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Out-Migration and Economic Cycles *

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Abstract

Out-migration concerns foreigners who decide to leave a country where they used to live. Taking advantage of the OECD bilateral IMS database, we analyze the short-run determinants of out-migration using a panel of Schengen countries between 1995 and 2011. We find that out-migration is counter-cyclical: foreign nationals tend to leave hosting countries that experience high unemployment while be incited to stay in good times (i.e. low unemployment). Typically, a 1 percentage point increase in unemployment rate leads to a 0.5 percentage point increase in out-migration. Thus, short-term economic fluctuations have the same qualitative effect than restrictive migration policies in economic downturns. However, we find mixed evidence for the role of economic cycles in the potential countries of destinations of those flows. Movers appear to be sensitive to unemployment changes in their country of origin, but they do not seem to be sensitive to business cycles in other potential destinations.

J.E.L: F22 ; J61 ; 015

Keywords: Migration ; Outflows ; Business cycle

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1 Introduction

It becomes a recurrent fact to observe a dramatic increase in the votes for anti-immigrant parties in Western Europe during recessions. By so doing, citizens put pressure on policymakers to limit the entry of new foreigners and encourage the exit of settled migrants.

Attitudes towards migrants have become more hostile in most European countries. This can be explained by the changing nature of migration: seasonal and other temporary worker migrants have been progressively replaced by family reunification and permanent settlements after the seventies (Castles, 2006). Researchers have shown that European opinions about migrants are shaped more by cultural views than by cost-benefit perceptions (Card *et al.*, 2012). But the perception of costs might have been exacerbated during the Great Recession. Hatton (2014) shows that the change in the opinion towards immigration during this period has been more negative in countries most affected by the crisis. He finds that unemployment has a negative impact on the propensity to think that immigrants are "*good for the economy*". It may have put additional pressure on policy makers to set measures encouraging many categories of migrants (unskilled, unemployed but also skilled foreign students) to move back home. Among these measures one could observe a hardening of residence cards renewals and a settlement of attractive financial packages to encourage migrants to go back home (OECD, 2009).

This paper shows that an alternative policy of 'laissez-faire' might also regulate the exit of migrants (i.e. out-migration)[1]. We claim in this paper that a hardening of out-migration policies might not be needed to regulate the number of settled foreigners in a country, as short-run economic forces by themselves might be capable to produce similar outcomes. More precisely, we show that settled migrants are incited to stay in the hosting country during periods of low unemployment while pushed to leave it instead, in periods of high unemployment. Notice in passing, that such result weakens the idea that *"migrants are stealing the jobs of native workers in bad times"*. The paper also shows, although to a lesser extent, that the business cycle in the country of origin of the migrants is also a driving force of return migration.

The literature on out-migration (return migration or migration to a third country) is relatively

[1]Along the paper, we also use the terms "migration outflows" or "outward migration" when we refer to out-migration

scarce. Borjas & Bratsberg (1996) analyzes the determinant of out-migration of foreign-born individuals in the US. They find that outmigration is negatively selected, which reinforces the positive selection over staying migration. They argue that return migration may have been planned as part of an *"optimal life-cycle residential location sequence"* or may be explained by erroneous information about opportunities in the US, received prior to the decision to migrate. More recent studies find much mixed evidence regarding the selection of outward migrants. Dustmann & Weiss (2007) set a model which synthesizes most of the micro-economic motives for people to go back home (return migration), provide some evidence at the micro level using UK Labour Force Survey (LFS) data showing that this migration is rather selective.[2] Analyzing the migration from Eastern Europe, Mayr & Peri (2009) show that the human capital acquired in Western Europe yields higher return in the home country, which may explain a positive selection in return migration. de Haas *et al.* (2014) analyze the determinants of return migration in Morocco and find very mixed results whether return migration is the sign of a success or a failure for the migrant. Dustmann & Gorlach (2014) also show that return migration is rather 'selective', as it happens to be temporary and more observed among migrants which are nationals of rich countries than for migrants originating from developing ones. Dustmann & Görlach (2015) summarize the literature on temporary migration and show how temporariness can affect various economic choices.

Some papers address the impact of economic cycles on out-migration, but only indirectly, based on micro-data and focusing on the possible influence of employment opportunities, experience of unemployment and income dynamics at the individual level. Aydemir & Robinson (2008) show the effect of the early 1990s recession in Canada on the probability of leaving of different cohorts of migrants. They find that the probability of leaving rises rapidly as the cohort entry date approaches this recession. However, this effect was not durable despite the persistence of high unemployment. Bijwaard & Wahba (2014) focus on the effect of income on migration duration in The Netherlands. They show that the intensities of return migration follows a U-shaped with respect to migrants' income. Based on the same data, Bijwaard *et al.* (2014) find that unemployment shorten immigration durations while re-employment delay returns. Bellemare (2007) and Constant & Massey (2003) also find a negative selection in terms of employment outcomes

[2]See also Dustmann *et al.* (2011).

in return migration from Germany. Also on Germany, Kırdar (2009) shows that immigrants who have been unemployed for less than 3 years are more likely to return but long-term unemployed immigrants are more likely to stay.

Another strand of the literature looks however, at short-run business cycle determinants of emigration or immigration. In particular, Beine *et al.* (2013) use bilateral migration data to show that it is driven by relative differences in business cycles or employment prospects, along with some long run determinants (wage differences). Docquier *et al.* (2014) find that economic growth in destination countries is the main economic generator of economic opportunities. These results appear to be relatively consistent with other prior studies that were generally based on one country at a time (Coulombe, 2006; Bertoli *et al.*, 2013; McKenzie *et al.*, 2014).

Our paper departs from the rest of the literature by studying the link between short run macroeconomic factors and out-migration specifically. To some extent our work is relatively close to that of Beine *et al.* (2013). However, the latter authors focus on *all* migrants from one country to another, thus using data which includes and probably represents mainly natives. Their work cannot tell specifically how *non-native* residents (which we call out-migrants in our study) behave to economic shocks. As mentioned above, this neglected issue is very important from the point of view of policy as policymakers in some hosting country would be interested to see how foreigners *per se* behave to a shock, which would enable them to adjust accordingly their exit-policies.

We use out-migration data from the OECD IMS database. The data have a bilateral dimension as they represent the OECD hosting countries declarations of out-migrations by nationality of origin. OECD Data on migration outflows have been overlooked so far because of the heterogeneity of the country sources that register these flows. To account for this caveat, we rely systematically on *within* reporting country variations. Now, one expects migration flows to be usually driven by three types of factors: short run factors, long-run determinants and policy factors. Because our objective is to measure in particular the effects of short run factors on out-migration, we concentrate on Schengen and EU countries. By so doing, we select a dataset of countries where long run factors (differences in wages, benefits, cultural differences, etc...) should not play a major role and where the movement of people is free from binding policy measures.

We show in particular that out-migration is counter-cyclical in the case of the hosting country:

more precisely, a 10 percentage points increase in unemployment in some resident country appears to be increasing outflows by around 5.5 percentage points. Because it holds within Schengen area where no barriers are set against the movement of EU citizens, this result cannot be due to a hardening of migration policies. It arises from the willingness of the migrant to exit a country in crisis. Further, to the extent that out-migration is also representative of return migration, we find it to be pro-cyclical for the country of origin: low unemployment at home incites nationals residing in foreign countries to move back home.

In section 2 we describe the data. Section 3 presents some stylized facts and the empirical strategy we use. The results are detailed in section 4. Section 5 concludes.

2 Data and Descriptive Statistics

2.1 Migration outflows

We use the *International Migration Statistics* (OECD, 2013) database to study the relation between out-migration and the business cycles. Data on migration outflows is provided by nationality of migrants and country of residence. It is available for 24 residence and 167 origin countries between 1990 and 2011. For each year, we know how much migrants from a given nationality have left one given hosting country. One should notice that these outflows account for all exit flows. This concerns return migration (e.g. migration back to the country of origin) as well as all migration flows toward third countries.[3] The first sub-section describes the data and its limitation before proposing to exploit within variations. The second sub-section explains the focus we make on Schengen countries in order to assess correctly the impact of cyclical effects on out-migration.

2.1.1 A focus on within-variations

The data are provided by a continuous reporting system on migration set by the OECD secretariat with the approval of the authorities of member countries. Depending on the country, the data are

[3]It is not possible to disentangle between return migration and migration towards a third country as the data does not inform about the new country of residence of the outward migrant.

obtained from three major sources: population registers, residence and/or work permits information delivered by the competent authorities, or estimations from specific surveys. In population registers, emigrants are "*usually identified by a stated intention to leave the country, although the period of (intended) absence is not always specified.*" (OECD 2013, p. 314). As for surveys related data, some countries like Ireland use households surveys while others like the UK, collect data from surveys of passengers entering or exiting the countries by plane, train or boat. Due to the heterogeneity of sources, the comparability of statistics across countries is not guaranteed. As an illustration, table 1 describes our sample of countries, as well as the time coverage through some descriptive statistics. Outflows are reported by the country of residence. In order to have a clearer idea about the *magnitude* of such outflows, we also report the ratio of these exit flows to the total stock of migrants in the country as well as native population. Migration outflows appear to represent between 2 and 10% of total migrants for most countries, and between 0.1 and 0.8% of the total native population. However, some countries like Italy or Estonia have much smaller figures than the average.

