The European Crisis and Migration to Germany: Expectations and the Diversion of Migration Flows*

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Abstract

The analysis of how the economic crisis in Europe has reshaped migration flows faces two challenges: (*i*) the confounding influence of correlated changes in the attractiveness of alternative destinations, and (*ii*) the role of rapidly changing expectations about the evolution of the economic conditions in various countries. This paper addresses the first challenge by controlling for multilateral resistance to migration, and the second one by incorporating 10-year bond yields as an explanatory variable in a study of European bilateral migration flows to Germany between 2006 and 2012. We show that, while expectations and current economic conditions at origin are significant determinants of migration, diversion effects account for 78 percent of the observed increase in German gross migration inflows.

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1 Introduction

International migration episodes are the outcome of a complex forward-looking decision (Sjaastad, 1962), where individuals or households compare expected utility streams net of all moving costs across different locations. Potential migrants have not only to choose among a set of alternative destinations, but they also have to form expectations on the evolution of economic conditions and other factors relevant for migration both at origin and across potential destinations. Macroeconomic instability, as the one currently experienced by most European countries, could increase the incentives to move and it certainly adds to the usual complexity of migration decisions.

How has the economic crisis been reshaping intra-European migration flows? Providing a convincing answer to this question requires to opt for an analytical framework that is consistent with the complexity of the underlying location-decision problem that potential migrants face. This requires, in turn, controlling for the sorting of migrants across alternative possible destinations, and trying to measure the expectations about future economic conditions that influence the decision to migrate.

The attention of the media is usually directed to the direct migration-creation effects of the crisis in countries that have been more severely affected, focusing, for instance, on Greek migration to Germany or on the surge in the enrollments in German classes in Spain.[1] Notwithstanding the anecdotal evidence in the media, migration figures reveal that "crisis-related increases in the outflows of nationals have been rather small" (OECD, 2012a, p. 44),[2] so that these direct effects appear to be limited. This could reflect the fact that economic uncertainty increases the option value of waiting for potential migrants (Burda, 1995), but we also need to observe that the asymmetric impact of the crisis has actually deeply changed the distribution of migration flows in Europe. Germany and Spain probably represent two polar cases in this respect.

Germany, which had experienced a long period of sluggish economic growth and high unemployment rates in the 1990s and early 2000s, has quickly recovered from the 2008-2009 recession, and it has been outperforming most European countries in terms of GDP and

[1] "Greeks seek better life in home of austerity", *Financial Times*, August 1, 2012; "El 'efecto Merkel' sacude la enseñanza de idiomas", *El Pais*, November 10, 2012.

[2] OECD (2012a) also observes, with respect to Greek migration to Germany, that "the numbers involved in 2011 are only marginally higher than those observed prior to Greece joining the Eurozone." (p. 44).

employment growth since then. The net immigration rate, which stood on average at 1 per thousand between 1997 and 2007, has thus climbed to 4 per thousand in 2011 (Statistisches Bundesamt, 2012). Spain, where the share of immigrants in its population had surged from 4 percent to 14 percent since the late 1990s (Bertoli and Fernández-Huertas Moraga, 2013), has been experiencing a *negative* net migration in 2011 (INE, 2012a).

These figures suggest that the changing economic landscape in Europe could have been producing relevant migration-diversion effects. The steep increase in the unemployment rate in Spain could not only induce a larger number of Spanish nationals to migrate, but it could also influence the location-decision choices of migrants coming from other European countries, diverting flows out of Spain into other destination countries with better economic prospects. Some destination countries, such as Germany, might be receiving larger migration inflows as the crisis has increased its relative attractiveness *vis-á-vis* other potential destinations. The existence of diversion effects induced by the crisis magnifies the analytical challenges that have to be dealt with in the econometric analysis, as they can severely bias the estimates of the determinants of migration flows (Hanson, 2010). Bertoli, Fernández-Huertas Moraga, and Ortega (2011) and Bertoli and Fernández-Huertas Moraga (2013) indeed show that this bias exists and is substantial.

The crisis also calls into question the reliance of econometric studies on lagged values of (proxies for) earnings at home and destination to estimate the effect of the expected "money returns to migration" (Sjaastad, 1962, p. 85) upon bilateral migration flows.[3] Such an identification strategy rests on the strength of the correlation between lagged earnings and the expectations about their future evolution, but this positive correlation can be considerably weakened in times of crisis, as macroeconomic instability could reduce the informative content of past earnings with respect to their future evolution.

This paper analyzes the determinants of recent bilateral migration flows to Germany (i) using the econometric approach proposed by Pesaran (2006), which allows to control for the confounding effect due to the time-varying attractiveness of alternative destinations (Bertoli and Fernández-Huertas Moraga, 2013), and (ii) including a proxy for future economic prospects in the vector of determinants of migration decisions. More specifically, we analyze the determinants of migration flows from the member states of the European Eco-

[3]See, *inter alia*, Clark, Hatton, and Williamson (2007), Pedersen, Pytlikova, and Smith (2008), Lewer and den Berg (2008), Mayda (2010), Grogger and Hanson (2011), Bertoli and Fernández-Huertas Moraga (2013) and Ortega and Peri (2013).

nomic Association, EEA,[4] to Germany based on a high-frequency administrative dataset from January 2006 to June 2012.[5] We focus on the EEA as it represents a unique environment where the legislation favors the free mobility of workers between its member states.

We resort to the Common Correlated Effects, CCE estimator proposed by Pesaran (2006) to control for "multilateral resistance to migration" (Bertoli and Fernández-Huertas Moraga, 2013), i.e., the bias induced by the time-varying attractiveness of alternative destinations.[6] Multilateral resistance to migration represents a pressing concern for our analysis, given the correlation in the evolution of economic conditions between Germany and other countries in the EEA. As an example, the identification of the direct effect of the increase in the unemployment rate in Italy on migration flows from Italy to Germany can be confounded by a simultaneous worsening of labor market conditions in Spain, which diverts Italian migration flows from Spain to Germany if multilateral resistance to migration is not adequately controlled for.

We also augment the usual vector of determinants of bilateral migration flows with a forward-looking variable, which can reflect the expectations about future economic prospects at origin held by potential migrants. More specifically, we use the yields on the secondary market of government bonds with a residual maturity of 10 years as a proxy for future economic conditions. This choice is supported by the evidence that we provide using data from 13 waves of the Eurobarometer survey that concerns about personal job market prospects and economic conditions in general in the year to come are closely related to the evolution of the 10-year bond yields.[7]

Our empirical analysis delivers two main findings. First, expectations, proxied by 10-year bond yields, are shown to be a relevant determinant of bilateral migration rates even after

[4]The EEA encompasses the whole EU plus Iceland, Liechtenstein and Norway; although Switzerland is not *de jure* a member of the EEA, it has ratified a series of bilateral agreements with the EU that allows to usually regard it as a *de facto* EEA member state.

[5]The migration data have a monthly frequency; other papers using monthly migration data in an econometric analysis are Hanson and Spilimbergo (1999) and Orrenius and Zavodny (2003).

[6]The CCE estimator has satisfactory small sample properties already for the longitudinal and cross-sectional dimension of our data according to the Monte Carlo simulations in Pesaran (2006).

[7]A key feature of this variable is that it certainly belongs to the information set upon which potential migrants take their decisions, as the media coverage of the yields of 10-year bonds has substantially increased in recent years when the crisis unfolded; Farré and Fasani (2013) demonstrate that information on fundamental economic variables in the media significantly impacts migration decisions.

controlling for current economic conditions, proxied by various lags of the unemployment rate and GDP per capita. Second, standard estimation strategies that do not control for multilateral resistance to migration deliver upward biased estimates for the coefficients of both the expectations and current economic conditions variables.

Our estimates allow us to quantify the impact of changes in bilateral variables and in the attractiveness of alternative destinations on the migration surge in Germany. Our decomposition of these effects shows that the expectations channel only had some relevance for a few countries, notably Greece and Portugal, while the evolution of current economic conditions are able to explain 40 percent of the observed increase in migration flows to Germany. More importantly, our estimates imply that the diversion effect accounts for 78 percent of the observed increase in flows from the EEA origin countries. Thus, during this period, immigration between a typical European country and Germany is explained to a much larger extent (twice as much) by changes in conditions in alternative destinations, typically Italy, Spain and the United Kingdom, than by changes in conditions in that particular country. For example, the surge in Romanian migration to Germany has much more to do with the Spanish economic situation than with the German or Romanian economic situation.

The remainder of the paper is structured as follows. Section 2 presents a simple random utility maximization model that describes the location decision problem that prospective migrants face, and it derives the equation to be estimated. Section 3 introduces our sample and data sources, and it provides empirical evidence that supports our reliance on 10-year bond yields as proxies for the expectations about future economic conditions at origin. Section 4 contains the relevant descriptive statistics, and Section 5 presents the results of our econometric analysis. Section 6 uses these results to decompose the sources of the surge in immigration to Germany during the studied period, emphasizing the strength of diversion effects. Section 7 draws the main conclusions of the paper.

2 The location-decision problem

We describe the location-decision problem that would-be migrants face through a random utility maximization model, from which we derive the equation to be estimated under the same distributional assumptions as in Bertoli and Fernández-Huertas Moraga (2013).

2.1 A random utility maximization model

Let i index the individuals residing in a country $j \in H$, who have to chose their utility-maximizing location from the set of countries $D = H$, which contains n elements indexed by k; the utility U_{ijkt} that the individual i from country j obtains from opting for country k at time t is given by:

$$U_{ijkt} = V_{jkt} + \epsilon_{ijkt} = \boldsymbol{\beta}'\boldsymbol{x}_{jkt} + \epsilon_{ijkt} \ , \tag{1}$$

where V_{ijkt} represents the deterministic component of location-specific utility that we assume to be a linear function of a vector $\boldsymbol{x}_{jkt}$ of determinants,[8] and ϵ_{ijkt} is an individual stochastic component. The distributional assumptions on the stochastic component in (1) determine the relationship between the vector $\boldsymbol{V}_{ijt} = (V_{ij1t}, ..., V_{ijnt})'$ of the deterministic component of location-specific utility and the vector $\boldsymbol{p}_{ijt} = (p_{ij1t}, ..., p_{ijnt})'$ which collects the choice probabilities for individual i over all the countries belonging to the choice set.

We assume here, as in Bertoli and Fernández-Huertas Moraga (2013), that ϵ_{ijkt}, for all $j, k \in H$, has an Extreme Value Type-1 marginal distribution that can be correlated across locations k. Allowing for a correlation in the stochastic component of utility appears to be a sensible option, as data constraints are likely to prevent a full specification of the deterministic component of location-specific utility in (1), so that its unobserved component is unlikely to represent pure white noise.

The assumption on the shape of its marginal distribution implies that the stochastic component of the model can be derived from a from a Generalized Extreme Value, GEV, generating function (McFadden, 1978). Specifically, consider the following GEV generating function:[9]

$$G_j(Y_{j1t}, ..., Y_{jnt}) = \sum_m \Big(\sum_{l \in b_m^j} (\alpha_{jlm} Y_{jlt})^{1/\tau} \Big)^{\tau} \ , \tag{2}$$

where $Y_{jlt} = e^{V_{jlt}}$ for $l \in D$ and b^j are origin-specific nests of D indexed by m. The matrix $\boldsymbol{\alpha}_j$ collects the allocation parameters α_{jlm} that characterize the portion of country

[8] The vector $\boldsymbol{x}_{jkt}$ can contain variables measured at any time $s \leq t$, as variables do belong to the information set upon which an individual draws to solve the location-decision problem at time t.

[9] This GEV function was first proposed by Vovsha (1997), who refers to the resulting model as the "cross-nested logit," which allows to analyze situations in which pairs of alternatives share some unobserved characteristics that have an uneven impact of the attractiveness for different individuals.

l which is assigned to the nest b^j_m for individuals from the origin country j,[10] and τ, with $\tau \in (0, 1]$, is the dissimilarity parameter for the nests b^j_m.[11]

The specification in (2) allows the allocation matrix $\boldsymbol{\alpha}_j$ to vary across origins. This implies that the stochastic component of utility can follow origin-specific patterns of correlation across alternative destinations.[12] Following Papola (2004) the correlation is given by

$$\text{corr}(\epsilon_{ijkt}, \epsilon_{ijlt}) = (1 - \tau^2)(\boldsymbol{\alpha}_{jk}{}'\boldsymbol{\alpha}_{jl})^{1/2} \,, \tag{3}$$

where τ is the dissimilarity parameter, so that the correlation depends on the inner product between the two vectors of allocation parameters, and $\text{corr}(\epsilon_{ijkt}, \epsilon_{ijlt}) \in [0, (1 - \tau^2)]$, and it is equal to zero for all pairs of destinations if and only if each destination is entirely assigned to a singleton nest.[13]

When the GEV generating function is as in (2), the element k in the vector of choice probabilities $\boldsymbol{p}_{ijt}$ is equal to:[14]

$$p_{ijkt} = \frac{\sum_m (\alpha_{jkm} Y_{jk})^{1/\tau} \Big(\sum_{l \in b_m} (\alpha_{jlm} Y_{jl})^{1/\tau} \Big)^{\tau - 1}}{\sum_m \Big(\sum_{l \in b_m} (\alpha_{jlm} Y_{jlt})^{1/\tau} \Big)^{\tau}} \,.$$

If we assume, as in Ortega and Peri (2013) and Bertoli and Fernández-Huertas Moraga (2013) that the origin country j entirely belongs to a singleton,[15] then we can express the log odds of opting for destination k over staying in the home country j as:

$$\ln \left(\frac{p_{ijkt}}{p_{ijjt}} \right) = V_{jkt}/\tau - V_{jjt} + \ln \left(\sum_m (\alpha_{jkm})^{1/\tau} \Big(\sum_{l \in b_m} (\alpha_{jlm} e^{V_{jlt}})^{1/\tau} \Big)^{\tau - 1} \right) . \tag{4}$$

[10]Notice that equation (2) allows for a destination l to belong to several different nests, the extent of this "belonging" being determined by the parameters α_{jlm}, which satisfy $\alpha_{jlm} \in [0, 1]$ for all $l \in H$, and with the sum of the elements in each row vector $\boldsymbol{\alpha}_{jl}$ being equal to 1.

