estimated coefficients are statistically insignificant.

As result of the comparison, the following findings should be emphasized. First, the net wage in a destination country exerts a much larger positive effect on the migrant inflows than the public social expenditures. The coefficients in specification (5) indicate an effect of the net wage which is about 14 times as large as the effect of the welfare state variable. In addition, the standard error of the welfare state coefficient points to a statistical insignificance of the effect. Under the assumption that the findings in specification (4) most accurately describe the reality, the effect of the net wage is still three times as large as the effect of the social expenditure variable. In the case of the net replacement rate and the annual replacement income, the gap lies between those two extremes.[39] Secondly, restricting the freedom of movement almost completely offsets the migration incentives of the pull factors, but does not seem to counterbalance the effects from changing push factor variables in the source countries.

[38] See column 6 which presents the difference in the values of column 4 and column 5.

[39] I find that the effect of the net wage is about six times as large as the non-significant net replacement rate effect and three times as large as the non-significant replacement income effect. De Giorgi and Pellizzari (2009) report a net wage effect that is about 10 times as large as the "welfare magnet" effect of the replacement income. In contrast to my results, they find significant effects of this welfare measurement.

6. Conclusion

The EU enlargements in 2004 and 2007 initiated a debate about the future of the welfare states in the EU-15. According to Kvist (2004) and Sinn (2002), the logic of "welfare magnetism" might cause strategic behavior of national governments with respect to the generosity of the welfare state. Hence, policy makers were expected to reduce the level of social security to avoid their countries becoming attractive destinations for "welfare migrants". In addition, national governments were endowed with another strategic instrument for reducing the potential pressure from these migration incentives: the *2+3+2 rule* which allows the closing of borders for migrants from the new member states by temporarily restricting the freedom of movement for workers.

In this paper, the interaction of these two policy variables in the EU-15 after 2002 is analyzed. The first result is that the race to the bottom after the accession decision did not happen as predicted. OECD data on the development of the social expenditures relative to GDP and the net replacement rates in the destination countries after 2002 give no indication of a strong EU-15 wide reduction in spending on welfare. Secondly, in the analysis of determinants of migration flows to EU-15 countries from 2004 to 2011, evidence is found that the "welfare magnet" effect is rather weak or does not persist at all and presumably does not influence national decision making. The ratio of social expenditures to GDP as a measurement for the welfare state generosity does not seem to have a positive effect on the immigration flows to EU-15 countries. The expected payments in the case of unemployment measured by the net replacement rate and the net replacement income do also not act as "welfare magnets". In contrast, the application of the *2+3+2 rule* is found to have a strong impact on migration behavior. It completely offsets, for example, the positive incentive effect of the net wage or a low unemployment rate in a destination country.

Thus, two reasons can be identified which explain the observation that the race to the bottom did not take place after 2002. First, the "welfare magnet" effect is just one determinant among a large number of other determinants of migration decisions and is probably of too little relevance to justify major welfare state reforms in the EU-15. Secondly, the application of restrictions on the freedom of movement for workers completely neutralizes potential effects of the welfare state. Hence, national governments might have used this instrument as a substitute for modifications of the welfare system. Furthermore, evidence is found that the positive migration incentives from a larger remuneration of human capital are also offset in the case of restricted freedom of movement for workers. Countries with restrictions are thus not able to reap the economic benefits from labor mobility as described by Sinn (2002).

A comparison of the marginal effects shows that the "welfare magnet" effect is completely offset by the application of the *2+3+2 rule*. But even in the case where the freedom of movement for workers is realized, the pulling effect of the welfare state variables is weak.

Based on the results of this analysis, it thus seems unlikely that the end of the *2+3+2 period* for Bulgaria and Romania in January 2014 will initiate major reforms of national welfare state institutions in the EU-15 or even start a race to the bottom of welfare state standards. This prediction is supported by the experience in countries that already opened the labor market for workers from the EU-2. In Denmark, Finland, Greece, Ireland, Italy, Portugal and Sweden, no evidence for adjustments of the welfare state can be found after the realization of the freedom of movement for EU-2 workers. That is why there is no reason to expect strongly diverging behavior by member states that open the labor markets in January 2014 or before.