That is why, in what follows, we will rely only on *within* country variations, through exploiting the temporal dimension of the database. We will thus present regressions where we include systematically reporting countries fixed effects (that is the residence countries' fixed effects) or, alternatively, dyadic fixed effects (i.e (residence)$\times$ (origin) effects). By exploiting information provided in the statistical annexes of OECD migration outlooks, we also exclude from the sample, countries which have changed their methodology in collection of data or have changed their definition of migrants.

Now, the account for fixed effects allows to capture permanent cross-country differences in the quality of reporting outflows. However, the quality of reporting might also change overtime and not at the same rate for all our countries. We thus had to find a way to assess further the reliability of outflows per reported country overtime. One ad-hoc but useful way to proceed is to look at the covariation between changes in outflows and changes in inflows of migrants for a reporting country, where inflows data are known to be much more reliable that those of outflows. Although the sign of the co-variation between the two measures is not obvious, there is one factor however, that should drive positive correlation: the fact that a higher number of outmigrants at a

time t can be, ceteris paribus, driven by a higher stock of migrants in t (due to an increase in the number of incoming migrants the years before). Nevertheless, some economic cycles determinants might drive in an opposite way both measures: a higher unemployment in some country might increase out-migration while decreasing in-migration. In either case, the two measures should co-vary positively (more likely in normal times) or negatively (likely to be the case in bad times). This should lead us to observe simultaneous cross-time changes in the flows of in-migration and out-migration. By comparing the changes in the two flows, we were able to identify graphically some apparent connections between the two types of data for at least 9 out of 16 countries. The following figure 1 are two extreme representation of what we found: one related to Germany, the other related to Italy. It turns out that those countries who appeared with figures that are close to what we have for Germany were among the most traditional hosting countries in the sample. Besides, they are probably those which we expect to produce the best data on migration issues for policy reasons (Besides Germany, we have Austria, Belgium, Switzerland, Denmark, Iceland, Luxembourg, Norway and Sweden.). In the appendix, we show the results of the same regressions that are presented in the heart of the paper, but based only on these 9 countries and found similar results than those shown in the heart of the paper.[4]

2.1.2 The choice of Schengen countries

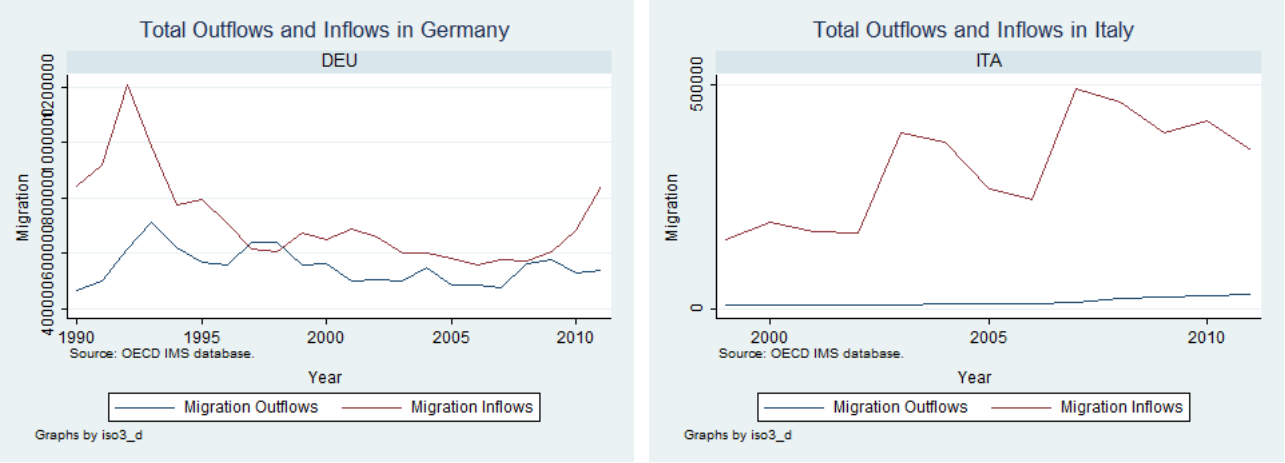
Besides focusing on within variations we choose to restrict the sample to outflows of nationals from Schengen countries residing in other Schengen countries. Doing so, we keep 16 countries of residence and 24 origin countries in our database, and we focus on the 1995-2011 period.[5] In the appendix of the paper, we modify our sample to: a) EU nationals residing within the EU; b) Nationals from EU15 countries; and c) the whole sample of outflows reported by the OECD data.

The Schengen agreements were signed in 1985 and supplemented in 1990 by the Schengen convention which proposed the abolition of internal border controls and a common visa policy

[4]We have also undertaken two alternative checks: first, we have run again our regressions on a subsample of countries where the correlation between the two is statistically significant at 5% and found similar results than those shown in the paper. Second, we have also checked the consistency of our results by dropping each country of residence one-by-one in order to be sure that our results are not driven by one single country. All these results can be provided upon request.

[5]Countries which have implemented Schengen after 1995 are included in the sample only when they entered the Schengen area.

Figure 1: Comparing Migration Inflows and Outflows



Source: OECD IMS Database
Note: Reliability coding for Germany: correct. Reliabily coding for Italy: weak.

Table 1: Descriptive Statistics of Migration Outflows (by country of residence)

Country	Years	Outflows (average)	Min	Max	Outflows (% tot. mig.)	Outflows (% nat. pop.)
Austria	1996-2011	53028	44350	75573	6,7%	0,6%
Belgium	1990-2011	27090	27042	56595	3,9%	0,3%
Denmark	1990-2011	13937	4561	27084	5,1%	0,3%
Finland	1990-2011	2516	938	4496	2,7%	0,0%
Germany	1990-2011	551500	466000	710240	8,0%	0,7%
Hungary	1991-2010	3677	1928	6047	2,2%	0,8%
Iceland	1999-2011	2364	810	5850	13,8%	0,8%
Italy	1999-2011	15494	7700	32404	0,5%	0,0%
Luxembourg	1990-2011	6741	4940	8641	4,1%	1,5%
Netherlands	1990-2011	25397	20397	47612	3,6%	0,2%
Norway	1990-2011	13088	8057	22883	6,2%	0,3%
Slovakia	2003-2011	2745	1080	5002	7,5%	0,1%
Slovenia	1998-2010	7034	1643	15071	13,9%	0,4%
Spain	2002-2011	160144	6931	335676	3,0%	0,4%
Sweden	1990-2011	16255	12522	23673	3,2%	0,2%
Switzerland	1990-2011	54438	46320	80373	4,3%	0,8%

Source: OECD IMS Database

for people from third countries. The Schengen Area was created on 26th of March 1995 with 7 countries (Belgium, France, Germany, Luxembourg, Netherlands, Portugal, Spain) and was progressively extended since then. Today, the Schengen Area includes 26 countries.

Two reasons have driven our choice of considering primary Schengen reporting countries and Schengen citizens:

- *Perfect free movement of people when using the Schengen sample*

  Our main objective is to measure the impact of short-run macro determinants. However, the estimated coefficients of macroeconomic variables may be biased if the economic context induces changes in migration policies too. For instance, it may be the case if high unemployment rates push governments to discourage settlements and/or encourage exits through more stringent policies. That is why we restrict our sample to countries across which the movement of people is free in our main regressions: by so doing, we are capable to condition out a priori the potential impact of migration policies and minimize the risk of endogeneity.

  As a matter of fact, the right to move and the right of residence for all citizens is a fundamental principle of the European Union: *"All Union citizens have the right to enter another Member State by virtue of having an identity card or valid passport. Under no circumstances can an entry or exit visa be required."*

  For stays of less than three months, the only requirement is that they possess a valid identity document or passport. The right of residence for more than three months remains subject to certain conditions: either be engaged in economic activity (or an employed or self-employed basis), have sufficient resources and insurance, be following vocational training or be a family member of a Union citizen who falls into one of these categories. These conditions are therefore relatively extensive. Moreover, the loss of a job or stop being self-employed, is not a sufficient condition to loose the right of residence. Formally, a person retain the status of worker or self-employed person if (i) she is temporarily unable to work as the result for an illness or accident, (ii) she is in duly recorded as involuntary unemployed after having been employed for more than one year, (iii) she is in duly recorded as involuntary unemployed after completing a fixed-term employment contract of less than a year, of after

having become involuntarily unemployed during the first twelve months, (iv) she embarks on vocational training.

If a citizen does not fulfill these conditions and is caught by the authorities, she can be invited to leave the country. However, it is explicitly mentioned that the host country cannot impose a ban on entry and the citizen keeps the right to return back at any time and enjoy the right to reside (without any conditions the first three months). Finally, the right of permanent residence in the host member state is guaranteed after a five-year period of residence and this right is no longer subject to any conditions. For all these reasons, we can reasonably assume that migration policies within the European Union are not binding for citizens from EU States.

Nevertheless, the accessing countries after the 2004 enlargement did not enjoy the same conditions: transitional restrictions were introduced for citizens which are nationals of these new member states. By then, all the EU countries, except the United Kingdom, Ireland and Sweden, had imposed some restrictions. If all restrictions have been abolished by May 2011, it was a serious case where migration policy could be binding within the EU. Furthermore, unless they are part of the Schengen Area, physical borders between EU countries still exist and could impede the movement of people even when they happen to be EU citizens.

