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ABSTRACT

Do Local Amenities Affect the Appeal of Regions in Europe for Migrants?*

This paper delves into the factors which determine the attractiveness of regions in Europe for migrants. Contrary to the literature on the US which has increasingly focused on the role of amenities, existing research in Europe tends to highlight the predominance of economic conditions as the main drivers of migration. Differentiating between economic, socio-demographic and amenity-related territorial features, we examine the appeal of various regional characteristics for migrants by analyzing net migration data for 133 European regions between 1990 and 2006. Our results show that, in addition to economic, human capital-related and demographic aspects, network effects and – in contrast to existing literature – different types of regional amenities exert an important influence on the relative attractiveness of sub-national territories across the European Union (EU). Our findings therefore indicate that locational choices in Europe may be much more similar to place-based preferences in the US than originally thought.

JEL Classification: O15 and R23
Keywords: amenities, economic conditions, europe, inter-regional migration, location choice, regions and social networks

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1. INTRODUCTION

What determines the appeal of places towards migrants? Does the attractiveness of geographical space depend solely on individual judgments or the personal characteristics of likely movers, or are there common place-based, spatial and amenity-related features that affect the attractiveness of territories for all prospective migrants?

The appeal of territories for potential migrants has long been acknowledged as a crucial aspect in regional development policies (Champion, 1993; Wilson and Rees, 2003; Niedomysl, 2004). In light of changing demographic and socioeconomic environments, the ability of territories to attract and to compete for future residents (McCann, 2004; Malecki, 2004) has been shown to play a fundamental role in determining a territory's future prospects. Hence places which are more attractive for migrants may have greater opportunities to face future challenges and may also position themselves as highly competitive economies (Camagni, 2002; Malecki, 2004; Markusen, 1996). This raises the question of what exactly determines whether a territory acts as a magnet or as a deterrent for migrants. Which are the key spatial pull- and push-factors and do economic, socio-demographic factors or amenities prevail as the fundamental drivers of migration?

While this question has raised particular interest among American scholars with recent clear evidence of natural amenities playing a key role in determining the migration appeal of places in the US (Partridge and Rickman, 2003, 2006; Partridge, 2010), the impact of amenities on regional migration patterns in the EU has, so far, played a minor role in a European literature which tends to stress the predominance of economic factors (Cheshire and Magrini, 2006; Faggian and McCann, 2009; Faggian et al., 2011).

This paper aims to assess whether this is the case or whether local amenities – as in the US – have become a basic driver of migration in Europe. This is done by analyzing migration data for 133 European regions during the period 1990-2006. To our knowledge, the paper represents, after Cheshire and Magrini (2006), only the second attempt to examine the impact of amenities on migration at a sub-national EU-wide level. However, while Cheshire and Magrini's (2006) study focuses on differences in population growth-rates across large city-regions (i.e. functional urban regions –FURs), our analysis employs more sophisticated econometric techniques and more recent data. It is also based on administrative territorial units (i.e. NUTS1 and NUTS2). The potential advantage of using regions rather than FURs is that regions allow us to capture the impact of different (non-urban) land cover variables on migrants' place-based utility and hence provide an opportunity to study not only the amenity-related pull of city-regions, but also that of more peripheral (or rural) areas. In order to analyze the attractiveness of European regions for prospective migrants, we estimate static and dynamic panel data models with Hausman-Taylor and heteroscedasticity robust fixed effects techniques, with the aim of contrasting the relevance of economic factors against alternative place-based and territorially-embedded features, such as natural amenities or social migrants' networks.

In contrast to Cheshire and Magrini (2006), who found that amenities (i.e. weather) mattered, but only on a national scale and were insignificant on a European level, our results indicate that, in addition to the traditional economic and socio-demographic territorial features, natural and more general (i.e. history and identity-type) amenities play, as in the case of the

US, an important role in determining the geographical appeal of regions across the EU for migrants.

The paper is divided into five further sections. We first briefly review the theoretical literature on how different types of spatial characteristics influence a place's attractiveness towards migrants (Section 2). Section 3 introduces a simple conceptual framework which provides the basis of the chosen empirical methodology. The empirical specification is discussed in Section 4, while the results are analyzed in Section 5. Some robustness checks are also conducted in this section, Section 6 presents the conclusions.

2. THE ATTRACTIVENESS OF PLACES FROM A MIGRANT'S PERSPECTIVE

The attractiveness of geographical space for migrants has been analyzed along several dimensions. Economic and non-economic territorial features have been found to be essential elements determining utility differentials, and hence migration incentives of potential movers, across different territories (Sjaastad, 1962; Graves and Linneman, 1979; Graves, 1980; Barkley, 1990; Greenwood, 1997; Huang et al., 2002). Traditional theories regarding the attractiveness of 'places' towards migrants highlight potential financial and economic returns as the basic magnet for migrants, making differences in wages, employment opportunities and other forms of expected income (e.g. state transfers) the driving force behind regional migration (Cooper, 1994; Ritsilä and Ovaskainen, 2001; Haapanen and Ritsilä, 2007; Faggian and McCann, 2009). The structure and absolute size of the local economy are therefore important elements in attracting different types of migrants and determining the magnitude and composition of population flows (Partridge and Rickman, 1996; Simon and Nadinelli, 2002; Simon, 2004).

Place-based regional conditions have deserved greater interest recently. Adequate socio-economic features, for example, are likely to allow migrants a fast transition into jobs that best suit their abilities and to accelerate adaptation and/or assimilation to a new structural and administrative system. Favorable human capital endowments and high regional development levels also increase the probability of individuals boosting their own productivity and wages through interaction with others in the region (Rudd, 2000; Rodríguez-Pose and Tselios, 2012). Individuals moving to highly-skilled and well-off regions benefit from knowledge-spillovers, while the presence of large groups of poor and educationally disadvantaged individuals, by contrast, lowers overall productivity and therefore also the region's appeal towards potential migrants (Di Addario and Patacchini, 2008). Other socio-economic features shaping regional migration flows are related to the structure and the demographic composition of the population, as age may have a significant influence on migration decisions (Massey et al., 1993; Tassinopoulos and Kristensen, 1998; Zimmermann, 2005). The propensity to migrate considerably decreases with age (Zimmermann, 2005). Thus, regions with a relatively young population structure will have a higher out-flow of (young) people and tight local labor market conditions, especially for young people, could trigger outward migration (Cairns and Menz, 2007). Past migration trends also play a central role in determining the appeal of any given territory for new migrants. Social network linkages stretching from home to host regions will considerably reduce the costs and risks of migrating by allowing potential movers to gain easier access to jobs and facilitate adaptation to new cultural or administrative environments (Massey et al., 1993; Massey et al., 1998). This may trigger path dependence, whereby current migration flows may be substantially influenced by the magnitude and direction of past migration movements, reflecting potential chain migration effects at the ethnic group, village, or even family level (Massey and Gracia, 1987; Bauer and Zimmermann, 1997; Shah and Menon, 1999; Bauer et al., 2002).