[11]The dissimilarity parameter τ is inversely related to the correlation ρ of the nest-specific stochastic component, i.e. $\tau = \sqrt{1 - \rho^2}$.

[12]This structure "allows for introduction of differential pairwise similarities between [countries] instead of the inflexible groupwise similarities permitted by the nested logit model" (Vovsha, 1997, p. 15).

[13]Notice that, as suggested also by the quote from Vovsha (1997), this pattern of correlation is more general than the one considered by Ortega and Peri (2013).

[14]The choice probability p_{ijkt} corresponds to the elasticity of G_j with respect to $Y_{jkt} = e^{V_{jkt}}$.

[15]This entails that, conditional upon observables, the origin country does not have a close substitute among the destination countries; formally, this implies that there is a nest b^j_h such that $\alpha_{jjh} = 1$, and $\alpha_{jlh} = 0$ for all $l \in D/\{j\}$.

If individual migration decisions are observed over time, then the expression for the logarithm of the bilateral migration rate, y_{jkt}, can be derived from the RUM model by averaging (4) over the set of individuals i:[16]

$$y_{jkt} = (\boldsymbol{\beta}/\tau)'\boldsymbol{x}_{jkt} - \boldsymbol{\beta}'\boldsymbol{x}_{jjt} + r_{jkt} + \eta_{jkt} \ . \tag{5}$$

The disturbance η_{jkt} is assumed to be orthogonal to $\boldsymbol{x}_{jkt}$ and $\boldsymbol{x}_{jjt}$ and r_{jkt} is equal to:

$$r_{jkt} = \ln\left(\sum_{m}(\alpha_{jkm})^{1/\tau}\Big(\sum_{l\in b_m}(\alpha_{jlm}e^{V_{jlt}})^{1/\tau}\Big)^{\tau-1}\right) . \tag{6}$$

The term r_{jkt} in (6) represents multilateral resistance to migration, as it captures the influence exerted by the opportunities to migrate to other destinations upon migration from country j to country k at time t (Bertoli and Fernández-Huertas Moraga, 2013).[17] The multilateral resistance to migration term r_{jkt} is always a non-increasing function of V_{jlt}, and it is equal to zero only if $\boldsymbol{\alpha}_{jk}'\boldsymbol{\alpha}_{jl} = 0$.[18] An increase in V_{jlt} redirects toward l proportionally more individuals that would have opted for destination k than individuals who would have stayed in the country of origin j, thus reducing the bilateral migration rate y_{jkt} in (5). Such a diversion effect due to variations in the attractiveness of destination l is stronger the higher the correlation is in (3).

[16]Notice that the vector of coefficients of the vector $\boldsymbol{x}_{jkt}$ of determinants of utility at destination is scaled by the dissimilarity parameter τ, as observed by Schmidheiny and Brülhart (2011); the value of τ can be recovered from the estimation of individual-level migration decisions (Bertoli, Fernández-Huertas Moraga, and Ortega, 2013), while the inability to identify it from aggregate migration data introduces an uncertainty with respect to the elasticity of migration with respect to the elements in $\boldsymbol{x}_{jkt}$ (Bertoli and Fernández-Huertas Moraga, 2012) which is immaterial in our case, as we will be controlling for location-specific utility at destination, but not identifying its determinants.

[17]This derivation of the multilateral resistance to migration term differs fundamentally from Anderson (2011), who assume that the stochastic component of utility is i.i.d EVT-1 but wages are endogenous to migration, so that in a stationary equilibrium the migration rate from j to k depends on all bilateral migration costs.

[18]This is the (unique) distributional assumption on the stochastic term that justifies the long-standing tradition of "estimating bilateral migration flows as a function of characteristics in the source and destination countries only" (Hanson, 2010, p. 4373), as $r_{jkt} = 0$ in this case.

2.2 The econometric approach

The multilateral resistance to migration term r_{jkt} in (5), which is unobservable for the econometrician, entails that the error term $r_{jkt} + \eta_{jkt}$ of the equation to be estimated is non-spherical, serially correlated and correlated with the vectors $\boldsymbol{x}_{jkt}$ and $\boldsymbol{x}_{jjt}$ (Bertoli and Fernández-Huertas Moraga, 2013). This, in turn, implies that the estimation of (5) with a fixed effect panel estimator would give rise to biased and inconsistent estimate $\hat{\boldsymbol{\beta}}^{FE}$ of the parameters in (1).[19]

Suppose, for the sake of concreteness, that the unemployment rate belongs to the vectors $\boldsymbol{x}_{jkt}$ and $\boldsymbol{x}_{jjt}$; if the evolution of this variable at origin is correlated with the evolution of the unemployment rate in other potential destinations, then the estimated effect of unemployment at origin upon y_{jkt} is confounded by its correlation with the multilateral resistance term r_{jkt}, which is a function of the attractiveness of other destinations.[20] Needless to say, this represents a relevant threat to identification in our case, as we will be focusing on a set of European countries that also represented relevant destinations for other countries in the region and that have been experiencing an economic crisis with relevant shared component over the past few years. In such a case, the direct effect of, say, a rise in unemployment in Italy on migration flows to Germany can be confounded by the simultaneous surge of the Spanish unemployment rate, which might have diverted the flow of Italian migrants from Spain to Germany.[21]

Bertoli and Fernández-Huertas Moraga (2013) demonstrate that r_{jkt} can be linearly approximated by the inner product of a vector of dyad-specific factor loadings $\boldsymbol{\gamma}_{jk}$ and a vector $\boldsymbol{f}_t$ of time-specific common factors:

$$r_{jkt} \approx \widetilde{r}_{jk} + \boldsymbol{\gamma}_{jk}{}'\boldsymbol{f}_t \tag{7}$$

[19]The term r_{jkt} can vary both over time and across destinations, so that the inclusion of a rich structure of fixed effects *à la* Ortega and Peri (2013) does not suffice to fully control for multilateral resistance to migration under our distributional assumptions.

[20]More specifically, this occurs if unemployment at origin is correlated with unemployment in at least one destination $l \neq q$ such that $\boldsymbol{\alpha}_{jk}{}'\boldsymbol{\alpha}_{jl} \neq 0$, otherwise the correlation of unemployment across countries does not give rise to an omitted variable bias problem.

[21]Notice that the bias due to multilateral resistance to migration clearly depends on the correlation between the unemployment rate at origin and (unobserved) r_{jkt} rather than on the bivariate correlation with the (observed) unemployment rate in other destinations; the discussion in the text is just meant to more fully deliver the economic intuition, even at the cost of some inaccuracy in econometric terms.

Intuitively, the vector of common factors $\boldsymbol{f}_t$ can be thought of as being composed by elements that reflect the attractiveness of alternative destinations. These exert an uneven impact of bilateral migration flows depending on the pattern of correlation across locations of the stochastic component of utility described by (3), which influences the value of the elements of the vector of factor loadings $\boldsymbol{\gamma}_{jk}$ and, in turn, shapes the strength of the migration diversion effect.

This approximation of r_{jkt} allows us to rewrite (5) as follows:

$$y_{jkt} = (\boldsymbol{\beta}/\tau)'\boldsymbol{x}_{jkt} - \boldsymbol{\beta}'\boldsymbol{x}_{jjt} + \widetilde{r}_{jk} + \boldsymbol{\gamma}_{jk}{}'\boldsymbol{f}_t + \eta_{jkt} \tag{8}$$

and it suggests to rely on the Common Correlated Effect, CCE, estimator proposed by Pesaran (2006) to deal with the threat to identification posed by multilateral resistance to migration. Specifically, Pesaran (2006) demonstrates that a consistent estimate of $\boldsymbol{\beta}$, $\hat{\boldsymbol{\beta}}^{CCE}$, can be obtained when the common factors $\boldsymbol{f}_t$ are serially correlated and correlated with the vectors $\boldsymbol{x}_{jkt}$ and $\boldsymbol{x}_{jht}$ from the estimation of the following regression:[22]

$$y_{jkt} = \boldsymbol{\beta}_1{}'\boldsymbol{x}_{jkt} + \boldsymbol{\beta}_2{}'\boldsymbol{x}_{jjt} + \beta_{jk}d_{jk} + \boldsymbol{\lambda}_{jk}{}'\widetilde{\boldsymbol{z}}_t + \eta_{jkt} \tag{9}$$

where d_{jk} are dyad fixed effects[23] and the vector of auxiliary regressors $\widetilde{\boldsymbol{z}}_t$ is formed by the cross-sectional averages of the dependent and of all the independent variables.[24] Section 5 provides further details on the exact specification of the equation that will be estimated.

3 Sample composition and data sources

This section describes the sample of origin countries included in our analysis, together with the data sources for the migration data and for the other variables.

[22]The error terms in (8) and (9) are identical when the cross-sectional dimension of the dataset goes to infinity.

[23]The inclusion of dyadic fixed effects controls for the dyad-specific average $\widetilde{r}_{jk}$ of the multilateral resistance to migration term in (8).

[24]The consistency of $\hat{\boldsymbol{\beta}}^{CCE}$ is established by Pesaran (2006) by demonstrating that $\boldsymbol{\lambda}_{jk}{}'\widetilde{\boldsymbol{z}}_t$ converges in quadratic mean to $\boldsymbol{\gamma}_{jk}{}'\boldsymbol{f}_t$ as the cross-sectional dimension of the panel goes to infinity, with the longitudinal dimension being either fixed or also diverging to infinity; see Section 5 in Eberhardt, Helmers, and Strauss (2012) for a non-technical introduction to the CCE estimator.

3.1 Sample

The sample of origin countries included in our analysis is composed by all member states of the European Economic Association, EEA, plus Switzerland. The EEA includes all member states of the European Union, EU, together with Iceland, Liechtenstein and Norway, and it represents an area of free mobility for persons.[25] It also extends to Switzerland, which has not joined the EEA but has signed *de facto* equivalent bilateral agreements with the EU.[26] The only exceptions are represented by Liechtenstein and Malta, as the migration data that we use do not provide figures on migration flows from Liechtenstein to Germany, and the series for Malta contains some zero entries.[27] This sample includes 28 countries of origin, slightly below the threshold of 30 for which Pesaran (2006) provides Monte Carlo evidence on the correct size of the CCE estimator. This is why, as a robustness, we also consider an extended sample including two major non-EEA countries of origin, namely Turkey and Croatia, whose citizens do not benefit from the same rules concerning free mobility.[28]

3.2 Data sources

3.2.1 Migration data

The data on gross migration inflows are provided by the Federal Statistical Office of Germany (Statistisches Bundesamt, 2012).[29] The Federal Statistical Office reports monthly data series on arrivals of foreigners by country of origin since 2006.[30] The data are collected at the end of each month and reported about six weeks later by the municipalities to the local statistical offices of the Federal States and to the Federal Statistical office.[31] We use all the observations

[25] See Part III of the Agreement of the European Economic Area, Official Journal No. L 1, January 3, 1994, and later amendments.

[26] See http://eeas.europa.eu/switzerland/index_en.htm (last accessed on December 12, 2012); we will at times slightly abuse the legal definitions, referring to the EEA as if it also includes Switzerland.

[27] As we weight observations by population at origin in our estimates, the exclusion of these two countries from the sample is immaterial, as they jointly represent less than 0.1 percent of the population of the EEA.

[28] Turkish immigrants represent the largest migrant community in Germany, but total inflows have been rather moderate in recent years; Croatia is, together with Serbia, the main migrant-sending country among former Yugoslavian countries, but recent inflows have been also relatively modest.

[29] This is the same data source as in OECD (2012a).

[30] The country of origin is defined as the country where an individual was resident before moving to Germany.

[31] See Statistisches Bundesamt (2010) for an in-depth outline of this dataset.

that are currently available, namely from January 2006 until June 2012, which gives us 78 monthly observations for each one of the countries in our sample.