That is why we propose to focus on the Schengen Area in the heart of the paper. This area does not include all EU countries. Nevertheless, it also includes non-EU members (Iceland, Norway, Switzerland). These comply with the EU free movement rules. In the appendix, we show however that our main result regarding the impact of unemployment, especially in the country of residence, resists in significance and magnitude to alternative country samples (i.e. total EU, EU15 or total OECD data).

- *Short-run factors are more likely to matter for within Schengen area migration:*

  It is well known that long run factors (differences in standards of living, benefits, cultural differences, etc...) play a significant role in shaping the movement of people across countries. A part of these factors cannot be correctly observed. Besides, some factors like living standards might be even correlated with short-run determinants of out-migration (i.e unem-

ployment rates). Fortunately, by choosing to restrict the focus on Schengen countries, we expect all of these long run factors not to play a major role. The corresponding countries are rather close to each other in terms of their common European culture, their standard of living or the access to insurance schemes and other benefits.

Hence, the choice to work with pairs of countries from Schengen has a direct implication: we expect the movement of people within the Schengen area to be relatively more governed by short run factors rather than long run ones while excluding policy measures from our empirical equations.

2.2 Link to macro variables

In order to assess the influence of the economic context, we use three macroeconomic variables: the GDP per capita (a proxy of living standards), the growth of GDP and the level of unemployment (i.e. short run drivers). All variables are from the World Development Indicator. See subsection 3.2 below for more details. As we make use of within country variations, we are focusing on the possible influence of the *evolution* of such variables on the evolution of outflows. Figure 2 shows the relation between the evolution of bilateral out-migrations and the changes in our three macroeconomic variables. While we observe no clear relationship between the evolution of outflows and GDP per capita differentials (across pair of countries), out-migration appears to be positively related to changes in unemployment and negatively shaped by GDP growth in the country of residence.

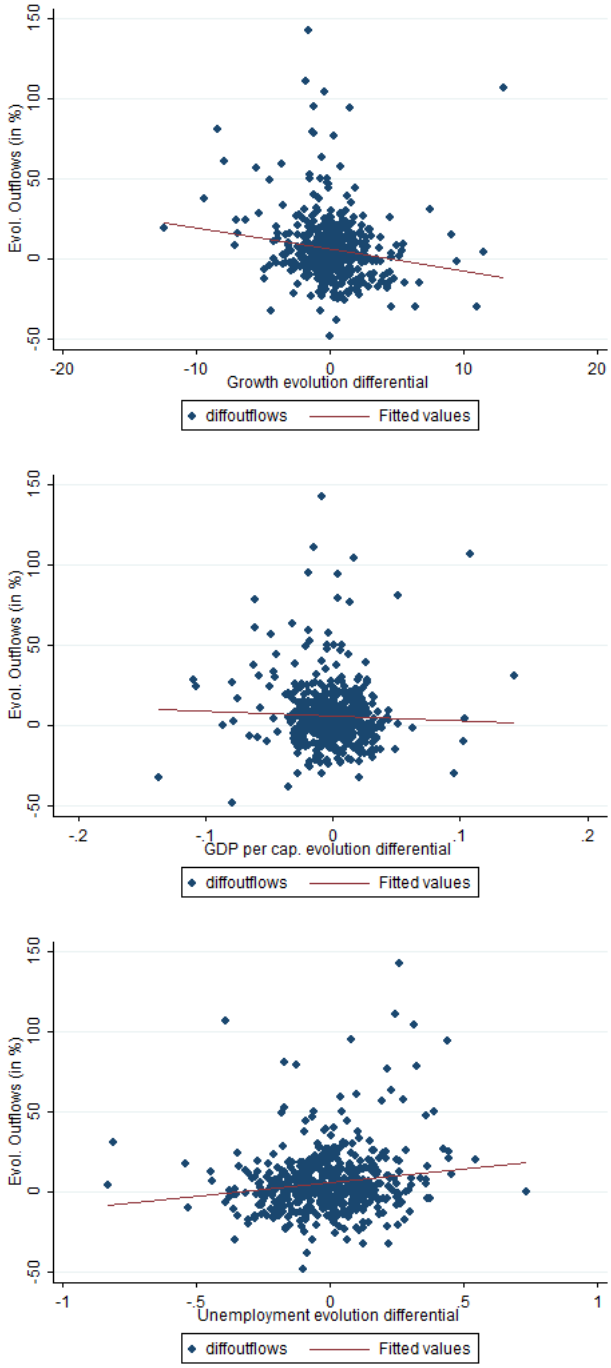
These simple facts regarding the role of business cycles are encouraging. They need to be validated however, by more robust econometric regressions. But before turning econometrics we present first the theoretical framework at the basis of our regressions.

3 Theoretical framework and Empirical Strategy

3.1 Theoretical framework

Our empirical strategy is based on the income maximization framework, which is frequently used to identify the main determinants of migration *in*flows. This approach was first introduced by

Figure 2: Evolution of Migration Outflows and Macroeconomic variables



Source: OECD IMS Database and World Development Indicators
Note: GDP per cap. evolution differential: Difference of GDP per cap. between t and $t-1$. Evol. Outflows: Growth rate between t and $t-1$ in %.

Roy (1951) and Borjas (1987) and was used to analyze the role of wage differentials (Grogger & Hanson, 2011), the role of diaspora (Beine *et al.*, 2011) or the role of "brain drain" (Gibson & McKenzie, 2011). The empirical specification is then very close to a pseudo-gravity model of international migration (Anderson, 2011).

We will adapt such a framework to estimate the determinants of *out*flows instead of *in*flows. The model considers heterogeneous migrants. At each period, they have two possible choices: (1) stay in their residence country, (2) migrate to an alternative country of residence (possibly, but not exclusively, their own country of origin). Basically, they compare the expected utility from staying to that of moving to an alternative destination and choose eventually the one associated with the highest expected utility.

More formally, our framework is very much inspired from that of Beine *et al.* (2013) that we adapt to out-migration. We note $u^{m,o,r}$ the utility of a migrant m of nationality o, residing in r. The triad index $\{m, o, r\}$ designates the identity of the migrant. This migrant might choose to stay in the current country of residence r where she already live or move out to any alternative country in the rest of the world. Let us call that country the oustide option country, *out*. The outside option can be her own country of origin or any third country. If she decides to stay in r, her utility from living in r at time t is then given by:

$$u_{r,t}^{m,o,r} = \beta_w \ln w_{r,t} + \beta_b bc_{r,t} - \beta_u \ln ur_{r,t} + a_r - ac_{r,t}^{o} + \epsilon_{r,t}^{m,o,r} \tag{1}$$

with $w_{r,t}$ represents the expected wage in country r at time t, $ur_{r,t}$ the corresponding level of unemployment and $bc_{r,t}$ a business cycle indicator. The β's represent the respective parameters to be estimated. Besides a_r is a shifter driven by country r characteristics and $ac_{r,t}^{o}$ represents, for a migrant with nationality o, her adaption cost to the way of life in country r. This cost reflects psychological or cultural costs explained by the fact of living far from its native country. $\epsilon_{r,t}^{m,o,r}$ is a random unobservable term that might differ across migrants (captures migrant heterogeneity).

However, if the (m, o, r)-type migrant decides to out-migrate at time t instead, by applying the same reasoning her utility would be,

$$u_{out,t}^{m,o,r} = \beta_w \ln w_{out,t}^{o} + \beta_b bc_{out,t}^{o} - \beta_u \ln ur_{out,t}^{o} + a_{out} - dc_{out,t}^{o,r} - ac_{out,t}^{o} + \epsilon_{out,t}^{m,o,r} \tag{2}$$

where $w^o_{out,t}$ designates the wage our migrant would expect in the country where she would choose to live, while $bc^o_{out,t}$ and $ur^o_{out,t}$ represent respectively the business cycle variable and the unemployment rate that the migrant is expected to face in the outside-option country.

Further, the cost of migrating can be divided in two parts. The first part is linked to the (direct) fixed cost of moving (cost of travel and new installation), $dc^{o,r}_{out,t}$. It is bared whichever the destination of the out-migrant would be. $ac^o_{out,t}$ are the adaption costs related to the migrants' new life. Actually, adaption costs can be observed even when moving back home ($out = o$): the agent might need to (re)-adapt herself to life at home. However, in such particular case we assume that adaption costs would be relatively small[6]. On the opposite, one would expect adjustment costs to be relatively high if moving to a third country.

We now assume that the random terms ($\epsilon^{m,o,r}_{r,t}$ and $\epsilon^{m,o,r}_{out,t}$), follow an iid extreme-value distribution. We can therefore apply the result of McFadden (1974) to derive two probabilities: (1) the probability that a migrant from o residing in r decides to stay in r, and (2) the probability that a migrant from o residing in r decides to out-migrate. These are conditional logit-type expressions.