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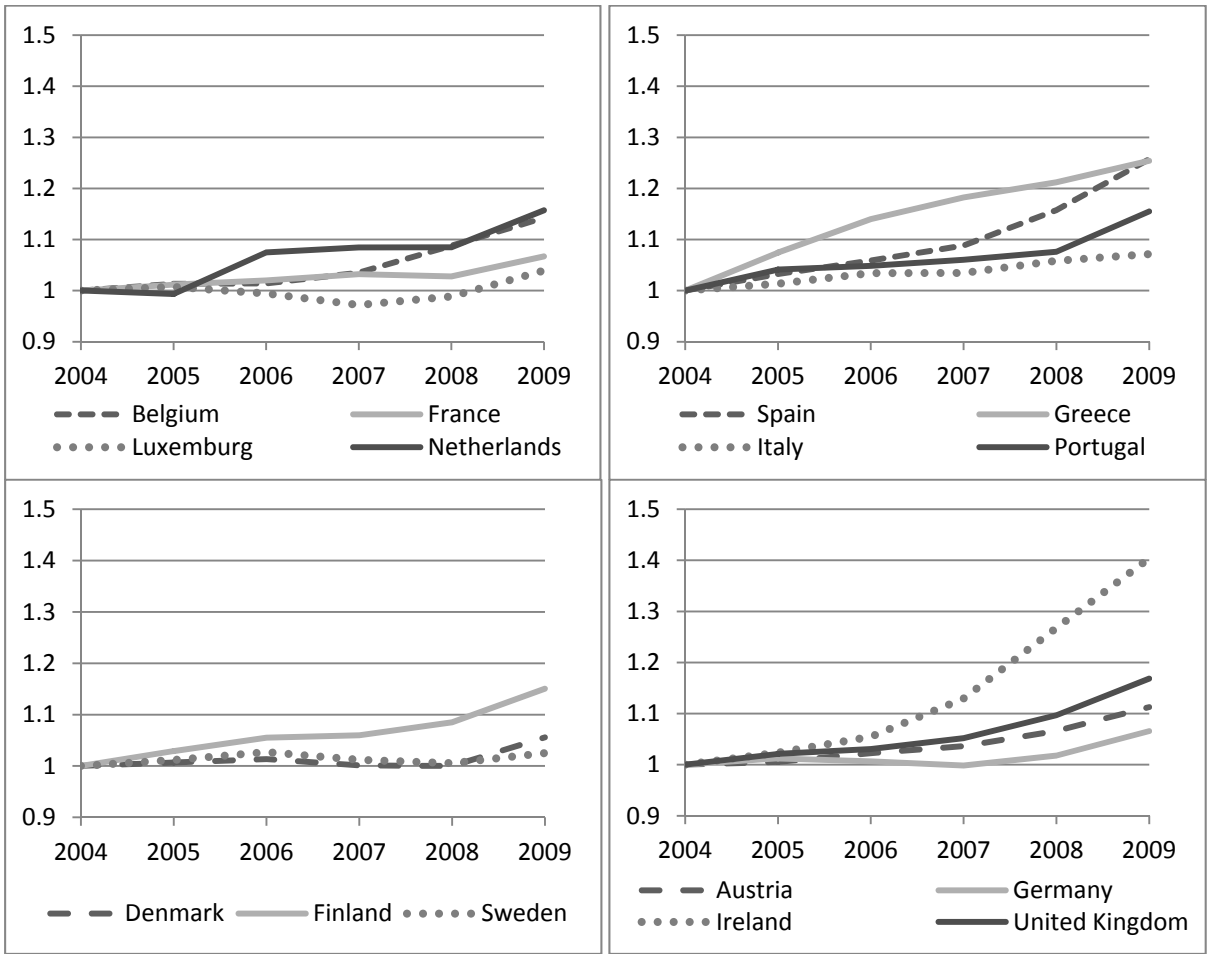
Appendix

A.1. Alternative measurements of the generosity of the welfare states

Figure 1A: Development of the public social expenditures per capita with constant prices (2000) and in PPP (2000) relative to the year 2004, 2004 – 2009



Source: OECD Social Expenditure Database (SOCX) - Public social spending per capita (in constant prices and in PPP of 2000). Cash benefits and benefits in kind are included.