In recent years, urban amenities and quality of life aspects have featured increasingly prominently in migration analyses, especially by North American scholars (e.g. Florida, 2002; Partridge and Rickman, 2003, 2006; Ferguson et al., 2007; Partridge, 2010). The beauty and accessibility of the natural environment, pleasant climatic features or the vibrancy of a region's cultural scene have been highlighted as potentially the main factors behind the attraction of talent and skills (Graves, 1979; Deller et al., 2001; Glaeser et al., 2001; Adamson et al., 2004; Rappaport, 2007; Partridge, 2010). The literature, however, also suggests that amenities may play a less important role in the case of Europe (Faggian and McCann, 2009; Faggian et al., 2011). In a densely urbanized environment, such as the European one, easy access to natural beauty is confined to a more limited number of areas. Average temperatures across the continent are also less extreme than in North America and, given its long history, the availability of cultural amenities may be more homogenously distributed and often directly related to city size and agglomeration. Hence, empirical studies on the impact of amenities on population change in Europe often reach ambiguous or contradictory results and tend to highlight the predominance of economic factors. Cheshire and Magrini (2006), for instance, find that climate variation matters only for within-country regional population growth in the EU and tends to be irrelevant for cross-national flows. For the case of Italy, Dalmazzo and de Blasio (2011) show that local cultural amenities attract skilled workers, whereas they seem to play no role in decisions to migrate from graduates in the South of the country (D'Antonio and Scarlato, 2007). Biagi et al. (2011) corroborate these findings, indicating that South-North migration movements in Italy are primarily linked to economic conditions, whereas amenities or quality of life-related characteristics are only relevant for short-distance movements. Similarly, Faggian and Royuela (2010) also find, in a model of inter-municipal migration in the Barcelona area, that quality of life-based territorial features are important determinants for short-distance migration decisions.

The question is thus how important are economic and non-economic place-specific attributes for migration in Europe? Given the presence of a number of regional characteristics likely to impact on a migrant's expected locational choice utility, the attractiveness of geographical space seems to be determined by a diverse spectrum of socio-economic and spatial attributes. There are relatively few empirical studies contrasting the importance of expected income-based territorial features vis-à-vis other socio-demographic and amenity-related elements as potential drivers of migration on an EU-wide sub-national scale. This study aims to close this gap in the literature by examining which place-specific elements are essential for the location choice of individuals at a European regional level.

3. CONCEPTUAL FRAMEWORK

Following the work of Roback (1982), Beeson and Eberts (1989) Rappaport (2004) and Faggian et al. (2011), we present in this section a simple locational choice spatial equilibrium approach which provides the theoretical basis for our empirical analysis. In order to analyze the migratory pull of different territories, we model regional net migration as determined by households' and firms' reactions to differences in productivity and non-economic territorially-based attributes (cf. Partridge et al., 2008, 2009; Faggian et al. 2011). Households and firms are thereby assumed to be mobile and their locational preferences dependent on utility or profit maximization across different areas. Net present returns between any region j and i[1]

$$\frac{1}{(1+d)^t}\int_t^{\infty}\Pi^j{}_t \geq \frac{1}{(1+d)^t}\int_t^{\infty}\Pi^i{}_t \qquad (1)$$

shape the behavior of companies.[2] Companies are expected to maximize current and expected profits (Π) across different locations. Company profits, in turn, are dependent on wages, rental costs of commercial land, as well as on exogenous natural or socio-economic features (such as a favorable administrative system, human capital endowments or the presence of natural resources – cf. Faggian et al., 2011).

Subject to different location-specific features, firms decide to relocate to areas with higher profits (i.e. to region j) until, in the long-run, current and expected profits are the same across all regions. The locational choice of companies thereby plays a crucial role in shaping the economic characteristics and attributes across different territories.

Region-specific utility from an individual's point of view may be portrayed as dependent on the consumption of goods, non-traded housing services, as well as on non-economic place-based natural or (man-made) cultural amenities (Rappaport, 2004; Faggian et al., 2011), which gives rise to the following net present utility:

$$V^i = \frac{1}{(1+d)^t}\int_t^{\infty} V^i{}_t\left(G^i{}_t,\ D^i{}_t,\ Z^i{}_t\right) \qquad (2)$$

, where G^i_t, D^i_t, and Z^i_t denote the consumption of goods, housing and amenities. Lifetime budget constraints (Equation 3) drive potential movers to also take into account rental and house prices (p^i_t), average wages (w^i_t), as well as the probability of becoming employed (e^i_t) in any given region.

$$\frac{1}{(1+d)^t}\int_t^{\infty} G^i{}_t + p^i{}_t D^i{}_t \leq \frac{1}{(1+d)^t}\int_t^{\infty} w^i{}_t e^i{}_t \qquad (3)$$

Region-specific wages and employment opportunities for migrants are thus likely to be influenced by both favorable territorially-embedded socio-economic regional features, boosting productivity and wages through increased interaction (cf. Rudd, 2000; Di Addario and Patacchini, 2008; Rodríguez-Pose and Tselios, 2012), as well as by the presence and magnitude of migrant communities potentially facilitating a faster transition into jobs (Massey and Gracia, 1987; Bauer and Zimmermann, 1997).

Maximizing Equation (2) under the assumption of constrained resources (Equation 3) results in the following indirect utility function depicting regional net migration as the structural outcome of a number of factors:

$$U^n\ (p^n, Z^n, w^n, e^n, S^n, N^n),\ n: i,j \qquad (4)$$

A territory's indirect utility is thus positively related to the presence of natural and socio-cultural or general amenities (Z^n), household income w^i, the likelihood of finding a job (e^n), as well as to territorially-embedded socio-economic regional features (S^n) and to the presence of migrant communities (i.e. migration network effects) (N^n). Regional housing costs p^n have a negative impact on a household's place-specific utility.

Indirect utility differentials between region i and region j ($\Delta U^{ji} = U^j - U^i$) may then trigger migration flows. Migration flows are further determined by the possible psychological and pecuniary utility costs of moving (C^{ij}).[3] An individual is likely to move to region j if ΔU^{ji} - C^{ij} > 0, because the costs exceed the utility, whereas if ΔU^{ji} - C^{ij} < 0, the benefits arising from residing in region i outweigh the incentives of moving (Barkley, 1990; Huang et al., 2002; Nakajima and Tabuchi, 2011).

Given that people can 'vote with their feet' (Ferguson et al., 2007:82), it is possible to assess a region's attractiveness towards potential migrants by analyzing in- and out-flows of economic agents (Nakajima and Tabuchi, 2011). Hence, the population stock in region i at time t_0 (P^i_{to}) may be expressed as:

$$P^i_{to} = P^i_{t1} + M^{ij}_{t1} - M^{ji}_{t1} + d^i_{t1} - b^i_{t1} \quad (5)$$

where P^i_{t1} describes individuals who did not move between t_0 and t_1 (or for whom either $\Delta U_t^{ji} < 0$ or $\Delta U_t^{ji} > 0$ and $C_t^{ij} > |\Delta U_t^{ji}|$). M^{ji}_{t1} denotes the share of residents for which $\Delta U_t^{ji} > 0$ and $C_t^{ij} < |\Delta U_t^{ji}|$, or put differently the number of migrants moving away from region i to any region j. Similarly M^{ji}_{t1} describes the number of movers from any region j to region i, whereas d^i_{t1} and b^i_{t1} denote the number of deaths and births, respectively, occurring between t_0 and t_1 (cf. Huang et al., 2002).