Hence the probability of moving out of the country of residence can be expressed as:

$$\begin{aligned} P(out = 1) &= \Pr\left[u^{m,o,r}_{out,t} > u^{m,o,r}_{r,t}\right] \\ &= \frac{\exp\left[\ln w^o_{out,t} + bc^o_{out,t} - \ln ur^o_{out,t} + a_{out} - dc^{o,r}_{out,t} - ac^o_{out,t}\right]}{\exp\left[\sum_{k\in(out,r)} \ln w_{k,t} + bc_{k,t} - \ln ur_{k,t} + a_k - dc_{r,k,t} - ac_{o,k,t}\right]} \end{aligned} \tag{3}$$

The probability to stay is then its complement to unity as:

$$P(stay = 1) = \Pr\left[u^{m,r}_{o,r,t} > u^{m,out}_{o,r,t}\right] = 1 - P(out = 1) \tag{4}$$

We do not have access to individual migrants data, however. We then approximate the probability of moving to another country by the share of movers ($M^{o,r}_{out,t}/Mtotal^{o,r}$), where $M^{o,r}_{out,t}$ expresses the number of setlled migrants in r which originate from o and who choose to move

[6]One could also think about 'net costs' from moving back home, where net costs correspond to the (re)adaption costs minus the satisfaction from retrieving the original habits, culture, family and network he had left behind after his first move.

to the *outside* destination during period t, and $Mtotal^{o,r}$ the total stock of o-type migrants settled in r at the *beginning* of period t. The share of stayers can be then immediately obtained through $(M^{o,r}_{r,t}/Mtotal^{o,r}) = 1 - (M^{o,r}_{out,t}/Mtotal^{o,r})$. By dividing the former by the latter share, we obtain the relative share of out-migrating. This corresponds to the relative rate of movers as $\frac{M^{o,r}_{out,t}/Mtotal^{o,r}}{M^{o,r}_{r,t}/Mtotal_{o,r}} = \frac{M^{o,r}_{out,t}}{M^{o,r}_{r,t}} = \frac{P(out=1)}{1-P(out=1)}$: accounting for equations 3 and 4, taking logs and rearranging, we obtain a corresponding equation in logs which will constitute the basis of our econometric tests:

$$\ln M^{o,r}_{out,t} = \ln M^{o,r}_{r,t} + \ln w^{o}_{out,t} + bc^{o}_{out,t} - \ln ur^{o}_{out,t} + a_{out} - dc^{o,r}_{out,t} - ac^{o}_{out,t} - \ln w_{r,t} - bc_{r,t} + \ln ur_{r,t} - a_r + ac^{o}_{r,t} \quad (5)$$

3.2 From theory to data

Recall from here that we only observe the number of migrants of nationality o who leave r at a given date t, but cannot observe the new destination they reach. For instance, we observe the total number of Spanish leaving Germany but are unable to observe to which destination countries they are heading. Because we do not observe the hosting countries of our o-type migrants we cannot precisely observe the variables which are linked to the countries chosen (like for instance $\ln w^{o}_{out}$, bc^{o}_{out} or $\ln ur^{o}_{out}$).

Starting from here, we need to approximate these unobserved variables with a series of observables.

We first assume that moving back to one's own country (i.e return migration) is one of the most likely outside options (i.e $out = o$). Then, our outmigration dependant variable $\ln M^{o,r}_{out,t}$ should be partly affected by factors which are related to the origin country o, the other part being linked to the rest of the world options where migrants would go. More formally, let $y^{o}_{out,t}$ represent one of the following variables of interest $(\ln w^{o}_{out,t}, bc^{o}_{out,t}, \ln ur^{o}_{out,t})$. $\forall y^{o}_{out,t}$ let us specify:

$$y^{o}_{out,t} = \alpha\ y_{o,t} + (1-\alpha) y_{RoW,t}$$

where $y_{o,t}$ and $y_{RoW,t}$ represent the value of y, respectively in the country of origin and in the rest of the world. α and $1-\alpha$ are their respective contribution to $y^{o}_{out,t}$. Note that $\alpha \in [0-1]$ interval and measure the share of the out-migrants who go back home. Because $y_{RoW,t}$ varies only over time it can be easily replaced by a time fixed effect. The time effect captures the general dynamics of the World-Wide economy. It is a first way to control for third-countries characteristics.

Accounting for the above equation, the reference out-migration equation 5 becomes:

$$\begin{aligned}\ln M^{o,r}_{out,t} = \ln M^{o,r}_{r,t} + \eta_w \ln w_{o,t} + \eta_b bc_{o,t} - \eta_u \ln ur_{o,t} + a_o - dc_{r,o,t} \\ -\beta_w \ln w_{r,t} - \beta_b bc_{r,t} + \beta_u \ln ur_{r,t} - a_r + ac_{o,r,t} + \lambda_t \end{aligned} \tag{6}$$

where $\eta_w = \alpha.\beta_w$, $\eta_u = \alpha.\beta_u$ and $\eta_b = \alpha.\beta_b$. Because $0 \leq \alpha \leq 1$, one should expect the η coefficients to be smaller than their β pairs. If all of the out-migrants were to go back home however, we would have $\eta_w = \beta_w$, $\eta_u = \beta_u$ and $\eta_b = \beta_b$. We leave it to the regressions to guide us on this point. Besides, λ_t is a time fixed effect supposed to capture changes over time of the rest of world variables ($w_{RoW,t}$, $bc_{RoW,t}$ and $ur_{RoW,t}$).

Alternatively, and more generally, one can assume that a significant fraction of outmigrants, instead of going back home, might want to go where most of the migrants of the same nationality usually concentrate. Migrants follow their networks. This is another way to say that the destinations that matter are those destinations where adaption costs are low enough. As already mentioned we do not observe where the out-migrant fly to but we do observe however, where they are historically settled. Let us consider the main destinations where each nationality is settled (excluding its home country and its country of residence). This is observed through the ranking of the share of migrants of some nationality across destinations. We could then develop further the expression of $y^{o}_{out,t}$ in order to account more explicitly for the main destinations chosen by our migrants. Each y type variable can then be expressed as the weighted average of the same variable across the country of origin, the other main destinations and the rest of the world. Hence, $\forall y^{o}_{out,t} \in \{\ln w_{out,t}, bc_{out,t}, \ln ur_{out,t}\}$ we could obtain:

$$y^{o}_{out,t} = \alpha\, y_{o,t} + \alpha_m\, \overline{y}^{o}_{main,t} + \alpha_{row} y'_{RoW,t}$$

where now $\overline{y}^{o}_{main,t}$ represents the average value of each variable of interest y over the main destinations of interest. In the econometric section, we compute these variables with respect to the five most popular destinations related to the o-type migrant.[7] α_m is the overall share of the popular destinations in total outmigration flows. Finally, $\alpha_{row}.y'_{RoW,t}$ represents the contribution of the rest of the world to changes in the y variable.

Accounting for this alternative, the reference out-migration equation 5 then becomes:

$$\begin{aligned} \ln M^{o,r}_{out,t} = \ln M^{o,r}_{r,t} + \eta_w \ln w_{o,t} + \eta_b bc_{o,t} - \eta_u \ln ur_{o,t} + a_o - dc_{r,o,t} \\ + \eta_{w,m} \overline{\ln w}^{o}_{main,t} + \eta_{b,m} \overline{bc}^{o}_{main,t} - \eta_{u,m} \overline{\ln ur}^{o}_{main,t} \\ - \beta_w \ln w_{r,t} - \beta_b bc_{r,t} + \beta_u \ln ur_{r,t} - a_r + ac_{o,r,t} + \lambda_t \end{aligned} \tag{7}$$

where $\eta_{w,m} = \alpha_m.\beta_w$, $\eta_{u,m} = \alpha_m.\beta_u$ and $\eta_{b,m} = \alpha_m.\beta_b$. Again, because the α's would hardly reach 1, we expect that the coefficients on popular destinations' variables together with those on that of the country of origin to be smaller, in absolute values, than those related to the country of residence.

We use data from different sources to estimate our above equations 6 and 7.

- ***Dependent variable***: the outflows variable $M^{o,r}_{out,t}$ come from the International Migration Statistics- IMS OECD database. The data have been already detailed in section 2. To make the notations more explicit and easier to read in the empirical work that follows, we shall refer to it as $Out.Migrant_{o,r,t}$. Recall that this variable varies across three dimensions: the nationality of origin of the out-migrant o, the current country of residence r and the time dimension t.

- ***Number of staying migrants*:** The $M^{o,r}_{r,t}$ variable describes the total number of stayers at year t. We proxy this variable by $Mig.Stock_{o,r,t}$, the stock of foreign-born population by

[7] We have alternatively computed these variables over the 3-main destinations and found very similar results.

country of birth settled in r and reported at the end of year t, also provided by the IMS OECD database. Actually, we have checked the data sources: these report that the stock of migrants in a country at date t is registered on the 31st of december of this date (for few declarant countries, it is even registered at the beginning of January of $t+1$). This end of year registration should then include all those who have decided to remain in r and exclude those who had decided to move to another destination over year t.

- ***Expected revenues from o, r or alternatives:*** $\ln w_{o,t}$, $\ln w_{r,t}$ and $\overline{\ln w}^{o}_{main,t}$ are proxied by GDP per capita variables (in constant 2005\$, expressed in PPP) and obtained from the World Development Indicators-WDI (World Bank dataset). These shall be respectively referred to by $\ln GDPcap_{o,t}$, $\ln GDPcap_{r,t}$ and $5Dest.\ln GDPcap_{o,t}$. The last measure is the logarithm of the weighted average GDP per capita for the 5 most popular destinations of migrants from country o, excluding the country of residence r and the country of origin o.

- ***Macro cycle variables:*** All these are also provided by the WDI-Worldbank database.