A.2. Description of the variables and the data sources

Dependent variable:

$\Delta m_{ij,t}$: Annual change in the diapora ratio (number of migrants in the destination per 1000 persons in the source cohort) calculated with data from the EU-Labor Force Survey (EU-LFS) 2004 to 2011. Source: Eurostat.

Explanatory variables:

1. Destination country variables $D_{ij,t-1}$

Annual nominal net wage in 10,000 Euro in *j*: Nominal annual net earnings in 10,000 Euro in the destination country for a single person without children (100 % of the average wage), 2004 - 2010. Source: Eurostat.

Unemployment rate in % in *j*: Annual average of the unemployment rate in % in the destination country (not seasonally adjusted), 2004 - 2010. Source: Eurostat.

Population in destination country *j* in mio. persons: Population size in the destination country in million of persons, 1st January of the year, 2004 - 2010. Source: Eurostat.

Southern European country (0/1): Dummy variable for destination countries in Southern Europe ("climate dummy"). It takes the value 1 for Greece, Italy, Portugal and Spain and the value 0 for Austria, Belgium, France, Germany, Ireland, Luxemburg, Netherlands, United Kingdom.

Regime dummy (restricted freedom of movement) in *j* (0/1): Dummy variable for the application of temporary restrictions to the freedom of movement (*2+3+2 rule*) in the destination country. It takes the value 1 if a country restricts labor market access for workers from the EU-10 or EU-2 in that year and the value 0 if no restrictions are applied. If the restrictions are lifted during the year, for example, on the 1st of May 2011, the dummy value is 0 as if there was no restriction in place during the whole year. Source: EU Commission, DG Employment.

Public social expenditures / GDP in *j*: Ratio of public social spending to the gross domestic product in the destination country. Numbers are based on detailed OECD data for 2004 to 2007 and projections of the aggregated spending for 2008 to 2010. It contains cash benefits and benefits in kind. Source: OECD Social Expenditure Database (SOCX).

Annual replacement income in 10,000 Euro in *j*: Annual out-of-work income in 10,000 Euro for a single person without children (100 % of the average wage), 2004 – 2010. Housing benefits are included (applies to Greece, Ireland, United Kingdom). Source: OECD Statistics, Out of work tax / benefit.

Net replacement rate in % in *j*: Net replacement rate in the case of unemployment in the destination country. Rate is calculated as the ratio of annual net earnings and out-of-work income for a single person without children (100 % average wage). Source: Eurostat, OECD Statistics Out of work tax / benefit.

2. Source-destination (network) effects $N_{ij,t-1}$

Diaspora stock in *j* in mio. persons: Total number of persons with a nationality of an EU-15 (other than the destination), EU-10 or EU-2 country in the destination country, in million persons. Source: Own calculations based on the EU-LFS, Central Register of Foreigners, Federal Office of Administration Germany.

Education level (ISCED) in age-specific diaspora: Average education level (ISCED) in the age-specific diaspora stock in the destination country. Based on the ISCED score, three education levels are built. The variable value for low education is set to 1 and consists of the ISCED levels 0 to 2, the variable value for medium education is set to 2 and consists of the ISCED levels 3 and 4 and the variable value for high education is set to 3 and consists of the ISCED levels 5 and 6. Source: Own calculations based on the EU-LFS.

Proportion of females in age-specific diaspora: Proportion of female persons in the age-specific diaspora stock. Source: Own calculations based on the EU-LFS.

Proportion of employed in age-specific diaspora: Proportion of employed persons in the age-specific diaspora stock in the destination country. Source: Own calculations based on the EU-LFS.