The population change in region i over the period t_0 to t_1 can then be expressed as:

$$P^i_{t1} - P^i_{to} = M^{ji}_{t1} + b^i_{t1} - M^{ij}_{t1} - d^i_{t1} \quad (6)$$

Rearranging and standardizing Equation (3) by the population stock at time t_0, delivers the net migration rate of region i (Puhani, 2001; Crescenzi and Rodríguez-Pose, 2008), which indicates utility differentials across different territories (Nakajima and Tabuchi, 2011).

$$Mig^i_{t1} = \frac{\left(M^{ji}_{t1} - M^{ij}_{t1}\right)}{P^i_{to}} = \frac{\left(P^i_{t1} - P^i_{to} - b^i_{t1} + d^i_{t1}\right)}{P^i_{to}} \quad (7)$$

4. ECONOMETRIC ANALYSIS

Estimation Approach and Variables

By modeling migration through households' and firms' cross-regional utility and profit maximization, net migration movements may be seen as the structural outcome of various time-constant, as well as time-varying regional characteristics, including wages, employment growth and housing costs. A household's location-specific utility and choice of residence can be thus analyzed by developing equation (5), which reveals a region's attractiveness for potential migrants with respect to different amenity endowments. Accounting for economic and non-economic territorial features, we obtain the following structural form for a region's net migration rate:

$$Mig^i_t = \alpha + \beta_1(w^i_t / w^{av}_t) + \beta_2(e^i_t / e^{av}_t) + \beta_3(S^i_t / S^{av}_t) + \beta_4(Z^i_t / Z^{av}_t) + \beta_5(N^i_t / N^{av}_t) \quad (8)$$

where w^i_t, e^i_t, S^n_t, Z^i_t, and N^i_t are place- and time-specific vectors denoting economic, socio-demographic and amenity-type regional attributes. Each regressor is expressed relative to the respective average across all possible location choices. Data limitations prevent us from including endogenous regional housing costs in the empirical implementation of the model. This is not problematic for our study as, given that housing prices may capitalize amenities, their inclusion in the empirical model would pull away from the main goal of our study.

We group the independent variables into the three categories considered (economic, socio-demographic and amenity-based). The economic drivers of migration are proxied using differences in relative living standards, in the form of GDP per capita levels and of differences in unemployment rates (Pissarides and McMaster, 1990; Jackman and Savouris, 1992; Puhani, 2001; Jennissen, 2003; Greenwood, 1997). It is expected that regions with relatively low standards of living or a low quality of life (Assadian, 1995) will have a negative net migration rate, whereas economically prosperous regions and territories with favorable labor market conditions will attract migrants. The introduction of demand-side aspects, in particular, may give rise to certain endogeneity concerns, especially in light of the so-called 'jobs vs. people' debate (Partridge and Rickman 2003, 2006). In spite of our focus on the impact of amenities, rather than on economic factors, we account for potential endogeneity by testing the robustness of our main results to the exclusion of regional wealth and by estimating an alternative model specification introducing an industry-mix employment growth variable, thereby accounting for anticipated economic growth (Bartik, 1991; Blanchard and Katz, 1992; Partridge et al., 2012).

As an additional potential economic factor, we include alternative financial benefits, such as *social welfare payments*, in the model (cf. Boyd, 1989; Day, 1992; Haapanen and Ritsilä, 2007). Because of the national character of most social welfare payments, we construct a redistributional variable combining national and regional data. The aim is to connect social welfare payments determined on a national scale with a region's economic well-being. The resulting variable is calculated as the ratio of total annual national welfare payments over national GDP levels multiplied by regional GDP levels.

Following Rodríguez-Pose and Tselios (2010), we consider place-based regional externalities. These include socio-demographic aspects, such as regional age patterns. Age structure is represented in our analysis by the percentage of the total regional population aged between 15 and 24 years. A region's share in this age group is standardized by the value for all other regions. Social migration networks are proxied by introducing the lagged dependent variable as a regressor in our model.

In addition, we construct a 'social filter index' (Rodríguez-Pose and Crescenzi, 2008: 56) in order to capture other social regional externalities which may influence migration decisions. This composite index accounts for the 'territorially embedded' innovation enhancing features of a region. The 'social filter' stands for "the unique combination of innovative and conservative […] elements that favor or deter the development of successful regional innovation systems" (Rodríguez-Pose, 1999: 82). Our social filter index is built using two main elements: regional *educational attainments* and the composition of *productive resources*. Regarding the former, education is believed to be one of the most important sources in determining the innovation creating capacity of a region (Lundvall, 1992; Malecki, 1997). We introduce potentially endogenous regional human capital (i.e. education) in the model as the number of people with completed tertiary education relative to both the total population of the region, as well as to the total number of people employed in the region. For the composition of a region's productive resources, we use the percentage of the labor force employed in agriculture as an indicator of low productivity. Agricultural employment may even be an indicator of some form of hidden unemployment, as agricultural workers show very little mobility and, in the European context, tend to be aged (Caselli and Coleman, 2001).

As educational attainments and the structure of productive resources are believed to be highly dependent on each other (Rodríguez-Pose and Crescenzi, 2008), problems of multicollinearity may arise. We therefore use principal component analysis (PCA) in order to construct our social filter index with the objective "to preserve as much as possible of the variability of the initial information" (Rodríguez-Pose and Crescenzi, 2008a: 57). The first principal component accounts for 44.2% of the total variance, while the second component represents 35.6%. The coefficients of the education variables are, as expected, positive, while that of the share of employment in agriculture is negative.

Regarding amenities, environmental and cultural place-based characteristics have been identified as key factors behind migration in North American studies (Deller, 1995; McGranahan, 1999; Florida, 2002; McIntyre et al., 2006; Partridge, 2010; Chi et al., 2011). The pull of regional amenities towards migrants may be the consequence of a combination of different types of local amenities (Moss, 1987, 1994, 2006; Bartos et al., 2008), including, first, natural or physical landscape characteristics, such as topographical, water- or climate-related features (i.e. natural amenities), and, second, aspects referring to cultural, historical or identity-type regional characteristics (i.e. cultural or more general amenities). Following this distinction we introduce two sets of amenity variables. The first set includes information on environment-related attributes, such as whether a region has access to the sea or is landlocked, the presence of nature conservation areas, and climatic characteristics (i.e. precipitation, temperature, and cloudiness in January and July). The climate amenity variables are measured as the average over 30 years and thus introduced as time-constant regressors. Natural amenities have the advantage that they are completely exogenous from migration.

General or identity-type amenities refer to the different landscapes and ecosystems which supply goods and services to society of considerable social-cultural and economic value (Metzger et al., 2006; Naidoo et al., 2008; Haines-Young and Potschin, 2009).

In order to measure identity-type regional amenities across Europe, we resort to the work of Kienast et al. (2009). Kienast et al. (2009) distinguish between aesthetic, recreational and cultural or artistic landscape properties.[4] While aesthetic properties refer to the attractiveness of different landscapes, such as the pleasantness of scenery (e.g. scenic roads, architecture) and the non-recreational appeal of landscape properties (cf. Kienast et al., 2009),[5] recreation-related landscape services are evaluated according to the variety of landscapes with touristic or recreational value. Artistic and cultural regional features relate to the variety of elements which are likely to provide services linked to natural heritage, the reflection of nature in folklore, architecture, regional or national symbols, etc. (Kienast et al., 2009).[6] We contrast the landscape functions with a small selection of additional ecosystem properties providing alternative benefits to society. Further types of landscape functions may provide additional insights and enable a more comprehensive comparison of ecosystem-based migration incentives.

The introduction of general or identity-based amenities in any migration model, has, however, two potential downsides. First, measuring landscape functions, cultural and more general amenities in places as rich in history as Europe is often tricky, as individuals would value different types of amenities in different ways. This leads to a certain degree of subjectivity in the perception and measurement of places' ability to supply certain goods and services, which contrast with the 'objectivity' of natural amenity measurements. Second, general amenities are prone to endogeneity. Socio-cultural amenities contribute to determine the appeal of any given place, while, in turn, migration shapes those socio-cultural amenities. Hence, the results involving cultural and general amenity variables have to be interpreted with some caution.