  1. $bc_{o,t}$, $bc_{r,t}$ and $\overline{bc}^{o}_{main,t}$ are the business cycle indexes that we approximate by the corresponding GDP growth rates, $Growth_{o,t}$, $Growth_{r,t}$ and $5Dest.Growth_{o,t}$.
  2. $\ln ur_{o,t}$, $\ln ur_{r,t}$ and $\overline{\ln ur}^{o}_{main,t}$ are the unemployment rates that correspond respectively to country o, country r and the average rate prevalent in the 5 most popular destinations. They shall be noted $\ln Unemp_{o,t}$, $\ln Unemp_{r,t}$ and $5Dest.\ln Unemp_{o,t}$.

     The $5Dest.Growth_{o,t}$ and $5Dest.\ln Unemp_{o,t}$ measures are weighted averages computed with exactly the same method than that used for the average GDP per capita above. Note that the 5 first destination countries account for 83% of total migration in average (from 37,75% to 99,5%).

- ***Transaction and adaption costs variables:*** $dc_{o,r,t}$ and $ac_{o,r,t}$ are proxied by including geographical distance ($\ln Dist_{o,r}$) and common language variables ($CommonLang._{o,r}$) provided by the CEPII-distance dataset. Of course these variables do not account for time variance. However, we assume that over time changes of our dc and ac variables follow a

time trend that should be captured by the time fixed effect in our regressions. In some alternative specifications, and to check for the robusteness of our results, we have also proxied transaction and adaption costs by including dyad effects (i.e. (origin×residence) fixed effects).

- ***Country-o and country-r specific shifters:*** we proxy a_o and a_r respectively by origin and residence effects (noted λ_o and λ_r)

The empirical counterparts of equations 6 and 7 then become:

$$\begin{aligned}\ln Out.migrants_{o,r,t} &= \beta_0 + \beta_1 \ln Mig.Stock_{o,r,t} + \beta_2 \ln(GDPcap_{r,t}) + \beta_3 Growth_{r,t} + \beta_4 \ln(Unemp_{r,t}) \\ &+\beta_5 \ln(GDPcap_{o,t}) + \beta_6 Growth_{o,t} + \beta_7 \ln(Unemp_{o,t}) \\ &+\beta_8 CommonLang._{o,r} + \beta_9 \ln(Dist_{o,r}) + \lambda_t + \lambda_o + \lambda_r + \epsilon^{m,out}_{o,r,t} \qquad (8)\end{aligned}$$

and alternatively

$$\begin{aligned}\ln Out.migrants_{o,r,t} &= \beta_0 + \beta_1 \ln Mig.Stock_{o,r,t} + \beta_2 \ln(GDPcap_{r,t}) + \beta_3 Growth_{r,t} + \beta_4 \ln(Unemp_{r,t}) \\ &+\beta_5 \ln(GDPcap_{o,t}) + \beta_6 Growth_{o,t} + \beta_7 \ln(Unemp_{o,t}) \\ &+\beta'_5 (5Dest. \ln GDPcap_{o,t} + \beta'_6 (5Dest.Growth)_{o,t} + \beta'_7 (5Dest. \ln Unemp_{o,t}) \\ &+\beta_8 CommonLang._{o,r} + \beta_9 \ln(Dist_{o,r}) + \lambda_t + \lambda_o + \lambda_r + \epsilon^{m,out}_{o,r,t} \qquad (9)\end{aligned}$$

Before presenting the results, recall that we do not observe the destination of the movers. Our theoretical set-up corrects for this and predicts then that we should expect the coefficients related to the residence country to be higher in absolute values to those related to the country of origin, or those on the 5 most popular destinations. Typically, the β coefficients on the unemployment and the growth variables in the residence country should be estimated to be higher than their counterparts in the country of origin, or for those related to the 5 most likely destinations. We leave it to the regressions to confirm or not these expectations.

3.3 Multilateral resistance applied to migration outflows

Multilateral resistance implies that any flow between two countries will affect other bilateral flows (Anderson & van Wincoop, 2003; Anderson, 2011). Recently, it has received more attention in the literature on migration (see Bertoli & Fernandez-Huertas Moraga (2013)). The literature shows then that any shock that takes place in a third country m has an impact on migration from say, a country r to d. For instance a boom in activity of country m would increase the incentive to choose country m over country d and thus ultimately, should show up as a decrease in the flow of migration from r to d.

Here, the structure of the data we study is quite different: we observe out-migration flows to the rest of the world from people of nationality o, but so far residing in country r. Had we had data by destination d we could have been able to control for a resistance term that is close to the one that the literature accounts for. Thus, the only reasoning we can draw here, is a comparison of a utility that one o-outmigrant obtains when remaining in r and the utility she can get when leaving it to the rest of the world (including going back to her own country o). The third country issue that drives the resistance term in prior studies, becomes thus irrelevant in our case.

Now, as already said, although we do not observe the destination country of the out-migrant, we do observe however her country of origin o. Our data has a bilateral dimension only in this respect. This information allows us, however, to consider and control for the fact that out-migrants from different origins might have different preferences across destinations: put differently, the opportunity cost of staying in r might be different across different origins of migrants. A Romanian migrant and a French migrant, who reside in Spain, would not have the same opportunity costs from staying in Spain. The alternative destinations of these two populations of migrants might be different, or at least might be weighted differently in their utility function. In the above subsection, we described precisely how we can develop our econometric specification to allow for differences in the distribution of preferences over destinations for migrants from different origins. We thus showed that differences in preferences across migrants from different origins should come from differences in shocks observed in their respective origin country, shocks observed across their respective main countries of destinations (the destination network effect), together with unobserved shocks (captured through origin or alternatively, (year x origin) country fixed effects).

We have also added progressively residence effects, (residence x year) and (origin x residence) effects to account for additional heterogeneity across these dimensions.

In sum, the strategy we use here is, to some extent, in the spirit of that set by Ortega Peri (2013)[8] and by Beine et al. (2013). [9]

4 Estimations and Results

4.1 Baseline Results

Table 2 shows the first results for the Schengen countries sample [10]. Before analyzing in details the results regarding our variables of interest (i.e effects of growth and/or unemployment), we begin by discussing briefly the impact of the 'long-term' and transaction costs variables. These appear to be very consistent across the different specifications in terms of order of magnitude and statistical significance. First, as expected, everything else equal, out-migrants flows are significantly related to the stock of migrants of same origin, residing in the same country. Second, while the common language variable appears with the expected sign and significant at around 5 to 10%, distance between Schengen countries does not seem to affect the choice of people to move within the Schengen area. It is possible that transaction and adaption costs from moving within Schengen are low enough so that distance does not affect our outflows.[11] Third, the GDP per capita variable does not have a robust effect on out-flows: namely, we find a positive effect of GDP per capita

[8] Their initial motivation was to capture the heterogeneity between stayers and movers.

[9] Some would be tempted to use alternatively the Bertoli and Fernandez-Huertas Moraga (2013) technique, using the Pesaran CCE estimator to account for the resistance term. But again, this technique would have been perfectly suitable had we had data by destination. One would then have been able to measure how changes in opportunities in third countries could produce an impact on moving from one country to another observed country. As discussed earlier however, in our case the structure of the bilateral data is completely different from that modelled by Bertoli and Fernandez-Huertas Moraga. Hence, it is difficult to see the value added that we can get out of using this estimator. And even if one can see conceptually how to obtain some value added out of this technique using our data structure, the method cannot be implemented here: As it is also shown in Beine et al (2013), we have an unbalanced panel (data on countries of residence and countries of origin are nor reported every year). As this method makes use of mean values for each observed year, of dependent and independent variables to produce the estimate we need, these means cannot be compared across-time as they would not be composed of the same set of country reporters and/or origin countries every year.

[10] Again, other results based on alternative samples, namely EU15 countries, the whole EU and finally all the countries in the OECD dataset, are shown in the appendix

[11] Note however, that once we consider countries quite or very far from each other, distance appears to matter: in the appendix of the paper, one of the tables present the results using all the countries and nationalities reported by the OECD dataset, and find there is a negative and statistically significant impact of geographical distance.

in the first estimation but it becomes non-significant once we introduce time fixed effects. This is not surprising. One should note that as we restrict the sample to Schengen countries we reduce drastically the variability of the GDP per capita across our selected countries which explains these results. In the appendix of the paper, when we estimate the same specifications for all of the countries in the dataset delivered by the OECD, we find a statistically significant impact of GDP per capita. This gives credit to our assumption that non-significant results of GDP per capita in our sample of Schengen countries is mainly explained by the relative homogeneity of these countries in terms of income.

Next, we turn to the effect of our main variables of interest, the macro-cycles' variables (growth and unemployment). We begin by focusing on columns 1 and 2 of table 2. In column (1) we proxy the short run macroeconomic cycle effect by one unique indicator, the GDP growth rate, while in column (2) it is replaced by the logarithm of the Unemployment rate. Column (1) shows a statistically significant negative impact of GDP growth of the residence country on out-migration, and a statistically significant positive effect associated with GDP growth in the country of origin. Column (2) shows further confirmation of a significant impact of short-run variables on outflows: Unemployment in origin and residence countries affect in an opposing manner the exit of migrants: while unemployment in the residence country incite them to leave it, unemployment in their homeland is more likely to make them stay there[12].