The German migration figures are based on the population registers kept at the municipal level. Registration is mandatory in Germany, as stated by the German registration law approved in March 2002 ("Melderechtsrahmengesetz"). This law prescribes that each individual has to inform the municipality about any change of residence. The law does *not* subordinate the need to register to a minimum duration or to the scope of the stay, though there are exceptions for foreign citizens whose intended duration of stay in Germany is below two months, so that tourists do not have to register.[32] Figures are reported separately for German and foreign citizens. Foreigners are defined as all individuals who do not possess the German citizenship according to Article 116(1) of the German constitutional law ("Grundgesetz"), which also encompasses stateless persons. The inflows of the so-called ethnic Germans ("Spätaussiedler") are reported together with the inflows of German citizens.

This administrative data source provides us with an accurate information on bilateral migration flows to Germany, as migrants have an incentive to register, and municipalities also have an incentive to accurately update their population registers. Specifically, registration is a necessary precondition to obtain the income tax card that is required to sign any employment contract,[33] including for seasonal work, and landlords usually require a proof that their would-be tenants have registered. Furthermore, the municipalities have an incentive to record new residents properly since their tax revenues depend on the number of registered inhabitants, so that fees are levied against the persons who do not comply with the mandatory registration.

This data source gives us $28 \times 78 = 2,184$ observations for our main sample, with inflows representing 61 percent of total gross inflows of migrants to Germany between January 2006 and June 2012.[34]

[32]Further exceptions are allowed for diplomats or foreign soldiers and their relatives who do not have to register.

[33]The limited incidence of informal employment in Germany suggests that the number of illegal migrants not covered by this administrative data source is likely to be small, and all the more so for the origin countries included in our sample.

[34]The extended sample includes 2,340 observations, representing 66 percent of total inflows.

3.2.2 Other variables

The location-specific utility corresponding to the country of origin is explicitly modeled as a function of (various lags) of the unemployment rate, GDP per capita and the yields on 10-year government bonds.[35] Furthermore, the econometric analysis allows the bilateral migration rate to Germany to depend also on relevant immigration policies variables, and on a number of dyadic factors which are controlled for but whose effects are not identified (see Section 5).

The data for the monthly rate of unemployment for all countries in the sample but Switzerland come from EUROSTAT (2012b), while the Swiss unemployment rate were obtained from Statistik Schweiz (2010). The series, which are based on the ILO definition of unemployment, are seasonally adjusted. The data for real quarterly GDP are derived from the International Financial Statistics of the IMF (2012); when the original series are not seasonally adjusted, we adjust them following the method proposed by Baum (2006) and applied by Bertoli and Fernández-Huertas Moraga (2013). We rely on population figures from the World Development Indicators of the World Bank (2012) to obtain real GDP per capita series.[36]

The third key variable in our analysis is represented by the yields on the secondary market of government bonds with a residual maturity of 10 years. For EU countries, the primary data source is represented by the European Central Bank, with the ECB series being available at EUROSTAT (2012a) and the OECD (2012b). We complemented these data sources with data from National Central Banks. The ECB does not provide 10-year bond yields figures for Estonia, as the country has a very low public debt financed with bonds of a shorter maturity.[37] To fill this gap in the data, we have regressed the 10-year bond yields on a linear transformation of the sovereign ratings from Fitch (2012), and used the estimated coefficients from this auxiliary regression to predict the 10-year bond-yields for Estonia.[38] As a robustness check, we also exclude Estonia from the sample, to ensure

[35]All the variables are collected since January 2005, as we will be using an optimally selected number of lags for the independent variables.

[36]Population at origin is also used to weight the observations in our estimates; population figures for 2012 have been obtained with an out-of-sample prediction using the 2011 population growth rates.

[37]The ECB states that "there are no Estonian sovereign debt securities that comply with the definition of long-term interest rates for convergence purposes. No suitable proxy indicator has been identified." (source: http://www.ecb.int/stats/money/long/html/index.en.html, last accessed on December 12, 2012).

[38]The estimation of the relationship between 10-year bond yields and sovereign ratings includes country

that the imputation of the 10-year bond yields does not affect our estimates.[39]

Finally, we defined two dummy variables for the accession of Bulgaria and Romania to the EU in January 2007, and for the concession of free movement to Germany in May 2011 to the citizens of eight countries that accessed the EU in 2004,[40] and that had been subject to transitional agreements that partly limited their mobility.

3.3 Ten-year bond yields and expectations

The yields that prevail on the secondary market for government bonds with a residual maturity of 10 years represent a usual focal point along the curve that relates yields to maturity, which is commonly reported in the media[41] and plays a key role in European treaties.[42] Differentials in bond-yields within the EEA, and in particular within the Eurozone, are mainly caused by fiscal vulnerabilities,[43] and by the perceptions about the risk of default, the liquidity in the sovereign bonds markets and the time-varying risk preferences of investors (Barrios, Iversen, Lewandowska, and Setzer, 2009).[44] Movements in the spreads can have significant consequences, as a rise in sovereign yields tend to be accompanied by a widespread increase in long-term interest rates faced by the private sector (the so-called sovereign ceiling effect),

fixed effects; still, the inclusion of origin dummies in our analysis of the determinants of migration flows entails that we do not use between-country variability for identification, so that the level of the predicted Estonian bond yields is irrelevant.

[39]The same procedure has been used to predict 10-year bond yields for the two countries in our extended sample, as bond-yields were missing for Turkey in 2005 and for Croatia over the whole period.

[40]Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia; Cyprus and Malta also joined the EU in 2004, but the free movement was granted to the citizens from these two countries without any transitional periods.

[41]See, for instance, the weekly page on economic and financial indicators published by *The Economist*.

[42]The Article 121 of the Treaty establishing the European Community states that "the durability of convergence achieved by the Member State and of its participation in the exchange-rate mechanism of the European Monetary System being reflected in the long-term interest-rate levels" (Official Journal of the European Communities C 325/33, December 24, 2002), and the European Central Bank gathers harmonized data on 10-year bonds to assess convergence on the basis of Article 121.

[43]In general, the yields of the 10-year government bonds reflect (*i*) the expectations about future interest rates, (*ii*) inflation and (*iii*) the risk premium required by the investors; in what follows, we implicitly assume that point (*iii*) is driving the evolution, across time and space, of the 10-year bond yields in the EEA.

[44]For the broad literature which analyses the economic determinants of the spread in interest rates see, *inter alia*, von Hagen, Schuknecht, and Wolswijk (2011), Bernoth and Erdogan (2010) and Caggiano and Greco (2012).

affecting both investment and consumption decisions. On the fiscal side, higher government bond yields imply higher debt-servicing obligations when the debt is rolled over (Caceres, Guzzo, and Segoviano, 2010), which can, in turn, induce the implementation austerity programs to stabilize debt ratios that can further depress economic conditions (Blanchard and Leigh, 2013).

This is why we can presume that the evolution of the 10-year bond yields can be correlated with the evolution of the expectations held by the citizens about the future economic outlook of their own country, which can, in turn, influence their decisions to migrate.

3.3.1 The Eurobarometer survey

The hypothesis that 10-year government bond yields capture individual expectations on personal economic prospects is proved here based on the Eurobarometer surveys. The Eurobarometer surveys are based on approximately 1,000 interviews conducted in European countries twice a year since 1973.[45] We selected the waves and the countries corresponding to the sample of countries that we use in our main econometric analysis. We thus drew the data from all the 13 waves of the Eurobarometer survey conducted between the Spring 2006 and the Spring 2012 in 27 countries.[46] We focused on the question: "what are your expectations for the year to come: will [next year] be better, worse or the same, when it comes to your personal job situation?", and we analyzed the determinants of the share of respondents who expect their job situation to worsen over the next year. Notice that the data from the survey cannot be directly used in the estimation as they have a lower frequency than the other variables, and they do not cover all the countries in our sample.

Table 1 presents some descriptive statistics for the 13 waves of the Eurobarometer survey for the 27 countries listed above.[47] There is notable variability across countries in the share of respondents that expect their personal job situation to worsen over the next year, varying

[45]The exceptions with respect to the sample size are represented by Germany (1,500 individuals), Luxembourg (600) and United Kingdom (1,300).

[46]The countries are Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom; Iceland is included only since 2010, while two countries in our sample (Norway and Switzerland) are not covered by the Eurobarometer survey.

[47]German data are not used in the analysis, which is restricted to the 26 origin countries that belong to our sample.

from an average of 3.0 percent for Denmark to 26.7 percent for Hungary. Interestingly, Germany is the country that, together with Bulgaria, experienced the largest decline in this share between the first (April 2006) and the last wave (May 2012) of the survey, down from 12 to 6 percent. All other countries but five experienced an opposite pattern, with the share of respondents who expressed their concern that increased by as much as 30 percentage points in Greece.[48] As expected, although there are differences across countries, Table 1 delivers the image of the European dimension of the crisis. Importantly, the correlation in economic conditions across the countries in our sample creates a threat to the econometric analysis of the determinants of bilateral migration flows to Germany that is discussed in Section 2 and addressed by our identification strategy.

Needless to say, we do not claim that a simple multivariate analysis can unveil a causal relationship between the expectations about the future labor market conditions and the interest rate on the sovereign rate bond, as the latter may well respond to concerns about the economic perspectives of a country. What we are interested in is to uncover whether the interest rate on 10-year government bonds is positively associated with expectations on the future labor market conditions, even after controlling for current economic conditions, as reflected by the gross domestic product and the level of unemployment at the time of the survey.

We first regressed the (logarithm of the) share of respondents that expect their personal job situation to worsen the next year over the (logarithm of the) unemployment rate in the month of the survey, including also country and time fixed effects.[49] This implies that the coefficients are identified only out of the variability over time within each country, and they are not influenced by time-varying factors that uniformly influence expectations across European countries.[50]

The results are reported in the first data column of Table 2, and they suggest that a 1 percent increase in the unemployment rate is associated with a 0.48 percent increase in the share of respondents who expect a worsening of their personal job situation in the

[48]Notable increases in the share of respondents concerned about their future personal job situation are recorded also for Hungary (14 percentage points), Ireland (8), Italy (11), Portugal (7) and Spain (11).

[49]The choice of the functional form of the equation has been informed by the choice with respect to the specification of the equation that describes the determinants of bilateral migration rates to Germany, presented in Section 5.

[50]The adjusted R^2 of the regression of the dependent variable on the country and time fixed effects stands at 0.810.

year to come. The second specification adds the (logarithm of) the interest rate on 10-year government bonds that prevails on the secondary market among the regressors: a 1 percent increase in the interest rate is associated with a 0.42 percent increase in the dependent variable, with the effect being significant at the 1 percent confidence level, while the estimated elasticity with respect to unemployment falls to 0.24. The elasticity of the expectations about the future personal job situation with respect to the interest rate is virtually unaffected when we also add the (logarithm of the) level of gross domestic product at the time of the time of the survey to the set of regressors.

The results reported here do not depend on the specific question that we selected from the Eurobarometer survey:[51] the finding of a highly significant effect of the yields of 10-year bonds is robust to the use of the answers to *any* of the other four questions concerning the expectations for the year to come: (*i*) your life in general; (*ii*) the economic situation of your country; (*iii*) the financial situation of your household, and (*iv*) the employment situation in your country. These additional results are reported in Tables A.1-A.2 in the Appendix.

These results provide support to the hypothesis that the current interest rate on the public debt is informative about the expectations about the evolution of the economic conditions in one's own country, which might, in turn, influence the decision to migrate.

4 Descriptive statistics

Table 3 presents the descriptive statistics for our main sample of origin countries with respect to the rate of migration, unemployment, real GDP per capita and the 10-year bond yields.

The average monthly migration rate per 1,000 inhabitants over our period of analysis stands at 0.79 throughout the sample period, with a standard deviation of 1.13. We also report an index of the migration rate, which is normalized to 100 in January 2006: Table 3 reveals the variability of this index, which ranges between 16.67 and 1,094.98.

Unemployment rate at origin ranges between 2.3 and 25.0 percent, and the associated index reveals that some countries have experienced a three-fold increase in the rate of unemployment since January 2006, while others reduced it by more than 50 percent. The variability in the unemployment rate is larger than the variability in quarterly real GDP per

[51]Results are also robust to clustering the standard errors by country, and to a weighting of the estimates to reflect the differences in the sample sizes across countries.

capita, with the index ranging between 85.26 and 128.31. The 10-year bond yields stand, on average, at 4.65 percent, but this average figure hides considerable variability across both time and space. Specifically, when we normalize bond yields to 100 in January 2006, we observe that the index ranges between a minimum of 28.4 and a maximum of 812.2.

4.1 Migration flows

Figure 1 displays gross inflows of migrants to Germany from all origin countries in the world, together with the inflows from our main sample of 28 EEA countries and with the inflows from the extended sample of 30 countries. Total gross immigration was nearly constant at around 600,000 per year between 2006 and 2009, and it then recorded a 40 percent increase up to 2011, when total inflows stood at around 840,000. In the first semester 2012, it increased by another 15 percent to 442,000 compared to the first semester 2011. Most of the observed variation in due to migration flows from EEA countries, which increased from 360,000 in 2009 to 550,000 in 2011.[52] This implies that the countries in our main sample, which represent 61 percent of the inflows during our period of analysis, accounted for around 80 percent of the surge between 2009 and 2011. The main country of origin is represented by Poland (888,776 migrants over the period), followed by Romania (397,078) and Bulgaria (199,505). Some of the countries that have been more severely hit by the crisis have been climbing up the list of the main countries of origin, with Italy ranking fifth (151,272 migrants), Greece seventh (85,378) and Spain eighth (83,358).[53]

Figure 2 breaks down the migration flows in our sample of origin countries: migration to Germany is largely driven by inflows from the new EU member states: 48 percent of the total immigration inflows in our main country sample comes from the eight Central and Eastern European countries which joined the EU in 2004, and another 13 percent from Bulgaria and Romania during our sample period. Around 14 percent of the flows in our sample stem from the Southern EU member states and Ireland, i.e. the countries mainly affected by the crisis in the Eurozone. Although this figure might appear to be low, we have to notice that immigration from these countries has substantially increased in the first semester of 2012 by

[52]The inflows from July 2011 to June 2012 stood up 607,899, up with respect to the 466,632 migrants recorded in the previous 12 months.