The exact definition and sources of all variables included in the analyses are summarized in Table 1. All variables report regional data, with the exception of the *national growth-rate*, which is used in order to explicitly control for national unobserved effects and minimize spatial autocorrelation [i.e. the missing independence of the residuals of neighboring observations (Rodríguez-Pose and Crescenzi, 2008: 72)].

Insert Table 1 around here

The model is run for the EU15 and covers the time period between 1990 and 2006 (time intervals are measured in years). The analysis is based on a combination of NUTS1[7] and NUTS2 regions. NUTS1 are used for Belgium, Germany, and the United Kingdom, while NUTS2 for Austria, Finland, France, Greece, Italy, the Netherlands, Portugal, Spain, and Sweden. Countries without a regional structure were excluded from the analysis.[8] In addition, some individual regions also had to be excluded due to inadequate data availability.[9] In total, the analysis is conducted for 133 regions in 12 countries.

Econometric specification

The empirical methodology is based on static and dynamic estimation procedures. In the first part of the analysis, we distinguish between traditional economic and alternative place-based characteristics by estimating a static migration model using heteroscedasticity-robust time- and region-specific fixed effects (FE), as well as Hausman-Taylor estimations which allow for the introduction of time-invariant variables. While fixed-effects models deliver consistent estimators in the presence of time-varying regressors, they fail to identify the impact time-constant factors. Using random-effects (RE) models accounts for the latter and may provide estimates for time-varying, as well as time-constant elements. RE models may, however, also lead to inconsistent estimates, if region-specific individual effects are correlated with some of the independent variables (Hausman, 1978; Baltagi et al., 2003; Cameron and Trivedi, 2009). In light of the systematic rejection of RE in favor of FE-models in our specifications, we suspect that at least some of the time-varying regressors are correlated with region-specific individual effects.[10] Hausman and Taylor (1981) introduced an alternative instrumental variable (IV) estimator, allowing to take into consideration time-constant variables and providing consistent estimates by accounting for the possibility that some, but not all independent variables, may be correlated with individual-specific effects. Values of regressors not correlated with region-specific individual effects are, hence, used as instruments for endogenous variables (Baltagi, 2001; Baltagi et al., 2003; Cameron and Trivedi, 2009).[11]

As noted above, spatial analyses involving migration data are often prone to endogeneity problems (Treyz et al., 1993; Ozgen et al., 2011). Given the possibility that migration may influence regional economic conditions or may even shape the structural features of regions, dependent and explanatory variables cannot be introduced with the same time structure. All explanatory variables are therefore lagged by one year in our main model specifications (i.e. Table 2 and 3),[12] In order to control for anticipated economic growth shaping migration decisions today, we introduce in section 5.2 an additional robustness test by controlling for an exogenous demand shock variable.

As a consequence of distinguishing between two different types of amenities (i.e. natural and more general or identity-type), two static models are estimated. The regressors are inserted successively in the analysis culminating in specifications which include several place-based amenity-related characteristics. Based on the discussion in the previous sections Equation (8) is finally transformed into the following (static) empirical formulation:

$$NetMigr_{it} = \alpha + \beta_1 \, GDPcap_{i,t-1} + \beta_2 \, Unempl_{i,t-1} + \beta_3 \, Young_{i,t-1} + \beta_4 \, SocWelfare_{i,t-1} + \beta_5 \, SocFilter_{i,t-1} + \beta_7 \, NatGrowth_{i,t-1} \; [+ \beta_8 \, Amenities_i] + \varepsilon_{it} \qquad (9)$$

Where the individual variables are as described in Table 1 and α is the constant; i is the regional index, i ϵ [1;133];[13] t is the temporal index, t ϵ [1990;2006]; ε is the residual term. The results for the static models are reported in Tables 2 and 3.

We transform the static model into a dynamic one, in order to more explicitly account for the potential risks of endogeneity and to include the influence of past migration flows or migratory network linkages on the attractiveness of places for migrants. Given the relative small number of time periods considered and that the only available instruments are 'internal', a heteroscedasticity-robust 'Generalized Method of Moments' (GMM) estimator in differences is used for the dynamic model estimations (Roodman, 2009a). The specific estimator chosen is the Arellano-Bover/Blundell-Bond panel data estimator in its two-step heteroscedasticity-robust estimation version (cf. Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998). Regarding the specification of the estimator, the lagged net migration rate, unemployment, regional wealth, as well as the composite 'Social Filter' index are classified as endogenous in all regressions. Moreover, the second and third lags have been chosen as (internal) instruments for the endogenous variables in all model specifications.

The dynamic model adopts the following form:

$$NetMigr_{it} = \alpha + \beta_1 \, LagNetMigr_{i,t-1} + \beta_2 \, GDPcap_{i,t} + \beta_3 \, Unempl_{i,t} + \beta_4 \, Young_{i,t} + \beta_5 \, SocWelfare_{i,t} + \beta_6 \, SocFilter_{i,t} + \beta_8 \, NatGrowth_{i,t} \; [+ \beta_9 \, Amenities_{i,t}] + \varepsilon_{it} \qquad (10)$$

where all variables are as described in Table 1.

5. RESULTS AND ROBUSTNESS TESTS

This section presents the regression results and robustness tests of the static and dynamic model, specified in equations (9) and (10). As mentioned earlier, we distinguish between economic, socio-demographic and amenity-based territorial characteristics.

Regression Results

The regression results are divided into two groups. The first of these groups depicts the regression results of the Hausman-Taylor estimation model including *natural* amenity variables (Table 2). The second group accounts for more *general* (i.e. cultural and identity-based) amenities, as well as past migration flows (Table 3). The reasons for this distinction are, on the one hand, the need to present more parsimonious results, and, on the other, that, given that general, identity-based amenities may be affected by endogeneity, the coefficients in Table 3 may need to be considered with greater caution.

The results presented in Table 2 show that, as expected, the traditional economic determinants of place-based utility tend to be highly significant in all different model specifications. Regional wealth acts as a fundamental territorial pull factor for migrants. A higher standard of living and potentially higher earnings are an important aspect in determining the attractiveness of a given territory. Place-based income-driven judgments about the appeal of a given territory are also likely to be dependent on the availability of jobs and the likelihood of finding a job somewhere else. The regression results (Table 2) show a consistent negative impact of regional unemployment on a territory's net migration rate, suggesting that areas with low employment opportunities are less attractive and therefore tend to be characterized by a net outflow of people. Regional unemployment rates provide a strong signal about local job availability and are, therefore, a marker anticipating expected future job and earning opportunities and hence the attractiveness of different regions for migrants.

Social welfare payments represent a further element affecting the appeal of places. The coefficient for social welfare spending is positive, albeit not significant (Table 2). This lack of significance of social benefits may indicate the presence of information asymmetries regarding available social welfare contributions for migrants (Zimmermann, 2005).

The appeal of place for migrants may be further determined by a region's inherent socio-demographic character. A territory's age- or education-structure may, thereby, not only affect the population's propensity to move (DaVanzo, 1978; Champion et al., 1998; Plane and Heins, 2003), but also the region's socio-economic dynamism and innovation potential (Rodriguez-Pose, 1998; Rudd, 2000). The regression results show that regions with a high share of young people tend to be characterized by a net population outflow, which may indicate the presence of lower migration barriers for the young (Borjas, 1989; Zimmermann, 2005), but also tighter local labor market conditions and a higher competition for available jobs among young professionals (Table 2). Regions with a predominantly young population, therefore, tend to lose people, implying a lower attractiveness especially for prospective (young) movers.