Column (3) is the exact mirror of equation 8, where both variables are considered. It is interesting to note then that the impact of GDP growth (for both origin and residence countries) is not statistically significant anymore, while the significance and expected signs on the unemployment variables remain robust. This result is consistent with the idea that what really drives the exit of migrants is not growth reduction *per se* but the impact it has on the employability of people in the country. It is also employability in the country of origin, not its GDP growth rate, that

[12]Some might flag a potential reverse causality between unemployment variables and outflows. The mechanism goes this way: an exit of people from one country, if the flow of exit is sufficiently large, might reduce unemployment there. If these people return back home again, and if the size of the corresponding flow is relatively large, they would in turn increase unemployment at home. If this is true then our coefficients on the unemployment variables would be underestimated in absolute values. This thought is very unrealistic in our case, however, because the number of outflow migrants is extremely small compared to the unemployed in the residence countries. The maximum level of *bilateral* outflows is 38,950 (Italian outflows from Germany in 1997). Outflows higher than 10,000 represent 2.7% of all bilateral flows only. Outflows higher than 30,000 (15 observations) are only Italian outflows from Germany for different years. Despite this skepticism concerning the risk of reverse causality, we run additional regressions using the lagged value of unemployment. Our results are similar and can be obtained upon request.

incites people to exit the current country of residence. Notice in passing that the unemployment coefficient related to the country of origin is, in absolute values and size, about three times smaller than that related to the country of residence. This suggests, although with great caution, an estimate for the share of total outflows who move back home to be around one third. In column (4), we show the results of a more general specification than that related to (3), as we replace the observed transaction costs proxies (distance and common language) by a more general bilateral effect. Again, we find similar results.

Table 2: Determinants of Migration Outflows (Schengen Area)

Dep. Var. ln($Mig.Outflows$)	(1)	(2)	(3)	(4)	(5)	(6)
ln($Mig.Stock$)	0.791***	0.794***	0.793***	1.088***	1.038***	0.883***
	(49.97)	(50.51)	(50.18)	(5.830)	(4.855)	(5.869)
Growth_r	-0.0503**		-0.0232	-0.0149	-0.0148	
	(-2.151)		(-1.110)	(-0.682)	(-0.650)	
ln($Unemp.$)_r		0.692***	0.644***	0.542***	0.549***	
		(5.480)	(5.259)	(4.117)	(3.880)	
ln($GDPperca.$)_r	-0.943	0.0884	0.687	0.419	0.534	
	(-0.712)	(0.0728)	(0.600)	(0.372)	(0.444)	
Growth_o	0.00933*		0.00768	0.00366		0.00663
	(1.758)		(1.433)	(0.730)		(1.576)
ln($Unemp.$)_o		-0.170**	-0.156**	-0.184***		-0.140**
		(-2.402)	(-2.173)	(-3.218)		(-2.428)
ln($GDPperca.$)_o	-0.212	-0.310	-0.484	-0.277		-0.347
	(-0.678)	(-0.902)	(-1.484)	(-0.877)		(-1.166)
Common Language	0.126*	0.114*	0.116*			
	(1.940)	(1.731)	(1.764)			
ln($Dist$)	-0.0467	-0.0547	-0.0568			
	(-0.957)	(-1.134)	(-1.175)			
Origin FE	YES	YES	YES	NO	NO	NO
Dest FE	YES	YES	YES	NO	NO	NO
Year FE	YES	YES	YES	YES	NO	NO
Bilat. FE	NO	NO	NO	YES	YES	YES
Origin/Year FE	NO	NO	NO	NO	YES	NO
Residence/Year FE	NO	NO	NO	NO	NO	YES
Observations	1,763	1,763	1,763	1,763	1,763	1,763
R-squared	0.940	0.942	0.943	0.973	0.976	0.984

Robust t-statistics in parentheses. Standards errors are clustered at residence-year level in column (1)-(5) and at origin-year level in column (6).
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

In the first estimates, unobserved factors affecting the movement of o-migrants, were taken into account through an origin country and a time fixed effects introduced progressively and independently in columns (1) to (4). However, out-migration might be also sensitive to unobserved

factors changing over two interacting dimensions: time and country of origin. For instance, pick some French and Polish residing in the UK although considering to move out. Each type of nationality is affected by what happens in the UK and in its own homeland. Nevertheless, the French might have a different set of destination opportunities than the Polish. Put differently, either nationals might not be equally sensitive to an unobserved time-varying event that takes place somewhere in the world (see section 3.3. for a discussion on multilateral resistance applied to migration outflows). Of course, when this is done all the variables that are specific to time and origin country are swept out from the regressions. The results are given in column (4) of table 2. Here, we still observe a strong effect of unemployment in the country of residence on the level of outflows. According to these estimates, all other things held equal, a 10% increase of unemployment leads to around 5.5% increase in out-migration. To have a better idea of the meaning of such result on aggregate figures, it shows that 27,500 more migrants flow out from Germany after an increase in the German unemployment of about 10%.

We also perform a symmetric exercise whereby we introduce a (residence×year) effect instead of (origin×year) effect. This is made to capture any unobserved time-varying event in the residence country that might affect exits. By so doing, all time and residence specific variables are now captured by the new interaction term. By looking again at the results, we still find a negative and statistically impact of unemployment in origin countries on the out-migration flows. Namely, higher levels of unemployment in origin countries are associated with lower level of migration outflows, as incentives for return migration are lower.

We turn next to table 3 where we test an augmented migration outflows specification, related to equation 9. Recall that the augmented specification accounts now for economic changes in the historical main countries of destinations of o-movers. In columns (1) to (5), we reproduce the corresponding specifications shown in the prior table2 while adding the variables related to the 5 main countries of migration. Two main results stand out: First, our two important results regarding the role of unemployment in the country of origin and the country of residence persist. Typically, we still find a positive and statistically significant impact of unemployment on out-migration in residence countries and a negative impact of unemployment in origin countries. Further, these effects are similar in magnitude than those found in the precedent table. Second,

more surprisingly, we do not find any significant impact of the economic context in the 5 main countries of migration. However, we should be very cautious as this lack of significance may come from the average if the economic context in these 5 countries follow very different business cycles.

Table 3: Determinants of Migration Outflows (Schengen Area)

Dep. Var. ln($Mig.Outflows$)	(1)	(2)	(3)	(4)	(5)
ln($Mig.Stock$)	0.795***	0.784***	0.782***	1.084***	0.857***
	(50.65)	(46.35)	(46.04)	(6.218)	(5.072)
Growth_r	-0.0534**		-0.0202	-0.0148	
	(-2.223)		(-0.984)	(-0.701)	
ln($Unemp.$)_r		0.707***	0.666***	0.546***	
		(5.677)	(5.453)	(4.173)	
ln($GDPperca.$)_r	-0.689	0.710	1.232	0.771	
	(-0.503)	(0.609)	(1.116)	(0.711)	
Growth 5 Dest. countries	0.00925		0.0136	0.00684	0.00760
	(0.460)		(0.687)	(0.434)	(0.530)
ln($Unemp.$) 5 Dest. countries		0.136	0.101	0.0896	0.106
		(0.600)	(0.440)	(0.531)	(0.614)
ln($GDPperca.$) 5 Dest. countries -1.690	-1.992	-3.062	-1.843	-1.677	
	(-0.874)	(-1.051)	(-1.472)	(-1.152)	(-0.960)
Growth_o	0.00762		0.00901	0.00398	0.00877
	(1.264)		(1.041)	(0.549)	(1.438)
ln($Unemp.$)_o		-0.158*	-0.149*	-0.187***	-0.156**
		(-1.916)	(-1.784)	(-2.735)	(-2.371)
ln($GDPperca.$)_o	-0.234	-0.0961	-0.280	-0.239	-0.375
	(-0.684)	(-0.220)	(-0.667)	(-0.651)	(-1.007)
Common Language	0.137*	0.167**	0.168**		
	(1.880)	(2.167)	(2.180)		
ln($Dist$)	-0.0464	-0.0636	-0.0661		
	(-0.955)	(-1.342)	(-1.414)		
Origin FE	YES	YES	YES	NO	NO
Dest FE	YES	YES	YES	NO	NO
Year FE	YES	YES	YES	YES	NO
Bilat. FE	NO	NO	NO	YES	YES
Origin/Year FE	NO	NO	NO	NO	YES
Residence/Year FE	NO	NO	NO	NO	NO
Observations	1,622	1,481	1,481	1,481	1,481
R-squared	0.938	0.940	0.940	0.974	0.984

Robust t-statistics in parentheses. Standard errors are clustered at the residence-year level.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.2 The role of networks

Networks in residence countries are likely to have a role in the decision to out-migrate. On one hand, networks may smooth adverse economic shocks as a kind of insurance mechanism. In that

case, it will reduce the impact of economic shocks on outflows. On the other hand, however, the presence in some destination of a significant network (big diaspora) might reduce the skill-quality of migrants (McKenzie & Rapoport, 2010; Beine *et al.*, 2011; Bertoli, 2010; Bertoli & Rapoport, 2015) and thus increases the likelihood of migrants of that diaspora to be unemployed. In this respect, one should observe an increase in the impact of unemployment on outmigration when the diaspora is sufficiently large. The relation is *a priori* ambiguous but one could expect a non-linear effect of economic shocks on outflows, depending on the size of the diaspora. In order to test the idea, we propose to interact unemployment and economic growth with the stock of migrant in residence countries.