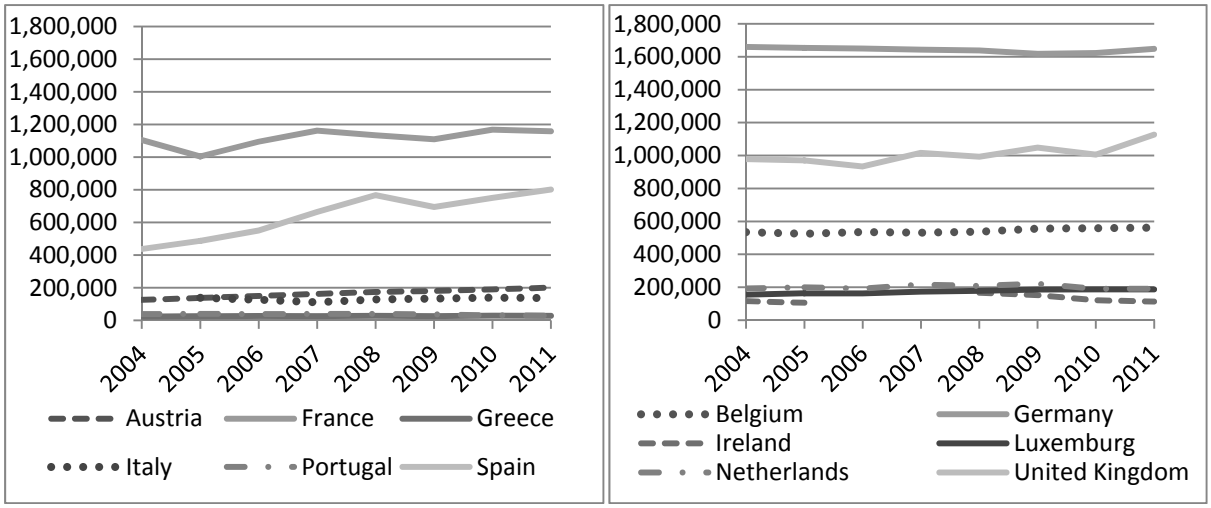
3. Source specific factors $S_{i, t-1}$

Education level (ISCED) in source cohort: Average education level (ISCED) in the age-specific cohort in the source region (EU-15, EU-10 or EU-2). Based on the ISCED score, three education levels are built. The variable value for low education is set to 1 and consists of the ISCED levels 0 to 2, the variable value for medium education is set to 2 and consists of the ISCED levels 3 and 4 and the variable value for high education is set to 3 and consists of the ISCED levels 5 and 6. Source: Own calculations based on the EU-LFS.

Proportion of employed in source cohort: Proportion of employed persons in the age-specific cohort in the source region. Source: Own calculations based on the EU-LFS.

A.3. Migrant stocks with EU-15 nationality in the destination countries

Figure 2A: Number of migrants with an EU-15 nationality in the EU-15 countries (2004 - 2011).



Source: EU-LFS (2004-2011), for Germany: Central Register of Foreigners, Federal Office of Administration Germany (2004-2011).

Notes: Denmark, Finland and Sweden are excluded. Ireland only provides EU-LFS data for the years 2004 to 2005 and 2008 to 2010. Italy does not provide data for 2004. All estimates are based on more than 50 obs. EU-LFS population weights are used.

A.4. Construction of diaspora ratios

Table 1A: Migrant stocks in the destination countries, grouped by age and source region (2010)

Cohort	1	2	3	4	5	6	7	8	9
Source reg.	EU-15	EU-15	EU-15	EU-10	EU-10	EU-10	EU-2	EU-2	EU-2
Age band	15-24	25-34	35-44	15-24	25-34	35-44	15-24	25-34	35-44
in Austria	20953	35314	41994	8530	25318	21875	7342	14697	9139
in Belgium	42375	72942	105464	(3933)	17018	12787	4639	14804	9293
in Germany	155679	272619	358197	(62169)	152976	155362	(25233)	(41456)	(46387)
in Spain	58229	111571	167403	(12477)	(34673)	(32302)	139337	273130	258286
in France	61936	114680	219996	(2035)	23189	10629	9305	28095	18372
in Greece	(2152)	3780	5603	5463	6162	5540	8245	22486	20950
in Ireland	11347	25312	29113	24952	92423	25575	2397	6130	3976
in Italy	5431	21849	33459	9754	45939	31187	119667	308917	247423
in Luxemb.	20028	32838	37876	(277)	(1302)	1449	(184)	(848)	(404)
in Netherl.	13147	29330	45397	(4538)	(12363)	(7647)	(1465)	(6771)	(3486)
in Portugal	3327	5912	6883	(60)	(1783)	(79)	3701	7589	4436
in United K.	104672	184856	185375	146943	422097	124159	(24536)	63457	(18983)

Source: Own calculations based on the EU-LFS 2010. The cell entries in brackets are estimations that are based on less than 50 observations in the EU-LFS. Thus, these estimations should be treated very carefully as they might be biased due to the small number of observations in the sample.