The 'social filter index' displays a positive correlation with the regional net migration rate. The significance of the coefficient in all regressions stresses the high importance of (innovation-enhancing) social conditions of places in order to attract migrants. Hence territorially embedded characteristics, such as the existence of a favorable educational environment and the associated opportunities for migrants to increase their own productivity through interaction with each other (Rudd, 2000; Acemoglu and Angrist, 2001; Di Addario and Patacchini, 2008) seem crucial in the potential of any European region to attract migrants.

Deconstructing the social filter into its individual components yields interesting results. First, among the factors that make up the social filter index, educational variables are highly significant. The level of education of the labor force has a strong positive influence (0.7174) on the filter index. The presence of a high-tech or high-skilled labor force tends to attract people, once all other factors are controlled for. These findings support the hypothesis that highly-educated people are more likely to be attracted to areas with an already highly-skilled labor force and with industries requiring highly-skilled labor. People eligible to work in such industries will find (better paid) jobs and are therefore more likely to migrate. The educational level of the total regional population has also a positive influence [albeit not as strong (0.0514)]. The small positive impact of this latter variable may signal a positive influence of a good regional educational system on net migration movements. Second, the composition of productive resources in a region, proxied by the relative number of people employed in agriculture has a negative influence in the framework of the social filter (-0.6948) and impacts net migration negatively. Regions with a more backward sectoral composition (high percentage of workers in the agricultural sector) tend therefore to be less attractive.

While the results for economic and socio-demographic variables follow, by and large, expectations, our key independent variables of interest are related to the influence of amenities on migration decisions. Here our results contrast significantly with past analyses for Europe. With regard to natural amenities (Table 2), our results suggest the existence of an overall positive influence of amenities on the appeal of different territories for migrants, which go well beyond national borders (cf. Cheshire and Magrini, 2006).

Regional January and July average temperatures are positively correlated with migration, when considered as standalone amenity variables (Table 2, Regressions 1 and 2) and, in case of the former, also in combination with other environment-related regional amenities (Table 2, Regressions 9 to 12). These findings coincide with the North American literature, as they tend to highlight the importance of climate on the appeal of any given place (Deller et al., 2001). Once economic and socio-demographic factors are controlled for, European regions with relatively warm winters exert a significant pull towards migrants (cf. Graves, 1979; Deller et al., 2001; Glaeser et al., 2001; Rappaport, 2007; Partridge, 2010 for the US). Average January and July cloudiness, measured in percentage of time, has a negative impact on the attractiveness of places when analyzed as free-standing amenity indicators (Table 2, Regressions 3 and 4). However, only January cloudiness is (highly) significant when estimated in combination with other natural amenity variables (Table 2, Regressions 9 to 12). The consistent negative impact of average cloud cover in January underline the appeal of places with a relatively high average number of sunny winter days and tends to corroborate previous findings underlining a certain valuation of mild winters across the Continent (Williams, 1997).

Regional rainfall does not exert any kind of influence when estimated in isolation (Table 2, Regressions 5 and 6). Once controlling for temperature and other natural amenities precipitation-rates in January and July show continuously positive coefficients which are, however, not significant at any meaningful level (Table 2, Regressions 9 to 12).

Regressions (7) to (9) introduce other natural amenities, not necessarily linked to climate. When analyzing whether having access to the sea matters (Table 2, Regression 7 and 9 to 12), we find positive coefficients in all specifications. This association, however, is only statistically relevant when no other natural amenity variables are included in the estimation (cf. Regression 8). The presence and relative regional size of nature conservation areas, as a potential indicator of natural beauty, is highly significant across all model specifications (Table 2, Regressions 8 to 12). Landscape conservation areas, measured as a percentage of the overall surface, are also reported to affect net migration positively, although the coefficients tend to be statistically insignificant (Table 2, Regressions 8 to 13).

Regressions (9) to (12) move beyond the simple estimation of standalone natural amenity variables in the presence of economic and socio-demographic factors, and introduce several natural amenity indicators simultaneously. Regression (9) focuses on landscape related as well as January temperature variables only, while model specifications (10) and (11) test the sensitivity of the results to the inclusion of the precipitation data. Model specification (12) introduces all natural amenity variables together. In all cases the regression results tend to strengthen the findings of the individual estimations.[14]

Cultural, history and identity-type regional amenities are much more difficult to measure and almost always involve some degree of subjectivity. In light of the latter, we try to proxy the individual-specific evaluation of cultural, aesthetic or other regional identity-type amenities by employing different indicators for an ecosystem's ability to provide goods and services to society. Table 3 presents the results including more general (i.e. history and identity-type) amenities. Regression (1) is based on a time- and region-specific fixed effects (FE) estimation and serves as the benchmark for the economic and socio-demographic drivers considered, whereas Regressions (2) to (4) use dynamic models in order to test whether the introduction of the lagged net migration rate as an additional regressor affects the results. The main advantage of dynamic over static models is the possibility of introducing past migration as a means to control for path dependency and for the presence of social networks, as well as addressing issues of endogeneity, by means of heteroscedasticity robust difference GMM estimators. The regression results reported in Table 3 confirm the robustness of previous findings and suggest a strong influence of traditional economic and socio-demographic territorial characteristics on place-based utility from a migrant's perspective. Moreover, the dynamic model results (Table 3, Regressions 2 to 4) show a strongly significant impact of past migration flows on the migration appeal of different territories, which could potentially indicate that places with larger communities of migrants, possibly of similar geographical or ethnic origin, tend to attract more people than regions with smaller migrant populations. These results may indicate the existence of important network effects at the community, peer group or family level, which could help settling in into a new administrative and cultural environment (cf. Massey et al., 1993).

The remaining results in Table 3 include several indicators which measure various types of benefits different natural and artificial landscapes (ecosystems) are able to provide to society. Measurement and definition of these landscape functions stem from Kienast et al. (2009). Regressions (5) to (7) introduce, apart from a territory's ability to provide a suitable living space for wild plants and animals, indicators referring to a region's ability to supply benefits related to recreational, cultural and aesthetic services. The results show that areas with a high recreational function or aesthetic and scenic appeal tend to be positively correlated with a net in-migration of people, thereby highlighting their importance for a territory's attractiveness (Table 3, Regression 5 and 7). Cultural and artistic landscape functions, by contrast, tend to be less important according to our regression results (Table 3, Regression 6).

Regressions (8) to (11) include indicators of an area's ability to provide goods related to wildlife products (e.g. game, fish, raw materials, etc.), commercial forest products (e.g. timber, fiber, etc.), as well as a region's capacity to provide shelter, housing and safe transportation. The results show that regions with a strong presence of forest-type landscapes tend to be negatively or not at all correlated with net migration rates, whereas areas favorable to the provision of wildlife products or suitable to an adequate supply of transport or housing facilities seem to be more attractive for migrants. A further interesting point is that an ecosystem's capacity to influence climate regulation seems attractive for migrants, whereas a region's ability to provide an appropriate living space for plants and animals (i.e. habitat) has less of a positive effect (Table 3, Regressions 5 to 11). In light of the potential difficulties to adequately quantify general, history and culture as well as other quality-of-life-related amenities, and given potential endogeneity issues these findings have to be considered with a pinch of salt. However, it also has to be acknowledged that, despite these caveats the results involving more general type amenities tend to reinforce those of natural amenities and confirm the general view of an overall positive influence of various types of amenities on a territory's migration perspective.[15]

Insert Tables 2 and 3 around here

Robustness Tests

A number of tests have been performed in order to assess the robustness of the results of the static and dynamic migration models reported above. These include statistical analyses of the quality of the instruments and assumptions and panel data estimators to provide a reference framework for our Hausman-Taylor estimation results. Furthermore, FE vs. RE Hausman specification tests for models with and without autocorrelation structures have been conducted. The results of the latter, reported in Table 4 and 5 (see Hausman tests in Columns 3 and 4), show a continuous rejection of the RE consistency assumption. Heteroskedasticity- and cluster-robust over-identification tests corroborate these findings by showing Sargan-Hanson p-values of 0.021 (Table 4, Column 3) and 0.068 (Table 5, Column 3) for the natural and general amenity models, respectively. The results suggest that region-specific fixed-effects tend to be correlated with at least some regressors and thus favor an FE over an RE estimation procedure. Finally, a sensitivity model has been estimated introducing industry-mix employment growth to account for anticipated economic growth (Bartik, 1991; Blanchard and Katz, 1992; Partridge et al., 2012).