Empirical specification is given by equations 10 and 11 and results are given in table 4.

$$\begin{aligned}\ln Out.migrants_{o,r,t} &= \beta_0 + \beta_1 \ln Mig.Stock_{o,r,t} + \beta_2 \ln(GDPcap_{r,t}) + \beta_3 Growth_{r,t} + \\ &+\beta_4 \ln(Unemp_{r,t}) + \beta_5 \ln Mig.Stock_{o,r,t}.\ln(Unemp_{r,t}) \\ &+\beta_6 \ln(GDPcap_{o,t}) + \beta_7 Growth_{o,t} + \beta_8 \ln(Unemp_{o,t}) \\ &+\lambda_t + \lambda_{o,r} + \epsilon^{m,out}_{o,r,t} \end{aligned} \tag{10}$$

$$\begin{aligned}\ln Out.migrants_{o,r,t} &= \beta_0 + \beta_1 \ln Mig.Stock_{o,r,t} + \beta_2 \ln(GDPcap_{r,t}) + \beta_3 Growth_{r,t} + \\ &\beta_4 \ln Mig.Stock_{o,r,t}.Growth_{r,t} + \beta_5 \ln(Unemp_{r,t}) + \\ &+\beta_6 \ln(GDPcap_{o,t}) + \beta_7 Growth_{o,t} + \beta_8 \ln(Unemp_{o,t}) \\ &+\lambda_t + \lambda_{o,r} + \epsilon^{m,out}_{o,r,t} \end{aligned} \tag{11}$$

The interaction term in residence country is positive which means that the size of migrants' networks actually magnifies the effect of unemployment in residence countries on the level of outflows. The higher is the diaspora, the stronger is the positive effect of unemployment on outflows. Without taking into account the conditional effect of networks, the effect of unemployment on outflows is 25% lower approximately. This result is consistent with the diaspora low-skill of migrants effect. However, we do not find any difference, neither statistical significance, when interacting the network variable with the growth variable.

Table 4: The role of Networks

Dep. Var. $\ln(Mig.Outflows)$	(1)	(2)	(3)	(4)
$\ln(Mig.Stock)$	0.839***	0.747***	1.085***	1.029***
	(4.832)	(3.982)	(5.862)	(4.909)
$Growth\_r$	-0.0248	-0.0265	-0.0169	-0.0173
	(-1.356)	(-1.434)	(-0.777)	(-0.756)
$\ln(Mig.Stock).Growth_{\Gamma}$			-0.00424	-0.00518
			(-1.370)	(-1.321)
$\ln(Unemp.)\_r$	0.378***	0.360***	0.550***	0.559***
	(3.608)	(3.213)	(4.190)	(3.964)
$\ln(Mig.Stock).\ln(Unemp.)\_r$	0.145***	0.167***		
	(3.000)	(3.047)		
$\ln(GDPperca.)\_r$	0.748	0.924	0.697	0.872
	(0.747)	(0.855)	(0.653)	(0.771)
$Growth\_o$	0.00175		0.00251	
	(0.325)		(0.472)	
$\ln(GDPperca.)\_o$	-0.267		-0.241	
	(-0.866)		(-0.768)	
$\ln(Unemp.)\_o$	-0.148***		-0.174***	
	(-2.678)		(-3.104)	
Year FE	YES	NO	YES	NO
Bilat. FE	YES	YES	YES	YES
Origin/Year FE	NO	YES	NO	YES
Residence/Year FE	NO	NO	NO	NO
Observations	1,763	1,763	1,763	1,763
R-squared	0.975	0.978	0.974	0.976

Robust t-statistics in parentheses. Standard errors are clustered at the residence-year level.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.3 Robustness Checks

4.3.1 External validity

As robustness checks, we have run various additional estimates that confirm our results. First, we changed the sample, by focusing on EU countries instead of Schengen countries. The results were very similar as for the influence of unemployment (See annex A). The influence of unemployment is even stronger in magniture (0.8). Second, we restricted the sample to EU15, excluding new members entered in 2004. By doing so, we obtained a more homogenous sample of countries in terms of living standards in order to focus even more on short-term drivers. Once again, our results appeared to be similar (see Annex B).

Lastly, we have also produced results using all of the countries in the OECD dataset. The results are provided in the annex C as an illustration only: recall that the risk of endogeneity here is stronger because of the influence of migration policies. We nevertheless see that long-term drivers of migration (such as living standards) are playing a stronger role. The sign and significance of the unemployment effect in residence countries is not affected, though the magnitude is lower. This latter result may be explained by the higher sensitivity of migrants towards economic cycles when there are no migration restrictions.[13] Unemployment in the origin country is no longer significant, which can be explained by the low relevance of unemployment rates in lots of developing countries (where informality might be high). Bilateral transaction cost proxies (distance and language) take the expected sign and are now statistically significant.

4.3.2 Taking into account the heterogenous quality of data

As highlighted in section 2.1.1, the quality of outflows data may be challenged. By focusing on within variation, we take into account the lack of comparability between countries using different methodologies to measure outflows. We have also excluded countries which have changed their methodology over the period. However, one cannot exclude that the within variation may also be biased. For instance, if the reporting sytem is very weak, the reported evolution of outflows is likely to be very flat, whatever is the real level of variation. This will create a downward bias

[13]This argument is very similar to Ortega & Peri (2013) on migration inflows. They find a much higher migration elasticity to income in the Schengen area than in the World sample and argue that it is explained by the lack of migration restrictions within Schengen.

in our estimates. On the other side, a peak of outflows data may be the result of a cleaning of population registers. If local authorities realize that migrants are no longer living in the place where they are registered, they will be excluded from the population register and it will be seen as an outflows, even if the migrants have left long time ago. If the cleaning of population register is done when the economic cycle is low, for whatever reasons, it will create an upward bias in these estimates. We provide three sets of robustness tests to check that our results persist when we focus on data that may be considered as more reliable.

First, we restrict the sample to countries where the reliability of data is stronger. We use the typology described in section 2.1.1. Doing so, we exclude countries where the low quality of data may alter the quality of estimates. Results are given in table 8 and are similar to our baseline estimates. We note also that coefficients of GDP per capita in residence country, common language and the log of distance turn significant with the expected sign. However, it is difficult to judge whether this change is explained by the higher data quality or simply to a selection bias as the sample of countries is restricted here.

Second, we restrict the sample to countries for which the correlation between inflows and outflows data is significant at the 5% level. As highlighted in section 2.1.1, this correlation may be positive or negative. The correlation is significant for 10 residence countries.[14] Estimated coefficients are a bit lower, which may be explained by the focus on countries where there is a *positive* correlation between inflows and outflows, which may create an additional downward bias as economic determinants of migration are supposed to have an opposite effect on inflows than on outflows. Nevertheless, our main results persist. Results are available upon request.

Finally, we exclude each country one-by-one in order to be sure that our results are not driven by one single country. It is also an indirect way to ensure that problems in data quality for one country do not explain some of our result. We replicate the estimates for the specification given by the column 5 in previous estimates (with origin-year fixed effects). Whatever is the country

[14] Austria, Belgium, Denmark, Finland, United Kingdom, Italy, Luxembourg, Netherlands, Norway, Sweden.

excluded from the sample, results are very similar. Estimated coefficient for unemployment in residence country is always positive and highly significant. It ranges from 0.321 when Spain is excluded to 0.726 when Iceland is excluded. For all other estimates, it is included between 0.5 and 0.55.[15]

All in all, our results are not affected by changes of samples according to the quality of data. If we acknowledge that measurement errors may persist, all these additional estimates and the robustness of our results show that we are able to identify real effects of economic cycles on migration outflows.

4.3.3 Methodological concerns

One concern in the empirical analysis undertaken using bilateral database is the large occurence of zeros that may biase the results when using OLS estimators. However, focusing on bilateral flows between Schengen countries, the occurence of zeros is only 1.35% in our case, which allows us to use traditional panel data methods. However, as we use the log value of outflows, we drop all nil observations in our estimates. To avoid this problem, we ran estimates using scaled OLS estimators as in Beine *et al.* (2013). Our dependent variable is transformed and we use $\ln(1 + outflows)$ in order to keep nil observations. We then get 1795 observations instead of 1763 in our baseline regressions. Results are perfectly similar.[16]

The last concern has to do with the level of clustering. Here standard errors are clustered at the level of our main variables of interest (destination/year and origin/year). We check the consistency of our results using different level of clustering (destination, origin, pair level). It does not affect the significance of our variables of interest.[17]

[15] All results are available upon request.

[16] Results are available upon request.

[17] Growth in residence countries turns significant (and negative) when standard errors are clustered at the dyadic level

5 Conclusions

In this paper, we have shown that the economic context is an important determinant of migration *outflows*. We have focused primarily on Schengen countries as free mobility is a fundamental principle of such agreements. By doing so, we have excluded a priori the possibility that migration policies drive our results.

We have shown that an economic downturn in residence countries, especially characterized by higher unemployment tends to increase migration outflows. A 10 percentage points increase in unemployment rate leads to an increase of 5.5 percentage point of outflows. The results show that short-run economic forces may act as a substitute for migration policies. In economic downturns, policy makers are pushed to put in place more restrictive migration policies and to encourage the exit of migrants but economic short-term fluctuations may have, qualitatively at least, the same effect.