[53]For instance, although the total inflows from Greece are less than 10 percent of the inflows from Poland, Polish migration to Germany increased by 34,507 migrants between 2007 and the last year in our dataset (July 2011 to June 2012), while the corresponding increase in Greek migration stands at 22,695.

52 percent compared to the first semester 2011, which is not covered by Figures 1 and 2.

4.2 The evolution of migration and in the explanatory variables

This section presents descriptive evidence with respect to the evolution of the bilateral migration rate to Germany from four countries in our sample (Greece, Spain, Romania and Poland), together with the evolution of the variables that describe current economic conditions and expectations at origin. These countries have been selected as they hint at the diversity of factors that might have contributed to determine the increase of the migration flows to Germany across different countries of origin, which will be explored in detail in Section 5.

Needless to say, Greece is the country that has been most heavily affected by the European crisis: the unemployment rate has increased there by a factor of 2.5 since 2006, and the 10-year bond yields by a factor of 6, with real GDP declining by 14 percent up the mid of 2012. The deep impact of the crisis, and the absence of prospects of economic recovery, could contribute to explain the four-fold increase in Greek migration to Germany, reported in Figure 3.[54] A similar picture emerges for Spain, where the labor market conditions severely deteriorated and the investors' confidence in government bonds plummeted, though to a lesser extent than in Greece, with migration flows to Germany increasing by a factor of 2.5 (Figure 4). While the relative increase in large, absolute figures of Spanish migration to Germany remain low, as observed by OECD (2012a);[55] still, this does not mean that the economic crisis in Spain played just a limited role in shaping the increase of migration inflows to Germany.

If we focus on Romania, for instance, we can observe that the unemployment rate, the government bonds yields and the real GDP index have remained relatively stable throughout the period that we analyze. At the same time, the gross migration rate produced a five-fold increase (Figure 5), above the corresponding figure recorded for Greece. A part of this surge might by attributed to the EU membership of Romania in 2007, which indeed coincides with a hike in the migration rate to Germany. Nevertheless, the overwhelming

[54]The inflow of Greek migrants increased by around 85 percent over the period July 2011 to June 2012 with respect to the previous twelve months.

[55]We can notice that the inflows from Spain increased to 24,544 migrants over the last twelve months for which we have data, more than 53 percent above the level recorded over the previous twelve months.

part of the substantial increase in immigration from Romania took place in the subsequent years, with inflows to Germany increasing from 42,899 in 2007 to 94,706 in 2011, when both the economic conditions in Romania and the institutional framework regulating mobility remained unchanged. This development can represent *prima facie* evidence of the diversion of migration flows induced by the economic crisis in Europe, which induced Romanian migrants to opt for Germany because of the deteriorating economic conditions in other main European countries. Interestingly enough, the increase in Romanian flows to Germany between 2007 and 2011 was matched by a corresponding decline in Romanian flows to Spain from 196,985 to 59,595,[56] suggesting that indeed the crisis might have induced a substantial change in the distribution of Romanian migrants across destinations.

The figures for Poland reveal that economic conditions have been more unstable than in Romania: while the real GDP has continuously increased during the sample period, the unemployment rate has first declined substantially but climbed up again since 2008 (Figure 6). The 10-year bond yields have increased slightly in the beginning of the sample period, but have then decreased, going back to their initial level by the end of our period of analysis. Against this background, the gross migration rate to Germany has first declined but increased again following the introduction of the free movement of workers in May 2011. Still, this increase is rather modest when compared to Romania. This might be traced back to the fact that economic conditions in alternative destinations are much better in the case of Poland compared to Romania, as the overwhelming share of Polish migrants opted for the United Kingdom before the crisis, which has been less severely touched by the recession, while Romanians were mostly going to Spain and Italy.

5 Estimates

In this section, we present the estimates for several specifications of equation (9). We show two sets of estimates for each specification. The first one constraints the multilateral resistance to migration term to be zero, that is, it is just a classical fixed effects (denoted FE) specification:

$$y_{jkt} = \boldsymbol{\beta}_1^{FE\prime}\boldsymbol{x}_{jkt} + \boldsymbol{\beta}_2^{FE\prime}\boldsymbol{x}_{jjt} + \beta_{jk}^{FE} d_{jk} + \boldsymbol{\beta}_t^{FE\prime}\boldsymbol{d}_t + \eta_{jkt}^{FE} \tag{10}$$

[56]The migration figures for Spain have been derived from INE (2012b).

The second one is the unrestricted estimation of equation (9), denoted by CCE. The difference between the two sets of estimates can be interpreted as the diversion effect since, in its absence, there would be no multilateral resistance to migration and the coefficients on both equations should be identical.

$$y_{jkt} = \boldsymbol{\beta}_1^{CCE\prime}\boldsymbol{x}_{jkt} + \boldsymbol{\beta}_2^{CCE\prime}\boldsymbol{x}_{jjt} + \beta_{jk}^{CCE}d_{jk} + \boldsymbol{\beta}_t^{CCE\prime}\boldsymbol{d}_t + \boldsymbol{\lambda}_{jk}{}'\widetilde{\boldsymbol{z}}_t + \eta_{jkt}^{CCE} \tag{11}$$

Our three potential variables of interest, included in the vector $\boldsymbol{x}_{jjt}$, are: the 10-year bond yield on sovereign debt,[57] the unemployment rate and the real GDP index of country j. All three variables enter the equation in logs. As outlined in Section 3.3, bonds yields are our measure of expectations on future earnings or, more generally, on the evolution of the economy of country j. The unemployment rate and the real GDP index are proxies for the current economic conditions in country j. Both affect employment opportunities and individual earnings. Since the unemployment rate and the real GDP index are highly correlated, we expect that multicollinearity may affect our estimation results. The correlation between the GDP variable and the unemployment rate is -0.59, indeed highly correlated once we take fixed effects out in our dataset. We start therefore with a more parsimonious specification taking 10-year bond yields and the unemployment rate as main explanatory variables, and consider them in addition to the real GDP index in a more comprehensive specification of the model. There is moreover a second reason why we do not include the real GDP index in our first specification. GDP data are available only at the quarterly level while we try to exploit the monthly variation in order to improve the precision of our estimates. As it can be seen in the summary statistics from Table 3, there is much fewer variability to exploit from a quarterly variable: the standard deviation of the normalized version of the variable is six to seven times lower than the standard deviation of the same normalized version of the unemployment rate.

Although we are focusing on migration flows within Europe, we can expect some lag between changes in economic conditions or in expectations about future economic conditions and their effect on migration flows to Germany. In order to choose the empirically relevant number of lags, we follow Canova (2007) and select the optimal number of lags by running successive LR tests on dropping higher order lags.[58] The result is that we include four lags

[57]Given the inclusion of German (time) fixed effects, this is equivalent to including the spread and we use both terms interchangeably.

[58]Both the Akaike and Bayesian Information Criteria select the same number of lags.

of these three variables in our monthly data regressions. What we report below is the long-run coefficient associated to each specification, that is, the sum of the lags for each of the variables.

We control for a very wide variety of other determinants of bilateral migration rates in our specifications.

First, we include time fixed effects ($\boldsymbol{d}_t$). They will absorb any German-specific variation in the data as well as common elements across countries of origin over time. For example, the effect of current German economic conditions or German general migration policies is absorbed by our time fixed effects. Importantly, they also absorb general expectations about future German economic conditions.

Second, we include origin-specific fixed effects (d_{jk}). These are introduced to control for time-invariant bilateral determinants of migration flows to Germany from a given origin. Some examples are cultural, linguistic and geographical distance, common membership in institutions that did not change over the period, etc.

Third, our origin-specific fixed effects (d_{jk}) also partly control for bilateral variables that did not change much during the period, like the demographic composition of the population at origin or bilateral migration histories (i.e. networks). We want to emphasize this last element. We do not explicitly control for bilateral networks, but we argue that their effect is mostly absorbed by these fixed effects, given that most bilateral migration stocks, which are used as proxies for networks by Beine, Docquier, and Özden (2011), remained relatively stable during our period of analysis.

Fourth, we control for two major changes in bilateral migration policies that took place during the sample period ($\boldsymbol{x}_{jkt}$). First, Romania and Bulgaria joined the EU on January 1, 2007. Although Germany did not immediately grant the free movement of workers to citizens from Bulgaria and Romania, EU membership opens numerous channels to access Germany: the freedom of settlement enables individuals to move to Germany as self-employed or small business owners. Moreover, the opportunities for seasonal work, contract work and the posting of workers have been extended in the context of EU enlargement. Finally, Germany granted persons with a university degree from the new EU member states access to its labour market. Thus, accession to the EU facilitated immigration from Bulgaria and Romania considerably albeit Germany decided to postpone the full application of the rules for the free movement of workers until January 1, 2014. The second major policy change was the introduction of the free movement of workers in May 1, 2011 for the eight Central and Eastern European member states which joined the EU in 2004. Germany did not only introduce the free movement of workers at May 1 2011, but abrogated also the remaining restrictions for service trade including the posting of workers, which may have further facilitated immigration from the eight Central and Eastern European member states. Immigration conditions for third-country nationals, i.e. citizens of non-EU and non-EEA countries, have remained by and large unchanged during the sample period. The new German immigration law became effective in 2005, and the 2009 amendment of this law involved only some incremental changes in channels that have been quantitatively negligible.[59] The new EU Bluecard and some further changes of the German immigration law that might affect immigration of third country nationals, were not implemented before August 2012, after the end of our sample period. Note again that our origin specific fixed effects (d_{jk}) control for migration determinants such as visa policies which are time-invariant during the sample period, while our time fixed effects ($\boldsymbol{d}_t$) control for general German migration policies that are not origin-specific.

Finally, we also control for country-specific seasonal effects in the data in our monthly specifications (also included in $\boldsymbol{x}_{jkt}$). The monthly flows we study present obvious seasonal patterns but they are different for different countries. While the inclusion of these controls does not affect our results, they improve the fit of the models that we present. Thus, we add origin-country times month-of-the-year fixed effects to absorb these origin-specific seasonal patterns.

5.1 Main specifications

As a first step, we present what we can term as a classical fixed effects specification in which the log of the migration rate from a given European country to Germany is regressed on our set of controls plus a variable that proxies for current economic conditions in that country: its unemployment rate. In all specifications, we weight observations by the population of the origin country, the variable of reference to calculate the migration rate.[60] The results are

[59]As an example, the income threshold for highly qualified workers with a university degree has been reduced from 85,000 euros to some 66,000 euros. However, mo more than 370 persons out of a total gross immigration of some 652,506 foreign citizens have used this channel in 2011 (BAMF, 2012, p. 82).

[60]This is the theoretically relevant specification since it ensures that the location decision of each individual is weighted in the same way, independently of her country of origin. Bertoli and Fernández-Huertas Moraga (2013) or Hanson and McIntosh (2012), among others, follow this approach.

shown in Column (1) of Table 4. The interpretation of the long-run coefficient is straightforward: a 1 percent increase in the unemployment rate at origin is associated with a 0.68 percent increase in the emigration rate to Germany. The policy variables are also remarkable. The 2011 free mobility extension was associated with an increase in the migration rate to Germany of 18 percent whereas the migration rate from Romania to Bulgaria after 2007 tripled (304 percent increase).

However, the estimation of these coefficients is likely to be biased by the existence of multilateral resistance to migration. For example, increases in the Romanian unemployment rate are correlated with increases in the Italian unemployment rate (0.60 correlation in our sample). Since Italy is an important alternative destination for Romanians, the coefficient on the Romanian unemployment rate variable is picking up both the increase in migration flows to Germany created by the worsening of Romanian economic conditions (what is supposed to pick up) and the increase in migration flows to Germany created from the diversion of Romanian migration flows from Italy to Germany. If this structure of correlations is prevalent, the coefficient is likely to be upward biased.

For the same reasons, given the coordination of migration policies at the European level, we would expect the two coefficients on migration policies to be upward biased (biased towards zero).