Tables 4 and 5 focus on the main model specification (cf. Table 1 and 2) and report results based on alternative estimation techniques. Table 4 and 5 provide initial consistent regressions by reporting the results of a time- and region- fixed effects estimator for both amenity models (Column 1). Column 2 (in Tables 5 and 6) extends the fixed effects model (of Column 1) by controlling for potential 1st order autocorrelation structures of the disturbance term. The results of both specifications show little variation with respect to the Hausman-Taylor estimations for the natural and general amenity models, thus confirming the

Hausman-Taylor results obtained for the economic and socio-demographic regional characteristics.

The incapacity of FE estimation techniques to provide information on time-constant amenity variables warrants the use of further panel data estimators. Tables 4 and 5 report regression results of RE and autocorrelation-robust RE(AR1) estimators. The results once again confirm the Hausman-Taylor findings. With the exception of January temperatures (Columns 3 and 4, Table 4) the coefficients for natural and general time-constant amenity variables are almost identical to those in Tables 1 and 2 (cf. Columns 3 and 4, Tables 4 and 5). Regarding the time-varying regressors, the *natural* amenity model (Columns 3 and 4, Table 4) shows a positive, but not significant impact, of GDP per capita, whereas the *general* amenity model tends to show a less robust influence of the social welfare variable (Columns 5, Table 5). These results, however, have to be interpreted with some caution given the above reported consistency tests. Tables 4 and 5 also introduce pooled AR(1) estimators with panel-corrected standard errors (PCSE) allowing for heteroskedasticity and correlation over groups (i.e. regions) (cf. Beck and Katz, 1995).

The results of the 'panel corrected standard error' (PCSE) estimation approach (Beck and Katz, 1995:634) confirm the influence of the main economic regional characteristics, such as regional wealth and unemployment rates for the appeal of places to migrants, and also point to the significance of temperature-, cloudiness-, and nature conservation-variables (Table 4, Column 5). In the case of general amenities (Table 5, Column 5), the PCSE results tend to further strengthen previous Hausman-Taylor findings, but also point to a less significant impact of social welfare payments.

In order to further assess the validity of our Hausman-Taylor (HT) estimation technique, we follow Baltagi et al. (2003) by conducting FE vs. HT Hausman tests as a means to examine the implied exogeneity assumptions of the HT estimator. The results (see Hausman tests in Columns 6, Tables 4 and 5) show a clear non-rejection of the assumption and confirm the correct specification and consistency of our estimator.

Our results are also corroborated by heteroscedasticity- and within-group (i.e. region) robust over-identification tests reported at the bottom of Tables 2 and 3 for all model specifications. The Sargan-Hanson statistics (p-values) in Tables 2 and 3, show that the subset of exogenous specified regressor(s) is not correlated with the fixed effects, underlining that the instruments are valid. Tables 2 and Table 3 further report Wald-chi2 and F-tests evaluating the joint significance of the independent variables. The results show consistently strong null-hypothesis rejections at all relevant levels, highlighting the general overall validity of the model specifications.

The statistical robustness tests for the dynamic panel-data model including past migration flows are also displayed in the bottom half of Table 3. F-tests of joint regressor significance confirm an overall appropriate model set-up. Hanson J-tests examining the validity of the used (internal) instruments show in model specification (2) a non-rejection of the over-identifying restrictions at a 5% threshold, whereas specifications (3) and (4) – at a 10% or higher level – tend to indicate that the instruments considered are, as a group, exogenous. Moreover, by limiting the number of time-lags to the 2nd and 3rd, the number of instruments does not exceed the number of groups (i.e. regions), reducing the risk of an over-fit of the endogenous variables and, hence, of weak test results (Roodman, 2009a and 2009b). Table 3 also displays Arellano-Bond (1991) tests analyzing potential autocorrelation structures in the error terms (Roodman, 2009a). The p-value of the AR(2) and AR(3) tests show a general adoption of the non-correlation hypothesis, confirming that the second and third lags are valid (internal) instruments.

Insert Tables 5 and 6 around here

In order to test for endogeneity (in particular regarding the demand-side variables) and to account for anticipated economic growth, an additional sensitivity model has been estimated. Table 6 shows the regression results when introducing regional industry mix employment growth in the model. Describing a region's employment growth, if all local industries grew at their respective national growth rates, the industry mix employment growth variable takes into account EU-wide or international industry-level demand shocks and has therefore traditionally been used as an exogenous regional employment growth measure (Bartik, 1991; Blanchard and Katz,1992; Partridge et al., 2012). The industrial composition of the local economy is thereby crucial in determining the extent and intensity of national or international shocks at regional level. By resorting to industry mix employment growth directly as an independent variable, we follow Partridge et al. (2012) who use spatially clustered OLS estimation techniques. We also use static and dynamic shift-share analysis to test for the importance of regional industry mix employment growth with cross-section, as well as panel data estimations.[16] The results tend to corroborate the main results in Table 1, as they underline the relevance of economic and socio-demographic, as well as the importance of natural amenities. Anticipated economic growth only exerts a significant positive influence on net migration when estimated using the static calculation of local industry-mix employment growth (Table 6, Regressions (1) and (2)) potentially indicating that local demand shocks may have led to more jobs for migrants.

6. CONCLUSION

This paper set out to analyze the appeal of European regions from a migrant's perspective. In light of the rapidly changing demographic and socioeconomic environments, a region's ability to attract future residents may represent a crucial aspect in determining its development prospects and future economic well-being (Champion, 1993; Wilson and Rees, 2003; Niedomysl, 2004; Malecki, 2004). We distinguish between economic, socio-demographic and amenity-based elements, in order to analyze the pull of various territorial features for migrants across 133 European regions over a time period of 17 years.

The combined results of the static and dynamic model underline the relevance of economic factors, such as regional wealth and favorable local labor market conditions, as important determinants of migration. Our findings also suggest that socio-demographic elements are likely to shape the appeal of different places for migrants, and that factors, such as the presence of a large migrant community, adequate regional human capital- and specific age-related characteristics, play an important role in determining the attractiveness of regions across the EU.

The key novelty of our study lies, however, in the analysis of the role played by amenity-related factors on migration incentives in a European regional context. We differentiate between natural and more general (i.e. history and culture-related) regional amenities and find significant evidence of the attractiveness of places with better natural amenities: i.e. higher January temperatures and fewer clouds, as well as some support for a higher individual utility in places that tend to have recreation-supporting or scenic landscapes, as well as ecosystem-related factors of aesthetic value.

Our findings depart from previous empirical evidence which, by and large, has tended to be skeptical about the amenity-migration connection in the European context. They stress the importance of (natural) amenities not only on a national (Cheshire and Magrini, 2006) or intra-regional scale (Biagi et al., 2011), but also on a cross-regional European level. It may then be the case that migrants in Europe respond to the same territorial factors as migrants in the US. The same stimuli seem to be in operation on both sides of the Atlantic and, everything else being equal, migrants in Europe also tend to prefer areas with milder overall climates and blue winter skies.