Table 2A: Population in source regions, grouped by age and source region (2010, in millions)

Cohort	1	2	3	4	5	6	7	8	9
Source reg.	EU-15	EU-15	EU-15	EU-10	EU-10	EU-10	EU-2	EU-2	EU-2
Age band	15-24	25-34	35-44	15-24	25-34	35-44	15-24	25-34	35-44
Austria	44.75	50.48	57.64	9.72	11.63	10.05	3.89	4.27	4.56
Belgium	44.44	50.16	57.40	9.72	11.63	10.05	3.89	4.27	4.56
Germany	36.19	41.58	46.80	9.72	11.63	10.05	3.89	4.27	4.56
Spain	40.97	44.29	51.25	9.72	11.63	10.05	3.89	4.27	4.56
France	38.31	43.94	50.37	9.72	11.63	10.05	3.89	4.27	4.56
Greece	44.66	50.00	57.22	9.72	11.63	10.05	3.89	4.27	4.56
Ireland	45.21	50.79	58.26	9.72	11.63	10.05	3.89	4.27	4.56
Italy	39.69	43.90	49.19	9.72	11.63	10.05	3.89	4.27	4.56
Luxemburg	45.70	51.49	58.85	9.72	11.63	10.05	3.89	4.27	4.56
Netherlands	43.75	49.58	56.50	9.72	11.63	10.05	3.89	4.27	4.56
Portugal	44.60	49.98	57.32	9.72	11.63	10.05	3.89	4.27	4.56
United K.	37.69	43.44	50.14	9.72	11.63	10.05	3.89	4.27	4.56

Source: Own calculations based on the EU-LFS 2010.

A.5. Summary statistics

Table 3A: Summary statistics of the country panel (minimum of 50 observations per cohort)

Variable	Obs.	Mean	Std. Dev.	Min	Max
Annual change in the diaspora ratio	432	0.748	2.578	-6.458	17.246
Diaspora stock in mio. persons	432	0.378	0.440	0.005	1.660
Education level in diaspora cohort	432	1.955	0.307	1.282	2.753
Prop. of females in diaspora cohort	432	0.552	0.095	0.347	0.916
Prop. of employed in diaspora cohort	432	0.886	0.078	0.549	1
Population in source cohort in mio.	432	28.056	21.394	3.892	60.629
Education level in source cohort	432	1.925	0.225	1.458	2.251
Prop. of females in source cohort	432	0.494	0.004	0.484	0.501
Prop. of employed in source cohort	432	0.892	0.056	0.683	0.955
Annual net wage in 10,000 Euro	432	2.246	0.614	1.098	3.613
Unemployment rate in %	432	7.865	2.996	3.100	20.100
Ratio of social exp. to GDP	432	0.249	0.033	0.161	0.322
Net replacement rate in dest. country	432	0.451	0.181	0.071	0.698
Net replacement income in 10,000 E.	432	1.077	0.580	0.125	2.147
Population size in dest. country (mio)	432	32.265	27.406	0.455	82.532
Southern European country	432	0.363	0.482	0	1
Migration regime dummy	432	0.271	0.445	0	1

Table 4A: Summary statistics of the country panel (minimum of 10 observations per cohort)