In Column (2), we add the auxiliary regressors of the CCE estimator ($\boldsymbol{\lambda}_{jk}{}'\widetilde{\boldsymbol{z}}_t$) to the specification in order to control for multilateral resistance to migration. For the unemployment rate coefficient, the result is as expected: the long-run elasticities of migration rates to Germany with respect to origin-country unemployment rates go down from 0.68 to 0.53, a 22 percent reduction. Unfortunately, although we include the policy variables as well, we do not have enough variation in the data as to distinguish their coefficients from those of the auxiliary CCE regressors,[61] so we cannot test our expectation on them. What we test for is the need for these auxiliary regressors. The value of the F-test on the assumption that the CCE term is zero is 27.64 (p-value=0.00), clearly establishing the need to control for

[61] This is due to the fact that all changes in each of the two variables happen simultaneously, in January 2007 and in May 2011, respectively. This, in turn, implies that the variables for all the countries for which we have a policy change are perfectly collinear with the associated auxiliary regressors. Bertoli and Fernández-Huertas Moraga (2013) are able to identify the effect of policy changes with the CCE estimator because they have variations in the visa variable at different points in time.

multilateral resistance to migration in this specification.[62]

Column (2) provides a consistent estimate of the effects of unemployment rates at origin on migration rates to Germany[63] even if we have omitted relevant observable or unobservable characteristics. Still, the interpretation needs to take into account that the effect of any variable that is tightly correlated with the unemployment rate is going to be picked up by the unemployment rate in the CCE specification. In this sense, the unemployment rate can be seen just as a proxy for current economic conditions at origin.

One of our concerns in this paper is to understand whether expectations over the future evolution of current economic conditions have any impact on migration flows. If it were the case that the unemployment rate was perfectly correlated with these expectations, we would not have any variability left to identify this expectations channel. However, Section 3.3 suggests that bond yields can have potential explanatory power, uncorrelated enough with current economic conditions, to proxy for future economic conditions. This is why our next step is the introduction of four lags of the bond yields at origin as additional explanatory variables.

This is done in Columns (3) and (4) of Table 4, which constitute our preferred specification. Column (3) presents the FE specification. The new variable, the 10-year bond yields at origin, appears as a strongly significant correlate of bilateral migration rates to Germany. A 10 percent increase in the variable is associated with increases in migration rates of 3.8 percent. Which part of this increase in migration rates can be associated with actual changes in the origin-country expectations about future economic conditions? Column (4) tells us that a 10 percent increase in the bond yields only increases the migration rate to Germany by 1.1 percent. The remaining 2.7 percent can be attributed to concomitant worsening of economic expectations in alternative destinations that divert flows from those destinations to Germany. Thus, over this period, our preferred specification concludes that only 28 percent of the increase in migration flows to Germany due to the worsening of economic expectations

[62] All of our results are robust to the exclusion of the policy variables from all specifications. In particular, the F-test still clearly rejects the null if policy variables are excluded or when cross-sectional averages of the policy variables are not included among the auxiliary regressors. Results available from the authors upon request.

[63] While we cannot purely establish causality, the endogeneity generated by reverse causality between changes in migration rates at the monthly level and changes in unemployment is likely to be irrelevant for most countries in the sample, given that migration rates to Germany do not generally affect great shares of the origin population.

can be attributed to origin countries, while 72 percent of this increase comes from the contemporary poor economic expectations about the evolution of alternative destinations for these origin countries.

As far as other variables are concerned, the unemployment rate effect becomes smaller in the FE specification (3) with respect to FE specification (1): 0.55 versus 0.68. However, it is virtually unchanged in CCE specifications (2) and (4): 0.53 in both. The coefficients on the policy variables are extremely similar in specifications (1) and (3). Specification (3) suggests that the 2007 EU Enlargement generated a 285 percent increase in the Romanian and Bulgarian migration rate whereas it increased the migration rate of countries affected by the 2011 Free Mobility provisions by 15 percent.

In addition to the biased coefficients, the results of the F-test for the significance of the auxiliary CCE coefficients in specification (4) show that it is indeed necessary to control for multilateral resistance to migration since the model in regression (3) is misspecified. The value of the test is 13.46 (p-value=0.00), clearly rejecting the null.

The last two columns in Table 4 add an additional variable (with its four lags) to the previous specifications: the log of the GDP per capita in the origin countries. The GDP per capita at origin is one of the most usual explanatory variables in the literature on the determinants of bilateral migration rates. However, as mentioned above, there are three reasons why it is not a part of our preferred specifications. First, it is only available at the quarterly level while we try to exploit the monthly variation in our longitudinal dataset in order to improve the precision of our estimates. Second, it is highly correlated with the unemployment rate for this particular dataset: -0.59 once we take out the fixed effects used in the estimates in Table 4. Third, there is much fewer variability to exploit, as it can be seen from the summary statistics in Table 3: the standard deviation of a normalized version of the variable is six to seven times lower than the standard deviation of the same normalized version of the unemployment rate, so that most of the effect of income differentials upon migration rates is captured by our structure of fixed effects.[64]

Still, for robustness purposes, we can see what happens when we introduce the GDP per capita (with four lags) in our preferred specification. The results are shown in Columns (5) and (6) of Table 4. The bond yields variable is basically unaffected in both specifications

[64]Specifically, origin dummies absorb the effect of differences in levels, while time dummies control for the shared dimension of the recent economic crisis.

(0.11). However, there is some evidence that both the unemployment rate and the GDP per capita at origin are proxying for the same concept of current economic conditions at origin. While both variables are significant in the FE specification in Column (5), the coefficient on the unemployment rate variable is significantly reduced with respect to specification (3): from 0.55 to 0.41. The same thing happens if we first include the GDP per capita variable and then the unemployment rate variable: the coefficient on the GDP per capita variable is greatly reduced in the second case.[65] A fourth reason why we don't include the GDP per capita variable in our preferred specification is the fact that it is only marginally significant in the CCE case: Column (6). This does not imply that GDP at origin does not matter for the magnitude of bilateral migration rates. It just reflects how changes in GDP per capita during the period were relatively small and correlated with changes in the unemployment rate so that the unemployment rate variable dominates the GDP per capita variable while the GDP per capita level effects are mostly absorbed by our extremely demanding structure of fixed effects.

5.2 Robustness checks

Next, we present three of the large number of robustness exercises that we have performed.

First, we test whether our results are robust if we expand our sample by adding Turkey and Croatia in order to achieve the minimum number of countries suggested by Pesaran (2006). As mentioned above, we add Turkey because it is one of the main traditional origins for German immigration although it is only the fifth country by the size of total gross inflows in the studied period (176,000 immigrants to Germany). As for Croatia, it is added as a representative country of immigration to Germany coming from the former Yugoslavia.

The results on this expanded 30-country sample are shown in Table 5. Column (1) presents the fixed-effects specification, basically unchanged with respect to specification (3) in Table 4. Column (2) offers the CCE specification, with a larger bond yields coefficient (0.18 versus 0.11) although the difference is barely significant statistically. The reason for this difference could either lie in the potential small-sample bias of the CCE specification or in the large effect that the inclusion of Turkey may have on the estimates, given that we use population-weighted estimates and Turkey becomes the largest origin in the expanded sample.

[65]From -2.89 to -1.47 in that case. Results available from the authors upon request.

To prevent concerns coming from the use of population weights in our preferred estimates, we reran the model on the baseline sample without population weights in specifications (3) and (4) from Table 5. The estimated coefficients are again barely different from those reported in specifications (3) and (4) from Table 4. Only the FE coefficient for the 2011 Free Mobility variable is significantly larger in the specification without fixed effects. This comes from the fact that the eight countries affected by this provision were mostly small countries: 29 percent of the countries hosting only 17 percent of the population.

Finally, we also test what happens when we estimate both the FE and CCE specifications dropping Estonia, the only country in our main sample for which we did not have actual bond yields data and had to estimate them. As it could be expected, the omission of a country that represents barely more than 0.3 percent of the total population of the included origin countries has no impact whatsoever on the estimates. Specifications (5) and (6) from Table 5 are almost identical to specifications (3) and (4) from Table 4.

6 The relevance of the diversion effect

In this section, we gauge the quantitative relevance of the studied variables in explaining the increase in migration flows to Germany in the aftermath of the European crisis. To this end, we perform a simple decomposition exercise on our preferred set of estimates, that is, Column (4) from Table 4.

The objective of the exercise is to understand the strength of the diversion effect, which we term multilateral resistance to migration, as a key factor explaining the evolution of gross migration inflows into Germany between 2006 and 2012. To provide an example, the additional migration from Greece to Germany due to increases in Greek bond-yields between 2007 and 2012 is not as remarkable as the additional migration from Romania to Germany due to increases in Spanish and Italian bond yields, Spain and Italy being the main alternative destinations for Romanian migrants.[66] Greek migration to Germany increased from 8,000 persons in 2007 to 31,000 persons in the last year of our sample (July 2011-June 2012). Out of this almost four-fold increase, Column (4) tells us that we can attribute only 11 percent, that is 2,580 migrants, to the worsening of Greek economic expectations proxied

[66] We compare 2007, after Romania had entered the European Union, with the last full year in our sample: the last six months of 2011 and the first six months of 2012.

by the increase in Greek bond yields from 4.5 to 21.4 percent. In the same period of time, Romanian migration to Germany accelerated from 43,000 persons in 2007 to 107,000 persons in the last year. Out of this more than doubling of the flows, changes in the economic conditions of alternative destinations approximated by the multilateral resistance to migration term $\boldsymbol{\lambda}_{jk}{}'\widetilde{\boldsymbol{z}}_t$ in equation (11) account for 99 percent, that is, for 63,751 additional migrants. A simple regression of this term on Spanish and Italian bond yields suggests that they can explain up to 40 percent of the variation in the multilateral resistance to migration term for Romania from 2007, which would translate into 25,602 migrants, almost 10 times the number of additional migrants from Greece.[67]

How can we obtain these numbers from specification (4) in Table 4? We just take advantage from the linearity of equation (11). If we sum all the monthly observations for a given country j in a particular reference year (2007 in our example) and subtract this expression from a similar expression for the last twelve months of the sample (between July 2011 and June 2012), we obtain a decomposition of the difference that accounts for the influence of each of the independent variables of the equation on the change in migration rates observed during the period:

$$
\begin{aligned}
\sum_{t=7/2011}^{6/2012} y_{jkt} - \sum_{t=1/2007}^{12/2007} y_{jkt} = {} & \hat{\boldsymbol{\beta}}_{21}^{CCE\prime} \left(\sum_{t=7/2011}^{6/2012} \boldsymbol{x}_{1jjt} - \sum_{t=1/2007}^{12/2007} \boldsymbol{x}_{1jjt} \right) + \\
& + \hat{\boldsymbol{\beta}}_{22}^{CCE\prime} \left(\sum_{t=7/2011}^{6/2012} \boldsymbol{x}_{2jjt} - \sum_{t=1/2007}^{12/2007} \boldsymbol{x}_{2jjt} \right) + \\
+ \hat{\boldsymbol{\beta}}_{1}^{CCE\prime} \left(\sum_{t=7/2011}^{6/2012} \boldsymbol{x}_{jkt} - \sum_{t=1/2007}^{12/2007} \boldsymbol{x}_{jkt} \right) & + \hat{\boldsymbol{\lambda}}_{jk}{}' \left(\sum_{t=7/2011}^{6/2012} \widetilde{\boldsymbol{z}}_t - \sum_{t=1/2007}^{12/2007} \widetilde{\boldsymbol{z}}_t \right) + \\
+ \hat{\boldsymbol{\beta}}_{t}^{CCE\prime} \left(\sum_{t=7/2011}^{6/2012} \boldsymbol{d}_t - \sum_{t=1/2007}^{12/2007} \boldsymbol{d}_t \right) & + \left(\sum_{t=7/2011}^{6/2012} \hat{\eta}_{jkt}^{CCE} - \sum_{t=1/2007}^{12/2007} \hat{\eta}_{jkt}^{CCE} \right) ,
\end{aligned}
\tag{12}
$$

[67]The figures are equally spectacular if we repeat the exercise with unemployment rates. They explain 33 percent of the increase in Greek migration to Germany, that is 7,475 additional migrants. For Romania, Spanish and Italian unemployment rates explain 59 percent of the variation in the Romanian multilateral resistance to migration term from 2007. That would mean that Spanish unemployment rates can account for 37,466 additional Romanian migrants to Germany during the last year, more than 5 times as much as the Greek unemployment rate effect on migration from Greece.

where $\boldsymbol{x}_{1jjt}$ in the first expression of the right hand side of equation (12) gathers the four lags of the bond yields variable and $\boldsymbol{x}_{2jjt}$ in the second parentheses includes the four lags of the unemployment rate in country j. The third and fourth elements constitute the contribution of the diversion effect to explaining the change in immigration to Germany between the two years. We consider $\hat{\boldsymbol{\beta}}_1^{CCE\prime}\left(\sum_{t=7/2011}^{6/2012}\boldsymbol{x}_{jkt}-\sum_{t=1/2007}^{12/2007}\boldsymbol{x}_{jkt}\right)$ as part of the diversion, or multilateral resistance to migration, term because of our inability to separately identify policy direct effects from the diversion effect. This is the main reason we use 2007 rather than 2006 as our reference year, so that the effects of the enlargement on Romanian and Bulgarian migration are already discounted and we only need to worry about the 2011 free mobility agreement with eight Eastern European countries. Finally, the decomposition concludes with the general effects contained in the time dummies $\boldsymbol{d}_t$ and the difference in residual unexplained components $\hat{\eta}_{jkt}^{CCE}$.