Our results, therefore, suggest that development policies designed to enhance the attractiveness of locations towards migrants are likely to be more successful when taking into account economic as well as amenity-based local conditions. Areas with a relatively low level of natural amenities would thus have to offer higher economic incentives or provide an adequate variety of man-made or cultural amenities (Partridge, 2010). The latter coincides with the literature on the US (Deller et al., 2001; Glaeser et al., 2001; Partridge, 2010; Rickman and Rickman, 2011; Monchuk et al., 2011) indicating that, once economic and socio-demographic aspects are controlled for, Europeans may not be so different from Americans in their preferences of locational choices. Second, our findings may also be interpreted as evidence in favor of an increasing importance of European amenity-based migration in the future. As pointed out by Partridge (2010), increased economic integration, rising incomes and declining migration and information costs may, also in Europe, put quality-of-life considerations more into the limelight. With declining air travel costs (Graves and Clawson, 1981), more peripheral areas have already benefitted from an in-flow of people, as already witnessed in parts of Spain, Italy and Southern France (Polèse, 2009). Thus, with European migration patterns becoming more similar to location choices in the US, EU economic geography may be subjected to additional forces putting into perspective the proclaimed predominance of economy-related and even socio-demographic pull- and push-factors.

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Table 1: Data Sources and Exact Definitions of the Variables

Variable	Abbreviation	Exact definition	Source
Dependent variable			
Net migration rate	NetMigr	Net migration standardized by the region‘s population (per 1000 inhabitants).	Eurostat + authors' own calculations
Economic explanatory variables			
Level of a region’s standard of living	GDPcap	Regional 1000*GDP PPS per inhabitant.	Eurostat
Regional unemployment rate	Unempl	Regional unemployment rate standardized by the average annual unemployment rate of all regions.	Eurostat + authors' own calculations
Industry-mix employment growth		EU total industry employment growth multiplied by local industry employment shares; standardized by EU-average.	OECD Regio + authors' own calculations
Social welfare expenditure	SocWelfare	National social expenditure/cap over national GDP/cap multiplied by regional 1000*GDP/cap (all in PPS).	Eurostat + authors' own calculations
National growth rate	NatGrowth	Growth rate of national GDP per inhabitant.	Eurostat + authors' own calculations
Socio-demographic explanatory variables			
Region’s share of young people	Young	People aged 15-24 years as % of total population and measured as the deviation from the annual mean value of all regions.	Eurostat + authors' own calculations
Social Filter			
Agriculture employment	Agri	% of total employment.	Eurostat
Employed people with tertiary education	Ede	% of total employment.	Eurostat + authors' own calculations
Population with tertiary education	Edp	% of population.	Eurostat + authors' own calculations
General Amenities (Historical and Identity Type)			
Cultural and Amenity Services Landscape Functions *			
Recreation and Tourism	RecrTour	Landscape services related to the variety in landscapes with touristic or recreational value.	Kienast et al. (2009)
Cultural and Artistic Services	CultArt	Cultural and artistic elements linked to natural heritage, the reflection of nature in folklore, architecture, regional or national symbols.	Kienast et al. (2009)
Aesthetic Goods and Services	Aesth	Benefits related to scenery (e.g. scenic roads, architecture) and non-	Kienast et al. (2009)

		recreational appeal of landscape properties.	

Table 1 continued…

Variable	Abbreviation	Exact definition	Source
Natural Product Supply Landscape Functions *			
Wildlife Products	WildProd	Variety in biochemical substances in flora and fauna providing game, fish, wood, genetic resources, etc.	Kienast et al. (2009)
Commercial Forest Products	Forest	Supply of fiber, timber and non-timber forest goods.	Kienast et al. (2009)
Transportation and Housing	Transp	Capacity of landscapes to supply transportation and housing.	Kienast et al. (2009)
*Maintaining Ecological Structures**			
Plant and Animal Habitats	Habitat	Provision of suitable living space for flora and fauna in order to maintain biological diversity.	Kienast et al. (2009)
*Regulating Landscape Functions**			
Climate Regulation	Climate	Ecosystems' ability to influence environmental quality especially in regard of a moderate climate (incl. greens house gas emissions, etc.).	Kienast et al. (2009)
Natural Amenities			
Precipitation – Jan/July	Prec-jan/jul	Mean January/July precipitation (in mm) from 1971-2000.	Mitchell et al. (2004)
Temperature- Jan/July	Temp-jan/jul	Mean January/July temperature (in °C) from 1971-2000.	Mitchell et al. (2004)
Cloudiness- Jan/July	Cloud-jan/jul	Mean January/July cloudiness (in% of time) from 1971-2000.	Mitchell et al. (2004)
Coast	Coast	Binary variable indicating whether a territory borders the sea.	ESPON project 2.1.1
Landscape Conservation Area	Landscp	Percentage of a territory's landscape conservation area.	Kienast et al. (2009)
Nature Conservation Area	Nature	Percentage of a territory's nature conservation area.	Kienast et al. (2009)

*Note: All non-binary amenity proxy variables mentioned in Table 1 are standardized by the average value over all regions. The landscape functions are based on a binary literature- and expert panel-based assessment of land use and environmental features' ability to provide certain goods and services to society. A detailed overview of the binary literature- and expert panel-driven selection, including an approach of additive relative importance, can be found in Kienast et al. (2009: 1105f.).

Table 2: Static Panel: Hausman-Taylor Estimator including Natural Amenities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Regional Wealth	0.436***	0.432***	0.434***	0.434***	0.437***	0.433***	0.435***	0.430***	0.439***	0.442***	0.441***	0.440***
Regional Unemployment Rate	-3.044***	-3.044***	-3.046***	-3.045***	-3.042***	-3.044***	-3.041***	-3.045***	-3.048***	-3.049***	-3.048***	-3.048***
Social Welfare Spending	0.006	0.006	0.006	0.006	0.007	0.006	0.006	0.007	0.007	0.007	0.007	0.007
Region's share of young people	-6.369***	-6.382***	-6.439***	-6.428***	-6.460***	-6.400***	-6.440***	-6.656***	-6.610***	-6.577***	-6.586***	-6.599***
Social Filter	0.404***	0.402***	0.402***	0.402***	0.402***	0.403***	0.403***	0.398***	0.400***	0.401***	0.401***	0.401***
Natural Amenities												
Temperature- January	1.023***								0.685**	1.154**	1.223**	1.002*
Temperature - July		7.595**								-1.359	0.219	2.740
Cloudiness- January			-13.154***						-8.566**	-15.511***	-14.553**	-15.351**
Cloudiness - July				-3.632*						4.823	4.238	5.403
Precipitation - January					1.708				0.877			1.083
Precipitation - July						-1.619					1.044	0.796
Coast							2.444**		0.703	0.483	0.776	0.617
Nature Conservation Area								1.643***	1.353***	1.263***	1.223***	1.240***
Land Conservation Area								0.052	0.405	0.404	0.401	0.397
National Growth Rate	0.331***	0.332***	0.332***	0.332***	0.332***	0.332***	0.332***	0.335***	0.333***	0.332***	0.333***	0.333***
Constant	3.648	-3.198	16.865***	7.952**	3.321	6.266**	3.165	3.824	9.276*	13.491	10.323	6.946
Observations	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865
Number of regions	120	120	120	120	120	120	120	120	120	120	120	120
Sargan-Hansen (p-value)	0.513	0.253	0.485	0.462	0.747	0.415	0.706	0.596	0.951	0.971	0.939	0.916
Wald chi2-Statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: *.**,*** illustrate the 10%, 5%, 1% significance levels, respectively. All regressions have been conducted using the Hausman-Taylor estimator including time and country dummies. Each first-stage F-statistics of all HT-instruments is larger than 308 (cf. Stock and Watson, 2003); the results are available upon request. The exact definitions of the above variables are provided in Table 1. Due to missing data on Greek regions the latter have been excluded from the above regressions. Moreover, additional estimations with alternative climate data (based on different environmental zones) have been conducted. The results tend to corroborate the above findings (Table 2), as they point towards the attractiveness of Mediterranean areas and associate Arctic, Atlantic, Boreal and Continental environmental zones with negative net migration rates. The results involving different environmental zones are available upon request.