Variable	Obs.	Mean	Std. Dev.	Min	Max
Annual change in the diaspora ratio	621	0.618	2.281	-6.458	17.246
Diaspora stock in mio. persons	621	0.291	0.400	0.000	1.660
Education level in diaspora cohort	621	1.951	0.340	1.124	2.939
Prop. of females in diaspora cohort	621	0.569	0.117	0.220	1
Prop. of employed in diaspora cohort	621	0.870	0.117	0	1
Population in source cohort in mio.	621	23.332	20.515	3.892	60.629
Education level in source cohort	621	1.900	0.237	1.458	2.251
Prop. of females in source cohort	621	0.494	0.004	0.484	0.501
Prop. of employed in source cohort	621	0.883	0.063	0.683	0.955
Annual net wage in 10,000 Euro	621	2.267	0.630	1.061	3.613
Unemployment rate in %	621	7.863	3.087	3.100	20.100
Ratio of social exp. to GDP	621	0.248	0.033	0.161	0.322
Net replacement rate in dest. country	621	0.465	0.170	0.071	0.698
Net replacement income in 10,000 E.	621	1.115	0.571	0.125	2.147
Population size in dest. country (mio)	621	32.918	27.593	0.455	82.532
Southern European country	621	0.343	0.475	0	1
Migration regime dummy	621	0.367	0.482	0	1

A.6. Results for the dynamic stock model

Identification strategy:

$$m_{ij,t} = \alpha_0 + \alpha_1 m_{ij,t-1} + \beta_1 D_{j,t-1} + \beta_2 N_{ij,t-1} + \beta_3 S_{i,t-1} + \beta_4 I_{ij,t-1} + \beta_5 T_t + \beta_6 c_i + \varepsilon_{ij,t}$$

Table 5A: Pooled OLS regression for the dynamic stock model (minimum of 50 obs. per cohort)

Explanatory variables	**Dependent variable:** $m_{ij,t}$ = annual cohort-specific diaspora ratio				
	(1)	(2)	(3)	(4)	(5)
Cohort-specific diaspora ratio in *t*-1	1.080*** (0.050)	1.106*** (0.044)	1.104*** (0.048)	1.105*** (0.052)	1.059*** (0.049)
Destination country variables $D_{j,t-1}$					
Net wage in 10,000 in *j*	0.964** (0.383)	0.593** (0.242)	0.616 (0.438)	0.634** (0.313)	2.037* (1.057)
Unemployment rate in *j*	-0.130*** (0.050)	-0.102 (0.063)	-0.112 (0.073)	-0.110 (0.079)	-0.338* (0.184)
Population in destination country *j* in mio.	0.013 (0.011)	0.017* (0.010)	0.020 (0.014)	0.019** (0.010)	0.036 (0.025)
Southern country (0/1)	1.714** (0.690)	1.002** (0.502)	1.092 (0.752)	1.173* (0.686)	3.889** (1.886)
Regime dummy (restricted freedom of m.) in *j* (0/1)	0.369 (0.614)	0.412 (0.767)	0.447 (0.742)	0.341 (0.829)	-5.915 (6.975)
Social expenditure / GDP in *j*	-2.019 (4.169)	-1.900 (3.520)	-0.204 (3.573)	0.674 (3.013)	-0.313 (9.423)
Source-destination (network) effects $N_{ij,t-1}$					
Diaspora stock in *j* in mio.		-0.713 (0.672)	-0.922 (0.867)	-0.996 (0.809)	0.526 (1.916)
Education level (ISCED) in age-specific diaspora			-0.131 (0.721)	-0.008 (0.740)	0.384 (1.522)
Proportion of females in age-specific diaspora			-2.773 (1.810)	-2.855 (1.892)	-2.250 (2.317)
Proportion of employed in age-specific diaspora			0.109 (1.214)	0.112 (0.977)	-1.782 (1.412)
Source specific factors $S_{i,\,t-1}$					
Education level (ISCED) in source cohort			3.230 (2.721)	-0.312 (3.110)	-6.372 (5.140)
Proportion of employed in source cohort			-5.140 (8.055)	-11.091 (7.972)	-4.626 (5.384)
Interaction: push-pull factors and migration regime $I_{ij,t-1}$					
Net wage x restriction					-1.488 (1.342)
Unemployment rate x regime dummy					0.411* (0.237)
Population in dest. country x regime dummy					-0.017 (0.032)
Southern country x regime dummy					-3.593* (2.054)
Social expenditures to GDP x regime dummy					-0.952 (9.903)
Diaspora stock in *j* in mio. x regime dummy					-1.273 (2.582)
Education level in diaspora x regime dummy					-0.430 (1.246)
Prop. of females in diaspora x regime dummy					0.538 (3.434)
Prop. of employed in diaspora x regime d.					2.030 (1.622)
Education level in source cohort x regime dummy					4.245 (2.734)
Prop. of employed in source x regime dummy					-15.388** (7.131)