The overall results from this simple decomposition exercise can be observed in Table 6. We have performed one decomposition for each individual country j in our baseline sample although we only report them for the ten countries that experienced the highest increase in overall gross migration flows to Germany during this period: from 2007 to July 2011-June 2012. The largest absolute changes[68] took place in four Eastern European countries: Romania, Bulgaria, Poland and Hungary. The other included countries are two Baltic states (Latvia and Lithuania) and the four Southern Europe countries most affected by the recession: Greece, Italy, Spain and Portugal. The last line of the table adds the results from the decomposition exercise across all countries in the sample. The ten countries shown account for 92 percent of the total increase in the flows to Germany during the period: 256,000 migrants.

Looking at Table 6, we can first identify the numbers used to illustrate the previous example. For the increase in Greek migration to Germany, we used the 11 percent associated with changes in expectations about the future of the Greek economy, proxied by the bond yields. However, we can see how changes in current economic conditions, proxied by the evolution of the unemployment rate, can be attributed a larger impact over Greek migration to Germany: 33 percent, three times as much. Still, changes in current and future Greek economic conditions together can only account for 44 percent of Greek migration during the period. This is notably smaller than the 61 percent that can be related to diversion effects,

[68]The largest relative changes during the same period correspond to Latvia, Greece, Slovenia and Spain.

that is, migrants from Greece who would have gone to other destinations but were deflected to Germany because of events happening in other potential destinations.

The strength of the diversion effect is even more remarkable for Romanian migration to Germany, since it could fully explain the increase in migration during the period (99 percent). In the Romanian case, there has been almost no variation in expectations and little in unemployment rates, which just explain 6 percent of the increase in flows. One could argue that what the diversion effect is picking up is, in fact, the residual variation in the data. However, to show that the diversion term actually captures the multilateral resistance to migration concept, we can observe its correlation with economic conditions in alternative destinations for Romanian migrants, notably Spain and Italy. To this end, we have regressed the estimated $\hat{\boldsymbol{\lambda}}_{jk}{}'\tilde{\boldsymbol{z}}_t$ term for Romania on Spanish and Italian economic conditions. Spanish bond yields and unemployment rates explain 66 percent of the variability in the Romanian multilateral to resistance term from 2007. Italian variables could also explain 58 percent of the variability.[69]

More generally, Table 6 shows that the expectations channel, proxied by the evolution of the bond yield has only been quantitatively relevant in explaining increases in migration from Greece (11 percent) and Portugal (16 percent). In fact, its overall contribution to immigration to Germany has been almost zero (-0.01).[70] On the contrary, current economic conditions, proxied by the unemployment rate, appear as solid factors explaining migration flows to Germany. They are able to explain 40 percent of the change over the studied period overall. In the main origin countries, the largest contribution takes place in Spain, where they explain 47 percent of the increase in the flows. Its relevance is lower in some Eastern European countries where economic conditions either improved or did not deteriorate much during the period, such as Poland, where unemployment rates actually contributed to reducing inflows by 9 percent, and Romania.

The last two columns of Table 6 include both the unexplained residual variation corresponding to the last parentheses in equation (12), which is typically small and with changing signs, and the part of the changes in migration flows to Germany that can be attributed to common factors, captured by the structure of time dummies: $\boldsymbol{d}_t$. The latter happens to be negative on average and not negligible: -0.18. In fact, the relative magnitude of this variable

[69] These auxiliary regressions are available from the authors upon request.

[70] This negative value comes from the positive evolution of the spread in countries sending few additional migrants to Germany, notably the UK, Switzerland and the Nordic countries.

is the same across countries but its contribution becomes larger wherever the relative change has been smaller. This is why it is much smaller for Latvia (-0.06), Greece (-0.07) and Spain (-0.09), where the relative increase in migration was more notable, than for Poland (-0.41), where the relative increase has been modest, although starting from a large 2007 inflow. There are many possible alternative explanations for this sign; for instance, the crisis, which induced a decline of GDP between 2008 and 2010 and exposed Germany to the instability arising from the sovereign debt crisis in other European countries, could have induced a direct negative effect on incoming migration flows.[71] In general, time dummies pick any factor that affects all origin countries in the same way.

Undoubtedly, the most remarkable number in Table 6 is that coming out of the contribution of the diversion effect to explaining the increase in gross migration inflows into Germany: 78 percent. This is exactly twice as much as the contribution of current and future economic conditions to explaining these flows. Unfortunately, we cannot disentangle the effect of changes in migration policies, the free mobility agreement with eight Eastern European countries in the sample in 2011, from changes in the "pure" diversion effect. Thus, our diversion effect is "contaminated" by direct policy effects of the 2011 agreement. In order to discount this effect, we can either trust the, possibly downward biased, coefficient on this variable from specification (3) in Table 4, which reported a 15 percent increase in the flows, or we can check how much of the variation in the multilateral resistance to migration term can be directly accounted for by the policy variables: 22 percent, the R^2 from a regression of $\hat{\boldsymbol{\lambda}}_{jk}{}'\widetilde{\boldsymbol{z}}_t$ on $\boldsymbol{x}_{jk}$.The 2011 agreement could be behind the large size of the explanatory power of the diversion effect for Poland (1.54) or Hungary (0.81). However, it must be noticed that the diversion effect is also very large for countries that were not directly affected by the agreement, such as Romania (0.99), Bulgaria (0.80) or Italy (0.81).

The relevance of the policy effect on the overall diversion effect is best judged by looking at the evolution of the multilateral resistance to migration term over time for the main countries reported in Table 6. Figure 7 performs this exercise for the first four: Romania, Bulgaria, Poland and Hungary. For Romania and Bulgaria, the jump in January 2007 reflects both countries' accession into the EU. However, the rest of the increase over the period is, as shown above, mostly related to the worsening of the economic conditions in Spain and

[71] Notice that, while the evolution of economic conditions in Germany might have *per se* contributed to reduce the scale of incoming flows, Germany nevertheless improved its *relative* attractiveness *vis-á-vis* other European destinations that have been more severely hit by the crisis.

Italy that made migration to Germany relatively more attractive. Notice that, for Table 6 purposes, we took the average of the 12 months in the series that follows the January 2007 jump so that the 2007 policy change does not affect the calculation. This is not the case for Hungary and Poland. In case of these countries it is clear that the jump, smaller in magnitude but a jump nonetheless, took place in May 2011, when Germany granted free mobility to their citizens. Overall, as seen in Table 6, the evolution of the diversion effect for this countries is a crucial factor explaining the surge in migration to Germany between 2007 and July 2011-June 2012.

We would like to emphasize how our methodology is able to take into account the effect of economic conditions or migration policy changes in alternative destinations for potential German-oriented migrants without actually needing to include such variables. We have already seen how the diversion, or multilateral resistance to migration, term for Romania was associated with economic conditions in Spain and Italy. The main advantage of the CCE estimator is that it does neither require us to make assumptions on what the relevant alternative destinations are nor do we need data on these alternative destinations. The auxiliary regressors do the job for us. The reason is that the structure of cross-sectional averages and their interactions with the origin fixed effects are able to detect average changes in the dependent and independent variables, and thus in the residual unexplained variation, and attribute them appropriately to each origin through the origin interaction. We do not need alternative destinations to be in the dataset for this to be the case. A change in US conditions that makes the US a more attractive destination for migrants will be reflected in migration rates across the sample, thus affecting their cross-sectional average, and will be assigned to each country through the origin interaction.

7 Concluding remarks

This paper has analyzed the effects of the current economic crisis on migration flows from EEA countries to Germany, tackling two key analytical challenges that arise out of the complexity of the location-decision problem that potential migrants have to deal with. Specifically, we control for the confounding influence exerted by the time-varying attractiveness of alternative destination countries with the econometric approach proposed by Bertoli and Fernández-Huertas Moraga (2013), and we extend the usual definition of location-specific utility to better account for the role of expectations in shaping the decision to migrate.

We find evidence that economic conditions at origin and the expectations about their evolution, proxied by the yields on 10-year government bonds, significantly influence the scale of bilateral migration flows. We use our estimates to understand how the observed variations in migration flows to Germany between January 2007 and June 2012 reflect (*i*) the migration-creation effect of the crisis, due to worsening economic conditions and expectations at origin, (*ii*) the migration-diversion effect due to a declining attractiveness of alternative destination countries, and (*iii*) the influence of common factors.

We find that diversion effects are very large, as they can account for 78 percent of the increase in migration flows to Germany, twice as much as the migration-creation effect of the crisis, while common factors contributed to reduce the scale of the incoming flows. The evolution of the yields of 10-year government bonds plays a role that is, on average, limited but that becomes substantial for two countries, namely Greece and Portugal, for which it can explain respectively 11 and 16 percent of the increase in migration that we observe in our data.

The key role of the migration-diversion effects induced by the crisis helps us to understand why Romania and Bulgaria, two countries that have been only modestly affected by the crisis, and that experienced no change in the entry conditions for their citizens to over our period of analysis, recorded the largest increase in the scale of migration flows to Germany. The severity of the crisis in Spain and Italy, which had absorbed most of Romanian and Bulgarian migrants before 2008, has redirected migration flows towards Germany.

These findings might have important policy implications. Currency union theory argues that a high level of labor mobility is an important prerequisite for an optimal currency area (Mundell, 1961). The level of labor mobility has been, however, low in the EU before the Eurozone was founded, and even today, after the crisis unfolded, migration outflows from the most affected countries are relatively moderate. Still, our analysis reveals a significant diversion of migration flows, that actually implies that intra-European migration flows are actually very sensitive to changes in economic conditions across alternative possible destinations. The migration-diversion effects induced by the crisis have a significant impact on labor endowments both in Germany and in the countries affected by the crisis, although bilateral migration flows between Germany and the Southern European countries are still modest.[72]

[72]The relevance of diversion effects will be presumably reinforced when Germany grants the free mobility

Thus, the implications of the crisis for intra-European labor mobility are substantially larger than what can be inferred by focusing only on the direct migration-creation effect of the crisis. This insight might be relevant for monetary and labor market policies.

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Table 1: Descriptive statistics from the Eurobarometer surveys

	worse personal job situation (percent)				
Country	Average	St. dev.	Lowest	Highest	Change
Austria	8.4	1.6	6	11	-3
Belgium	7.4	2.3	5	11	0
Bulgaria	11.6	2.8	8	17	-6
Cyprus	11.1	2.9	7	17	7
Czech Republic	12.1	2.9	8	18	6
Denmark	3.0	0.8	2	5	0
Estonia	7.3	2.8	3	12	0
Finland	3.6	1.3	2	6	2
France	6.2	1.5	4	10	-3
Germany	7.7	2.2	4	12	-6
Greece	20.6	12.9	8	42	30
Hungary	26.7	6.3	16	37	14
Iceland	3.8	1.6	2	6	-
Ireland	11.5	5.1	4	20	8
Italy	15.4	3.4	11	22	11
Latvia	9.5	6.0	4	25	-1
Lithuania	22.4	9.0	12	40	3
Luxembourg	4.9	2.0	4	11	0
Netherlands	7.4	1.4	6	11	2
Poland	9.7	3.4	4	16	4
Portugal	22.3	6.0	14	33	7
Romania	14.8	6.0	8	26	4
Slovak Republic	13.5	3.5	9	20	1
Slovenia	10.6	2.9	6	16	7
Spain	9.6	3.6	5	17	11
Sweden	3.5	0.8	2	4	-2
United Kingdom	7.1	2.1	5	11	2

Notes: values are in percent; change reports the difference in percentage points between the May 2012 and the April 2006 surveys; 13 observations for each country, except for Iceland (5 observations), as Iceland has been covered by the Eurobarometer only since 2010.
Source: authors' elaboration on data from European Commission (various issues).

Table 2: Determinants of the expectations on your personal job situation

	Dependent variable: worse personal job situation		
	Specification		
Variables	(1)	(2)	(3)
Unemployment rate	0.476	0.236	0.171
	[0.074]***	[0.076]***	[0.098]*
10-year bond yields		0.421	0.411
		[0.059]***	[0.060]***
Gross domestic product			-0.573
			[0.543]
Adjusted R^2	0.834	0.858	0.858
Observations	330	330	330
Countries	26	26	26
Surveys	13	13	13
Country dummies	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$; standard errors in brackets; the dependent variable is the share of respondents who expect their personal job situation to worsen over the next year; all variables are in natural logarithms.
Source: authors' elaboration on data from European Commission (various issues) and the data described in Section 3.2.2.

Table 3: Summary statistics

Variable	Average	St. dev.	Min	Max	Obs.
Migration rate ($\times$ 1,000)	0.79	1.13	0.01	8.90	2,184
Migration rate index	158.74	116.18	16.67	1,094.98	2,184
Unemployment rate	8.684	3.90	2.30	25.00	2,184
Unemployment rate index	111.12	46.02	43.13	338.64	2,184
Real GDP index	103.70	5.98	85.26	128.31	2,184
10-year bond yields	4.649	1.95	0.61	29.24	2,184
10-year bond yield index	120.92	47.08	28.37	812.22	2,184

Notes: Monthly series on 28 countries January 2006 - June 2012, all descriptive statistics are weighted by population at origin; all indices are set to 100 in January 2006.
Source: authors' elaboration on Statistisches Bundesamt (2012) and on the data presented in Section 3.2.2.