We have also provided some evidence regarding the role of the origin country's short-run activity on out-migrants flows. This needs to be further investigated however. Data on return migration is still not available. More generally, the data researchers have access to so far do not inform about the destinations chosen by out-migrants, to be able to estimate correctly the impact of the economic activities related to these destinations.

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Appendix

A Results on EU countries

Table 5: Determinants of Migration Outflows (EU)

Dep. Var. ln($Mig.Outflows$)	(1)	(2)	(3)	(4)	(5)	(6)
ln($Mig.Stock$)	0.745***	0.747***	0.747***	1.147***	1.176***	0.849***
	(51.36)	(51.23)	(50.99)	(6.565)	(4.691)	(10.04)
Growth_r	-0.0619		-0.0469	-0.0467	-0.0451	
	(-1.468)		(-1.305)	(-1.290)	(-1.128)	
ln($Unemp.$)_r		0.762***	0.717***	0.802***	0.801***	
		(3.867)	(3.667)	(4.182)	(3.676)	
ln($GDPperca.$)_r	-3.439**	-1.882	-0.883	1.350	1.438	
	(-2.438)	(-1.246)	(-0.599)	(0.907)	(0.814)	
Growth_o	0.00691		0.00546	0.00846**		0.00553*
	(1.239)		(0.985)	(2.082)		(1.855)
ln($Unemp.$)_o		-0.121*	-0.100	-0.167***		-0.131***
		(-1.852)	(-1.544)	(-3.084)		(-2.885)
ln($GDPperca.$)_o	0.654*	0.397	0.384	-0.451		-0.107
	(1.896)	(1.028)	(0.971)	(-1.578)		(-0.508)
Common Language	0.104**	0.104**	0.101**			
	(2.300)	(2.228)	(2.223)			
ln($Dist$)	-0.00624	-0.000184	-0.00181			
	(-0.166)	(-0.00484)	(-0.0481)			
Origin FE	YES	YES	YES	NO	NO	NO
Dest FE	YES	YES	YES	NO	NO	NO
Year FE	YES	YES	YES	YES	NO	NO
Bilat. FE	NO	NO	NO	YES	YES	YES
Origin/Year FE	NO	NO	NO	NO	YES	NO
Residence/Year FE	NO	NO	NO	NO	NO	YES
Observations	1,935	1,933	1,933	1,933	1,938	1,933
R-squared	0.943	0.944	0.945	0.975	0.978	0.987

Robust t-statistics in parentheses. Standards errors are clustered at residence-year level in column (1)-(5) and at origin-year level in column (6).
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

B Results on EU15 Sample

Table 6: Determinants of Migration Outflows (EU15)

Dep. Var. ln($Mig.Outflows$)	(1)	(2)	(3)	(4)	(5)	(6)
ln($Mig.Stock$)	0.700***	0.703***	0.701***	1.771***	1.876***	1.195***
	(30.02)	(29.70)	(29.92)	(8.633)	(7.820)	(8.885)
Growth_r	-0.0499*		-0.0360	-0.0156	-0.0183	
	(-1.984)		(-1.490)	(-0.713)	(-0.799)	
ln($Unemp.$)_r		0.494***	0.440***	0.426***	0.375**	
		(3.310)	(3.049)	(2.949)	(2.556)	
ln($GDPperca.$)_r	-2.288**	-2.028*	-1.424	-1.931*	-2.450**	
	(-2.106)	(-1.856)	(-1.351)	(-1.806)	(-2.068)	
Growth_o	0.0120		0.00642	0.00438		0.000543
	(1.125)		(0.546)	(0.583)		(0.107)
ln($Unemp.$)_o		-0.106	-0.0891	-0.140**		-0.158***
		(-1.397)	(-1.068)	(-2.557)		(-3.926)
ln($GDPperca.$)_o	-1.016*	-1.127**	-1.113**	-0.352		-0.512**
	(-1.927)	(-2.108)	(-2.083)	(-1.084)		(-2.331)
Common Language	0.439***	0.433***	0.436***			
	(7.670)	(7.500)	(7.550)			
ln($Dist$)	-0.0185	-0.0171	-0.0193			
	(-0.285)	(-0.260)	(-0.295)			
Origin FE	YES	YES	YES	NO	NO	NO
Dest FE	YES	YES	YES	NO	NO	NO
Year FE	YES	YES	YES	YES	NO	NO
Bilat. FE	NO	NO	NO	YES	YES	YES
Origin/Year FE	NO	NO	NO	NO	YES	NO
Residence/Year FE	NO	NO	NO	NO	NO	YES
Observations	1,390	1,390	1,390	1,390	1,406	1,390
R-squared	0.936	0.937	0.938	0.966	0.970	0.988

Robust t-statistics in parentheses. Standards errors are clustered at residence-year level in column (1)-(5) and at origin-year level in column (6).
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

C Results on World Sample

Table 7: Determinants of Migration Outflows (World)

Dep. Var. ln($Mig.Outflows$)	(1)	(2)	(3)	(4)	(5)	(6)
ln($Mig.Stock$)	0.648***	0.677***	0.679***	0.836***	0.746***	0.691***
	(39.78)	(44.63)	(44.42)	(9.759)	(7.522)	(18.55)
Growth_r	-0.0547**		-0.0373*	-0.0330	-0.0289	
	(-2.583)		(-1.826)	(-1.491)	(-1.182)	
ln($Unemp.$)_r		0.347***	0.283**	0.251*	0.313*	
		(2.619)	(2.067)	(1.649)	(1.752)	
ln($GDPperca.$)_r	-2.065**	-2.153**	-1.670*	-2.366**	-2.353*	
	(-1.989)	(-2.077)	(-1.712)	(-2.008)	(-1.756)	
Growth_o	0.00502**		0.00109	0.000298		-0.000482
	(2.106)		(0.327)	(0.156)		(-0.278)
ln($Unemp.$)_o		0.0398	0.0398	-0.0246		0.00872
		(0.913)	(0.915)	(-0.902)		(0.299)
ln($GDPperca.$)_o	0.384***	0.670***	0.659***	0.234**		0.433***
	(3.491)	(4.739)	(4.606)	(2.318)		(4.501)
Common Language	0.237***	0.359***	0.359***			
	(4.159)	(5.237)	(5.231)			
ln($Dist$)	-0.470***	-0.477***	-0.474***			
	(-24.37)	(-21.93)	(-21.73)			
Origin FE	YES	YES	YES	NO	NO	NO
Dest FE	YES	YES	YES	NO	NO	NO
Year FE	YES	YES	YES	YES	NO	NO
Bilat. FE	NO	NO	NO	YES	YES	YES
Origin/Year FE	NO	NO	NO	NO	YES	NO
Residence/Year FE	NO	NO	NO	NO	NO	YES
Observations	14,774	10,355	10,319	10,396	15,743	10,396
R-squared	0.870	0.882	0.883	0.947	0.953	0.966

Robust t-statistics in parentheses. Standards errors are clustered at residence-year level in column (1)-(5) and at origin-year level in column (6).
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

D Results on a subsample of countries where data reliability is high

Table 8: Determinants of Migration Outflows (Sub-sample of countries where data reliability is high)

Dep. Var. ln($Mig.Outflows$)	(1)	(2)	(3)	(4)	(5)	(6)
ln($Mig.Stock$)	0.793***	0.796***	0.795***	0.859***	0.753***	0.833***
	(42.51)	(42.97)	(42.37)	(5.474)	(4.416)	(5.053)
Growth_r	-0.0364*		-0.0105	-0.000168	-0.00229	
	(-1.946)		(-0.852)	(-0.0119)	(-0.155)	
ln($Unemp.$)_r		0.459***	0.427***	0.319***	0.313***	
		(4.276)	(4.529)	(3.908)	(3.720)	
ln($GDPperca.$)_r	1.612	1.846**	2.078**	1.727**	2.031***	
	(1.473)	(2.218)	(2.338)	(2.335)	(2.608)	
Growth_o	0.0135**		0.0125*	0.0124***		0.0124***
	(2.014)		(1.839)	(2.614)		(3.422)
ln($Unemp.$)_o		-0.103	-0.0859	-0.0900		-0.0778
		(-1.268)	(-1.037)	(-1.375)		(-1.291)
ln($GDPperca.$)_o	-0.173	-0.00582	-0.315	-0.342		-0.338
	(-0.521)	(-0.0139)	(-0.807)	(-0.898)		(-1.061)
Common Language	0.180**	0.176**	0.175**			
	(2.622)	(2.547)	(2.544)			
ln($Dist$)	-0.104	-0.101	-0.107*			
	(-1.627)	(-1.604)	(-1.693)			
Origin FE	YES	YES	YES	NO	NO	NO
Dest FE	YES	YES	YES	NO	NO	NO
Year FE	YES	YES	YES	YES	NO	NO
Bilat. FE	NO	NO	NO	YES	YES	YES
Origin/Year FE	NO	NO	NO	NO	YES	NO
Residence/Year FE	NO	NO	NO	NO	NO	YES
Observations	1,179	1,179	1,179	1,179	1,179	1,179
R-squared	0.952	0.953	0.953	0.984	0.987	0.987

Robust t-statistics in parentheses. Standards errors are clustered at residence-year level in column (1)-(5) and at origin-year level in column (6). Residence countries: Austria, Belgium, Switzerland, Germany, Denmark, Iceland, Luxembourg, Norway and Sweden.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$