Table 5A: Pooled OLS regression for the dynamic stock model (continued)

Time dummies	yes	yes	yes	yes	yes
Age and source dummies	yes	yes	yes	no	no
Source cohort dummies	no	no	no	yes	yes
Constant included	yes	yes	yes	yes	yes
R-squared	0.966	0.975	0.975	0.975	0.978
Number of observations	504	486	486	486	486

* p<0.10, ** p<0.05, *** p<0.01. Standard errors that are clustered by destination country and time are shown in parentheses. I use the Cameron, Gelbach and Miller (2011) procedure in Stata to control for two-way clustered error terms. In all regressions, time dummies and a constant are included. All explanatory variables are lagged by one year except for the regime dummy.

A.7. Regression tables for the static flow model with all covariates

Table 6A: Estimates for the static flow model with all covariates (minimum of 50 obs. per cohort)

Explanatory variables	**Dependent variable:** $\Delta m_{ij,t}$ = annual change in the diaspora ratio				
	(1)	(2)	(3)	(4)	(5)
Destination country variables $D_{i,t-1}$					
Net wage in 10,000 in *j*	1.792***	1.967***	1.992***	2.143***	4.508**
	(0.347)	(0.487)	(0.563)	(0.576)	(1.952)
Unemployment rate in *j*	-0.040	-0.072	-0.084	-0.082	-0.329***
	(0.043)	(0.056)	(0.082)	(0.101)	(0.119)
Population in destination	0.017**	0.003	0.006	0.003	0.029
country *j* in mio.	(0.008)	(0.015)	(0.015)	(0.013)	(0.025)
Southern country (0/1)	2.762***	3.317***	3.535***	3.948***	7.926***
	(0.399)	(0.681)	(0.935)	(0.939)	(1.936)
Regime dummy (restricted	0.822	0.934	0.969	0.873	-10.436
freedom of m. in *j* (0/1)	(0.729)	(0.782)	(0.789)	(1.146)	(10.500)
Social expenditures	2.322	4.988	9.493**	12.829***	5.897
/ GDP in *j*	(5.179)	(5.691)	(4.410)	(4.855)	(10.227)
Source-destination (network) effects $N_{ij,t-1}$					
Diaspora stock in *j* in mio.		1.171	0.848	0.986	1.132
		-0.949	-1.047	-0.920	-3.055
Education level (ISCED)			0.660	1.120	3.890
in age-specific diaspora			-1.031	-0.955	-2.918
Proportion of females			-4.303*	-5.050*	-2.731
in age-specific diaspora			-2.543	-2.925	-3.534
Proportion of employed			0.318	0.557	-2.855
in age-specific diaspora			-2.571	-2.645	-3.599
Source specific factors $S_{i,\,t-1}$					
Education level (ISCED) in			3.579	1.001	-4.271
source cohort			-3.416	-7.327	-5.739
Proportion of employed in			-5.603	-19.142*	-17.305**
source cohort			-8.846	-10.111	-8.650
Interaction: push-pull factors and migration regime $I_{ij,t-1}$					
Net wage x regime dummy					-3.479*
					-2.004
Unemployment rate					0.438**
x regime dummy					-0.194
Population in dest. country					-0.014
x regime dummy					-0.038
Southern country					-7.364***
x regime dummy					-1.713
Social expenditures to GDP					-5.147
x regime dummy					-10.73

Table 6A: Estimates for the static flow model with all covariates (continued)

Diaspora stock in *j* in mio.					-1.996
x regime dummy					-4.239
Education level in diaspora					-4.004
x regime dummy					-2.755
Prop. of females in diaspora					0.175
x regime dummy					-4.943
Prop. of employed in					2.108
diaspora x regime d.					-3.953
Education level in source					4.416
cohort x regime dummy					-4.037
Prop. of employed in					-5.890
source x regime dummy					-16.186
Time dummies	yes	yes	yes	yes	yes
Age and source dummies	yes	yes	yes	no	no
Source cohort dummies	no	no	no	yes	yes
Constant included	yes	yes	yes	yes	yes
R-squared	0.286	0.298	0.315	0.338	0.474
Number of observations	432	432	432	432	432

* p<0.10, ** p<0.05, *** p<0.01. Standard errors that are clustered by destination country and time are shown in parentheses. I use the STATA routine by Cameron, Gelbach and Miller (2011) to control for two-way clustered error terms. In all regressions, time dummies and a constant are included. All explanatory variables are lagged by one year except for the regime dummy.