Table 4: Determinants of bilateral migration rates to Germany (2006-2012)

	Dependent variable: log of the bilateral migration rate to Germany					
	Specification					
Model	FE	CCE	FE	CCE	FE	CCE
Variables	(1)	(2)	(3)	(4)	(5)	(6)
log unemployment rate	0.680	0.527	0.548	0.525	0.409	0.436
(4 lags)	[0.021]***	[0.039]***	[0.019]***	[0.045]***	[0.022]***	[0.062]***
log 10-year bond yields			0.377	0.106	0.347	0.113
(4 lags)			[0.017]***	[0.030]***	[0.016]***	[0.035]***
log GDP per capita					-1.466	-0.603
(4 lags)					[0.129]***	[0.366]*
2007 EU Enlargement	1.113	(included)	1.047	(included)	1.121	(included)
	[0.036]***		[0.032]***		[0.032]***	
2011 Free Mobility	0.164	(included)	0.141	(included)	0.231	(included)
	[0.023]***		[0.020]***		[0.021]***	
CCE Test (p-value)		27.64 (0.00)		13.46 (0.00)		9.99 (0.00)
Time dummies	yes	yes	yes	yes	yes	yes
Origin-month dummies	yes	yes	yes	yes	yes	yes
Auxiliary regressors	no	yes	no	yes	no	yes
Adjusted R^2	0.982	0.995	0.986	0.995	0.987	0.995
Countries	28	28	28	28	28	28
Observations	2,184	2,184	2,184	2,184	2,184	2,184

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$; standard errors in brackets; observations weighted by population at origin; the coefficients on the independent variables are the long-run coefficients on four lags of the variables; CCE specifications include the cross-sectional averages of the dependent and independent variables interacted with origin fixed effects as auxiliary regressors; policy variables are included but not identified because of perfect collinearity with the auxiliary regressors in the CCE specifications; the null of the CCE test (F-test) is that the coefficients on these cross-sectional averages are jointly zero.
Source: authors' elaboration on Statistisches Bundesamt (2012) and on the data presented in Section 3.2.2.

Table 5: Determinants of bilateral migration rates to Germany, robustness checks

	Dependent variable: log of the bilateral migration rate to Germany					
	Specification					
	Adds Croatia and Turkey		*No population weights*		*Drops Estonia*	
Model	FE	CCE	FE	CCE	FE	CCE
Variables	(1)	(2)	(3)	(4)	(5)	(6)
log unemployment rate	0.522	0.491	0.541	0.453	0.549	0.522
(4 lags)	[0.019]***	[0.039]***	[0.025]***	[0.076]***	[0.019]***	[0.045]***
log 10-year bond yields	0.379	0.184	0.305	0.152	0.378	0.105
(4 lags)	[0.016]***	[0.027]***	[0.022]***	[0.044]***	[0.017]***	[0.031]***
2007 EU Enlargement	1.079	(included)	1.175	(included)	1.047	(included)
	[0.033]***		[0.049]***		[0.032]***	
2011 Free Mobility	0.151	(included)	0.337	(included)	0.141	(included)
	[0.021]***		[0.026]***		[0.021]***	
CCE Test (p-value)		13.09 (0.00)		7.80 (0.00)		13.64 (0.00)
Time dummies	yes	yes	yes	yes	yes	yes
Origin-month dummies	yes	yes	yes	yes	yes	yes
Auxiliary regressors	no	yes	no	yes	no	yes
Adjusted R^2	0.984	0.994	0.964	0.983	0.986	0.995
Countries	30	30	28	28	27	27
Observations	2,340	2,340	2,184	2,184	2,106	2,106

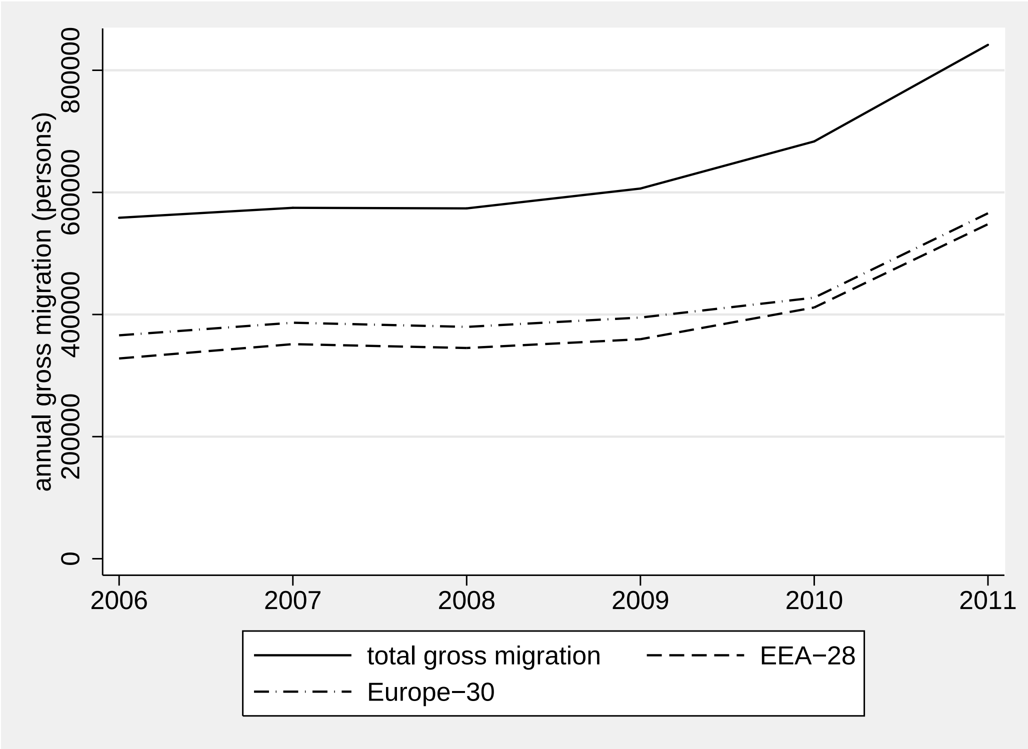
Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$; standard errors in brackets; observations weighted by population at origin except for columns (3) and (4); the coefficients on the independent variables are the long-run coefficients on four lags of the variables; CCE specifications include the cross-sectional averages of the dependent and independent variables interacted with origin fixed effects as auxiliary regressors; policy variables are included but not identified because of perfect collinearity with the auxiliary regressors in the CCE specifications; the null of the CCE test (F-test) is that the coefficients on these cross-sectional averages are jointly zero.
Source: authors' elaboration on Statistisches Bundesamt (2012) and on the data presented in Section 3.2.2.

Table 6: Decomposition of the change in migration flows to Germany between 2007 and 2012

		Decomposition				
	Change in flows	Bond yields	Unempl.	Diversion (MRM)	Common factors	Residual
Country						
Romania	64,179	-0.001	0.063	0.993	-0.105	0.049
Bulgaria	35,253	0.010	0.233	0.780	-0.098	0.054
Poland[a]	34,507	0.031	-0.089	1.539	-0.414	-0.066
Hungary[a]	26,883	0.020	0.267	0.812	-0.126	0.027
Greece	22,695	0.114	0.329	0.613	-0.074	0.018
Italy	16,905	0.046	0.329	0.810	-0.161	-0.023
Spain	15,973	0.026	0.471	0.607	-0.089	-0.015
Latvia[a]	8,255	0.006	0.352	0.671	-0.055	0.028
Lithuania[a]	6,502	0.016	0.412	0.731	-0.095	-0.064
Portugal	4,842	0.158	0.341	0.668	-0.155	-0.016
Total[b]	256,428	-0.007	0.403	0.776	-0.175	0.003

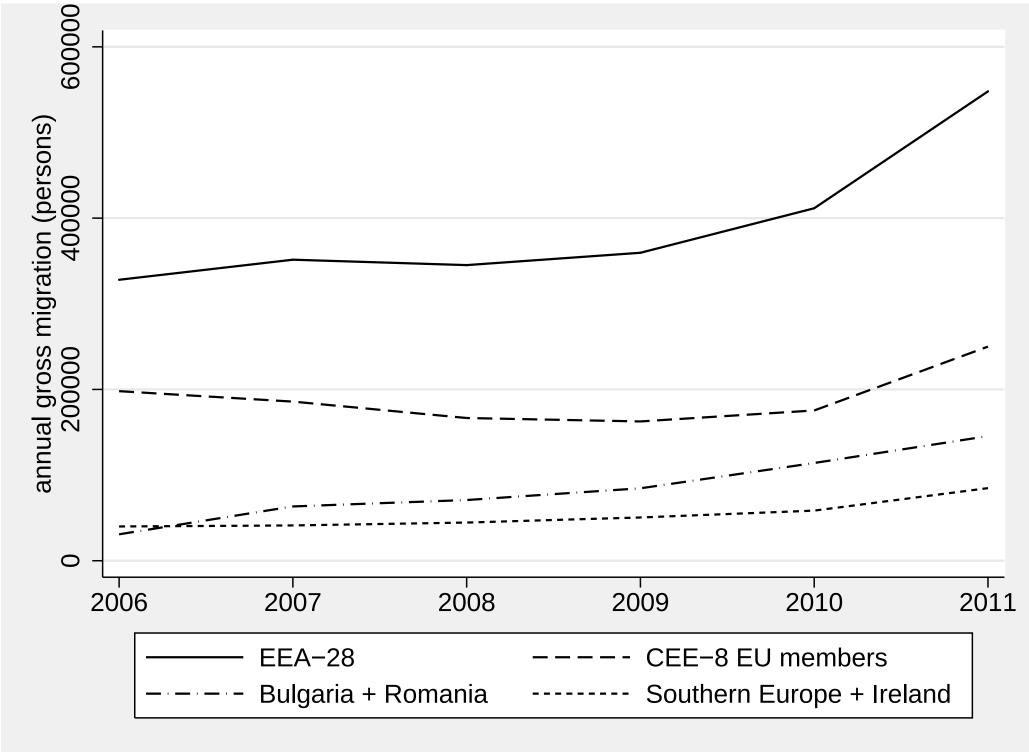
Notes: change in flows compares total migration to Germany from the baseline sample of countries between July 2011 and June 2012 with total migration during 2007; decomposition based in specification (4) from Table 4; common factors refer to time dummies; [a] The diversion effect (MRM) also includes policy changes (the 2011 free mobility agreement); [b] The total refers to all 28 origin countries in our sample.
Source: Authors' elaboration on the estimates from specification (4) in Table 4.

Figure 1: Gross inflows to Germany by country sample, 2006-2011



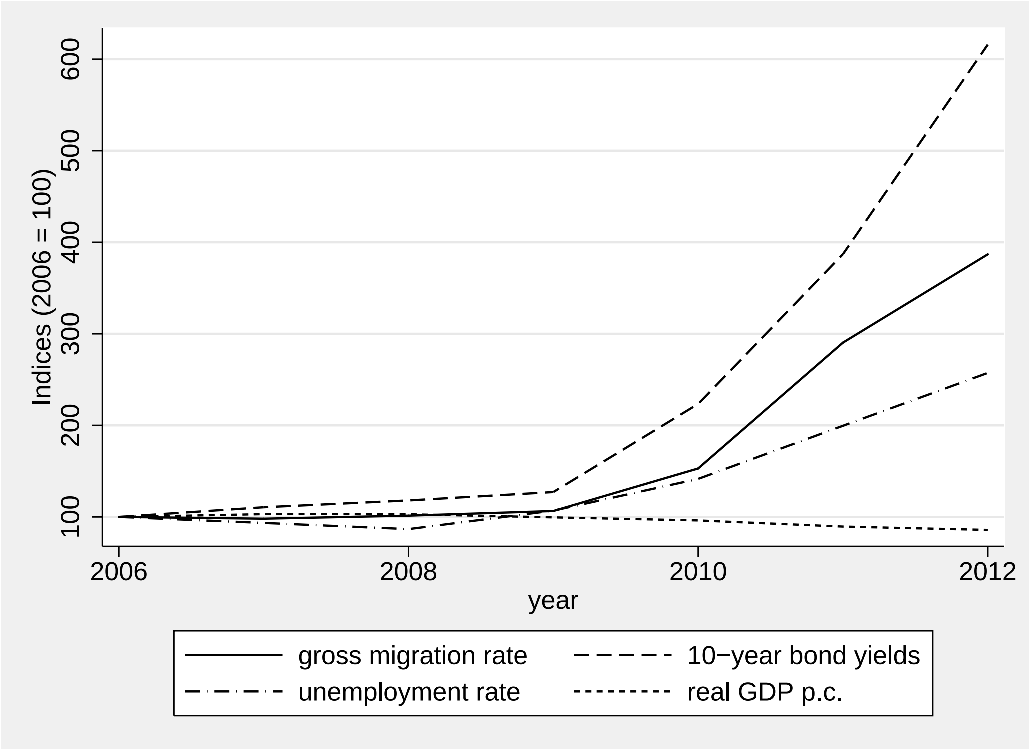
Source: authors' elaboration on Statistisches Bundesamt (2012).