Table 7A: Estimates for the static flow model with all covariates (minimum of 10 obs. per cohort)

Explanatory variables	**Dependent variable:** $\Delta m_{ij,t}$ = annual change in the diaspora ratio				
	(1)	(2)	(3)	(4)	(5)
Destination country variables $D_{i,t-1}$					
Net wage in 10,000 in *j*	1.219***	1.307***	1.465***	1.453***	1.518
	(0.354)	(0.431)	(0.452)	(0.409)	(0.998)
Unemployment rate in *j*	-0.052	-0.079	-0.076	-0.075	-0.241
	(0.040)	(0.051)	(0.065)	(0.072)	(0.153)
Population in destination	0.017**	0.005	0.006	0.006	0.015
country *j* in mio.	(0.008)	(0.011)	(0.011)	(0.011)	(0.020)
Southern country (0/1)	2.258***	2.638***	2.756***	2.748***	3.839***
	(0.476)	(0.705)	(0.788)	(0.842)	(1.362)
Regime dummy (restricted	0.426	0.528	0.590	0.517	-8.060
freedom of m.) in *j* (0/1)	(0.605)	(0.646)	(0.673)	(0.742)	(8.270)
Social expenditures	1.837	4.095	5.249	5.679	12.872
/ GDP in *j*	(4.668)	(5.091)	(4.744)	(4.951)	(8.762)
Source-destination (network) effects $N_{ij,t-1}$					
Diaspora stock in *j* in mio.		1.314	1.035	1.083	4.173**
		(0.884)	(0.866)	(0.878)	(1.743)
Education level (ISCED)			-0.479	-0.427	-0.744
in age-specific diaspora			(0.477)	(0.416)	(0.794)
Proportion of females			-1.910	-1.977	-0.945
in age-specific diaspora			(1.347)	(1.507)	(0.827)
Proportion of employed			0.405	0.417	-0.042
in age-specific diaspora			(0.743)	(0.770)	(1.274)
Source specific factors $S_{i,\,t-1}$					
Education level (ISCED) in			0.609	2.198	0.089
source cohort			(1.953)	(3.563)	(3.538)
Proportion of employed in			-2.144	-6.461	-8.634***
source cohort			(4.045)	(5.121)	(1.413)

Table 7A: Estimates for the static flow model with all covariates (continued)

Interaction: push-pull factors and migration regime $I_{ij,t-1}$					
Net wage x regime dummy					-0.753
					(1.161)
Unemployment rate					0.333**
x regime dummy					(0.169)
Population in dest. country					-0.005
x regime dummy					(0.027)
Southern country					-3.566**
x regime dummy					(1.549)
Social expenditures to GDP					-14.448
x regime dummy					(11.160)
Diaspora stock in *j* in mio.					-4.666**
x regime dummy					(2.336)
Education level in diaspora					0.281
x regime dummy					(0.906)
Prop. of females in diaspora					-0.378
x regime dummy					(2.211)
Prop. of employed in					0.599
diaspora x regime d.					(1.124)
Education level in source					1.868
cohort x regime dummy					(2.222)
Prop. of employed in					-8.849
source x regime dummy					(6.317)
Time dummies	yes	yes	yes	yes	yes
Age and source dummies	yes	yes	yes	no	no
Source cohort dummies	no	no	no	yes	yes
Constant included	yes	yes	yes	yes	yes
R-squared	0.206	0.229	0.239	0.244	0.375
Number of observations	621	621	621	621	621

* p<0.10, ** p<0.05, *** p<0.01. Standard errors that are clustered by destination country and time are shown in parentheses. I use the STATA routine by Cameron, Gelbach and Miller (2011) to control for two-way clustered error terms. In all regressions, time dummies and a constant are included. All explanatory variables are lagged by one year except for the regime dummy.

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