Figure 2: Gross inflows to Germany from different country groups, 2006-2011



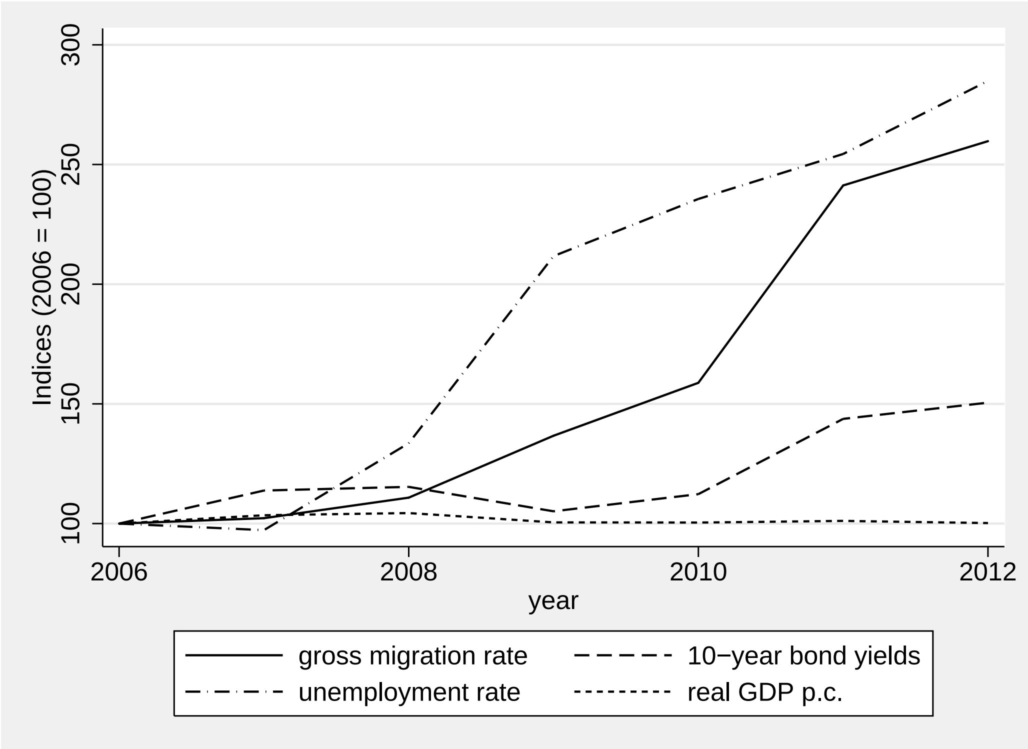
Source: authors' elaboration on Statistisches Bundesamt (2012).

Figure 3: Greece: Gross migration rate and economic fundamentals, 2006-2012



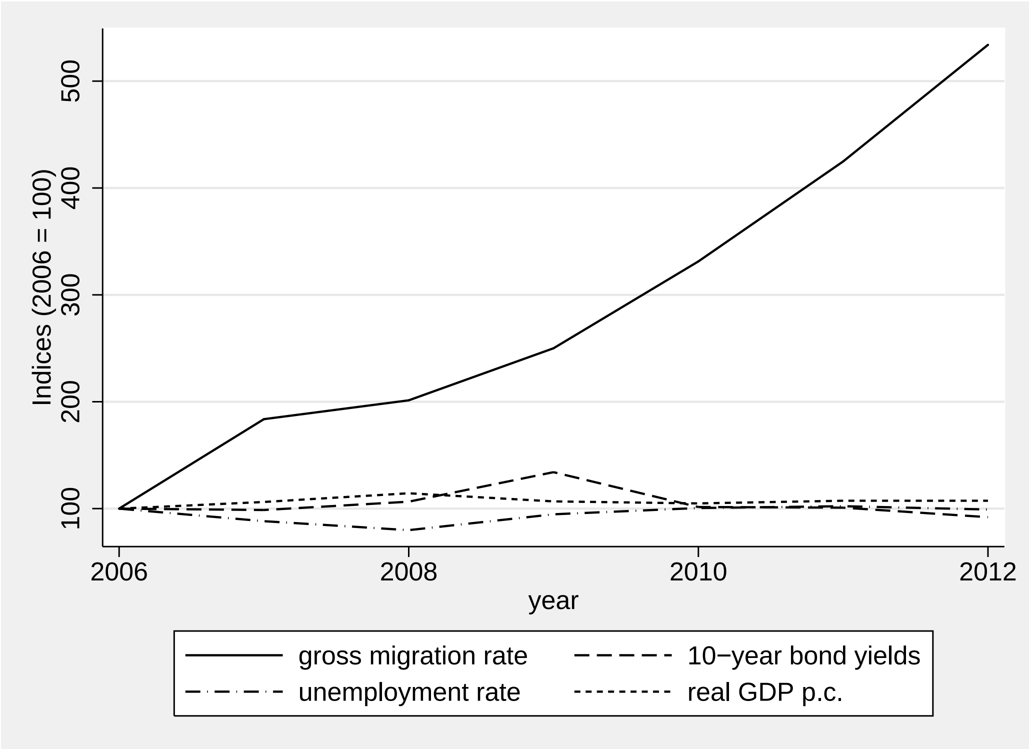
Source: authors' elaboration on Statistisches Bundesamt (2012) and on the data presented in Section 3.2.2.

Figure 4: Spain: Gross migration rate and economic fundamentals, 2006-2012



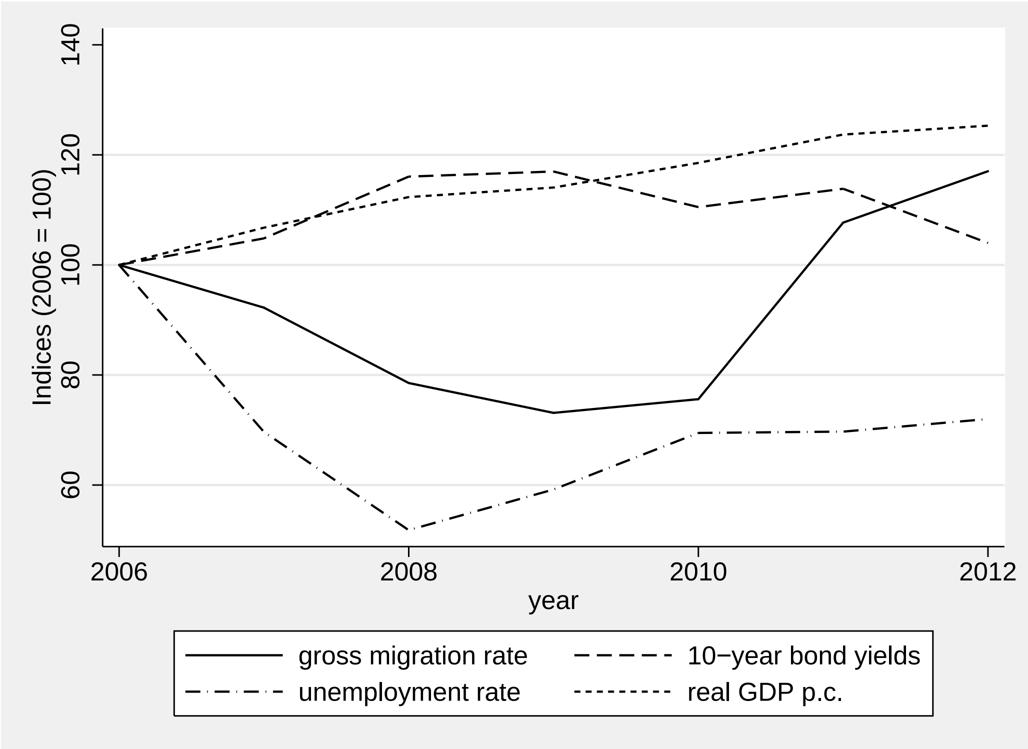
Source: authors' elaboration on Statistisches Bundesamt (2012) and on the data presented in Section 3.2.2.

Figure 5: Romania: Gross migration rate and economic fundamentals, 2006-2012



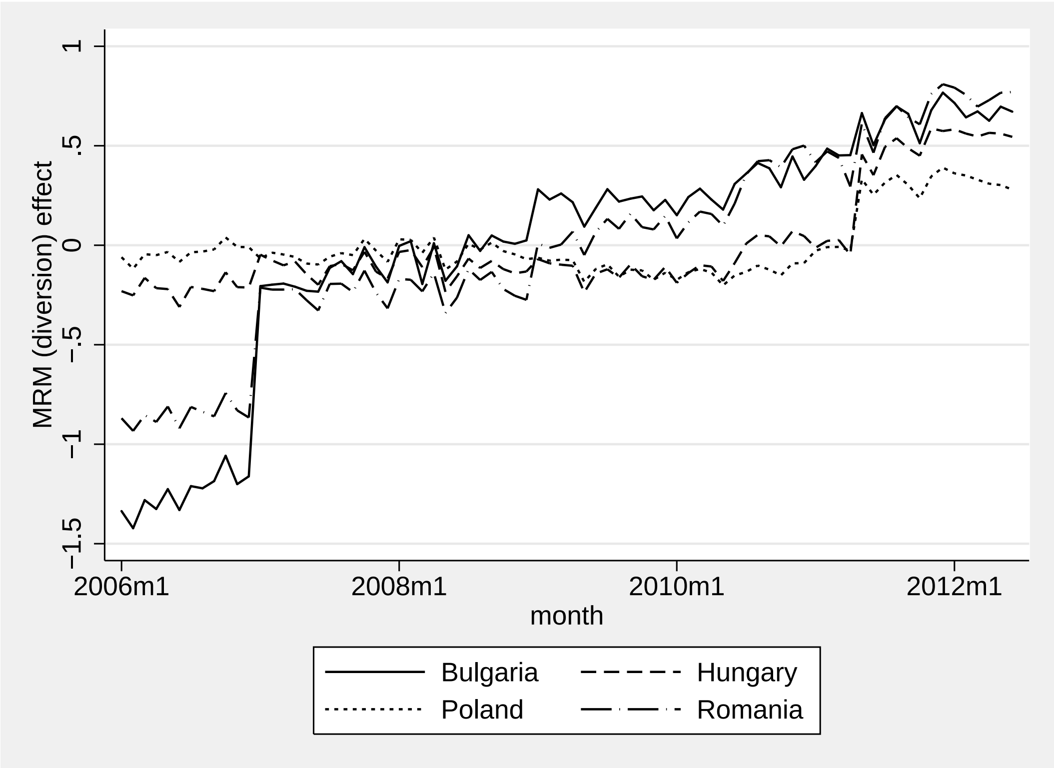
Source: authors' elaboration on Statistisches Bundesamt (2012) and on the data presented in Section 3.2.2.

Figure 6: Poland: Gross migration rate and economic fundamentals, 2006-2012



Source: authors' elaboration on Statistisches Bundesamt (2012) and on the data presented in Section 3.2.2.

Figure 7: Evolution of the diversion (multilateral resistance to migration) effects



Note: diversion effects include policy direct effects; the series have been cleaned of origin-season fixed effect to ease its representation.

Source: authors' elaboration on the estimates in Column 4, Table 4.

A Further results from the Eurobarometer surveys

Table A.1: Determinants of expectations

	Dependent variable:					
	worse life in general			worse economic situation in the country		
	Specification					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Unemployment rate	0.428	0.303	0.288	0.193	0.077	0.057
	[0.076]***	[0.083]***	[0.108]***	[0.083]**	[0.091]	[0.117]
10-year bond yields		0.219	0.217		0.203	0.200
		[0.065]***	[0.066]***		[0.071]***	[0.072]***
Gross domestic product			-0.132			-0.177
			[0.598]			[0.653]
Adjusted R^2	0.848	0.853	0.853	0.597	0.607	0.605
Observations	330	330	330	330	330	330
Countries	26	26	26	26	26	26
Surveys	13	13	13	13	13	13
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$; standard errors in brackets; the dependent variable in specifications (1)-(3) is the share of respondents who expect their life in general to worsen over the next year, and in specifications (4)-(6) the share of respondents who expect the economic situation in their country to worsen over the next year; all variables are in natural logarithms.
Source: authors' elaboration on data from European Commission (various issues) and the data described in Section 3.2.2.

Table A.2: Determinants of expectations (cont'd)

	Dependent variable:					
	worse household financial situation			worse employment situation in the country		
	Specification					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Unemployment rate	0.426	0.203	0.179	0.418	0.340	0.357
	[0.069]***	[0.071]***	[0.092]*	[0.091]***	[0.101]***	[0.130]***
10-year bond yields		0.391	0.387		0.138	0.141
		[0.056]***	[0.057]***		[0.079]*	[0.080]*
Gross domestic product			-0.211			0.156
			[0.513]			[0.723]
Adjusted R^2	0.795	0.825	0.824	0.618	0.621	0.619
Observations	330	330	330	330	330	330
Countries	26	26	26	26	26	26
Surveys	13	13	13	13	13	13
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$; standard errors in brackets; the dependent variable in specifications (1)-(3) is the share of respondents who expect their the financial situation of their household to worsen over the next year, and in specifications (4)-(6) the share of respondents who expect the employment situation in their country to worsen over the next year; all variables are in natural logarithms.
Source: authors' elaboration on data from European Commission (various issues) and the data described in Section 3.2.2.