Table 3: Static and Dynamic Panel: Fixed-Effect, Arellano-Bond and Hausman-Taylor Estimators including General (mainly Historical and Identity Type) Amenities

	(1)	(2)§	(3)§	(4)§	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Regional Wealth	0.607***	1.519***	1.966***	2.114***	0.593***	0.592***	0.608***	0.585***	0.588***	0.612***	0.603***
Regional Unemployment Rate	-4.561***	-5.110***	-4.528***	-4.983***	-4.585***	-4.583***	-4.565***	-4.589***	-4.585***	-4.566***	-4.574***
Social Welfare Spending	0.007**	-0.001		0.000	0.007*	0.007*	0.007*	0.007*	0.007*	0.007*	0.007*
Region's share of young people	-6.876***	-0.873		2.985	-6.732***	-6.772***	-7.002***	-6.694***	-6.734***	-7.018***	-6.879***
Social Filter	0.294***		0.527***	0.632***	0.295***	0.294***	0.287***	0.297***	0.295***	0.286***	0.291***
Lagged Migration Rate		0.346***	0.271***	0.230***							
Cultural and Amenity Services											
Recreation and Tourism					143.878***			137.307***			111.213***
Cultural and Artistic Information						36.090			9.769		5.302
Aesthetic Information							42.595***			48.184***	26.143**
Supply natural products to people											
Wildlife Products								20.004***	20.423***	19.137***	19.079***
Commercial Forest Products								-1.953	-10.893	-17.086***	-7.610
Transportation and Housing								8.348	20.450**	18.687***	8.902
Maintaining Ecological Structures											
Habitat for wild Plants and Animals					-151.678***	-45.667	-53.915***	-163.154***	-55.360	-93.906***	-171.289***
Regulating Services											
Regulatory Environment (Climate)					10.075***	12.307***	26.375***	9.410	26.309***	43.110***	21.446**
National Growth Rate	-0.040	-0.052	-0.163	-0.226*	-0.041	-0.04	-0.037	-0.041	-0.04	-0.037	-0.039
Constant	5.287				1.438	2.493	-8.514	-5.068	-4.818	-11.036	-7.512
Observations	2073	1945	1945	1945	2073	2073	2073	2073	2073	2073	2073
Number of groups (NUTS regions)	133	133	133	133	133	133	133	133	133	133	133
R2 (within)	0.242	--	--	--	--	--	--	--	--	--	--
Sargan-Hansen (p-value)	--	--	--	--	0.0839	0.0706	0.1123	0.1250	0.1576	0.4631	0.2541
F-Statistic (p-value)	0.000	0.000	0.000	0.000	--	--	--	--	--	--	--
Wald chi2-Statistic (p-value)	--	--	--	--	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of Instruments	--	103	131	133	--	--	--	--	--	--	--
2nd Order Autocorrelation	--	0.537	0.666	0.371	--	--	--	--	--	--	--
3rd Order Autocorrelation	--	0.123	0.108	0.092	--	--	--	--	--	--	--
Hansen J-Test (p-value)	--	0.061	0.174	0.173	--	--	--	--	--	--	--

Notes: *.**,*** illustrate the 10%, 5%, 1% significance levels, respectively. All regressions include time dummies. Regression (1) serves as a benchmark for time-varying coefficients by using a heteroscedasticity-robust region and time fixed effects estimator, country dummies have been included. Regressions (2) to (4) report the dynamic model results by introducing the lagged migration rate as an additional regressor. The latter estimations are based on the Arellano-Bond difference GMM estimator and highlighted by a paragraph sign (§) above. In order to exclude the possibility that the lagged migration rate might capture some lagged economic effects, we additionally introduce all regressors with a one period time lag. The results, which are available upon request, confirm a strong positive influence of past migration flows. Moreover, while Regressions (1)-(4) do not include time-invariant amenity proxies, Regressions (5) to (11) introduce time-constant variables trying to proxy different landscape functions - i.e. the ability of different territories to supply goods and services to society (Kienast et al., 2009). For the latter Hausman-Taylor estimation techniques, including country dummies, have been employed. Each first-stage F-statistics of all HT-instruments is larger than 486 (cf. Stock and Watson, 2003); the latter results are available upon request. The exact definitions of all variables are provided in Table 1.

Table 4: Static Panel: Robustness Tests for Model (12), Table 2

	(1) FE	(2) FE(AR)	(3) RE	(4) RE(AR)	(5) PCSE(AR)	(6) HT
Regional Wealth	0.428***	0.710***	0.047	0.110	0.165*	0.440***
	(0.129)	(0.188)	(0.078)	(0.083)	(0.090)	(0.128)
Regional Unemployment Rate	-3.028***	-2.290***	-3.112***	-2.581***	-2.160***	-3.048***
	(0.421)	(0.577)	(0.395)	(0.483)	(0.662)	(0.422)
National Growth Rate	0.331***	0.175*	0.411***	0.234**	0.257	0.333***
	(0.097)	(0.099)	(0.096)	(0.095)	(0.192)	(0.098)
Social Welfare Spending	0.006	0.001	0.008	0.002	0.002	0.007
	(0.005)	(0.003)	(0.005)	(0.004)	(0.006)	(0.005)
Region's share of young people	-6.322***	-12.128***	-8.090***	-5.969**	-8.593*	-6.599***
	(1.929)	(3.385)	(1.779)	(2.448)	(5.191)	(1.921)
Social Filter	0.407***	-0.033	0.293***	0.107*	0.066	0.401***
	(0.049)	(0.080)	(0.043)	(0.055)	(0.058)	(0.049)
Natural Amenities						
Precipitation - January			0.459	0.527	0.572	1.083
	--	--	(1.320)	(1.225)	(0.386)	(1.619)
Precipitation - July			0.648	0.738	-0.182	0.796
	--	--	(1.302)	(1.212)	(0.836)	(1.593)
Temperature- January			0.400	0.087	0.159	1.002*
	--	--	(0.470)	(0.442)	(0.193)	(0.585)
Temperature - July			4.213	6.513	4.768**	2.740
	--	--	(5.928)	(5.515)	(2.219)	(7.230)
Cloudiness- January			-12.735**	-10.524**	-11.801***	-15.351**
	--	--	(5.007)	(4.649)	(2.074)	(6.129)
Cloudiness - July			4.262	3.711	4.887**	5.403
	--	--	(3.260)	(3.026)	(2.030)	(3.987)
Nature Conservation Area			1.178***	1.348***	1.977***	1.240***
	--	--	(0.360)	(0.334)	(0.708)	(0.441)
Land Conservation Area			0.139	0.109	0.088	0.397
	--	--	(0.338)	(0.314)	(0.131)	(0.417)
Coast			0.531	0.380	-0.595	0.617
	--	--	(0.880)	(0.820)	(0.804)	(1.077)
Constant	-0.130	5.333***	13.228	6.160	9.232	6.946
	(3.324)	(1.871)	(9.361)	(8.897)	(7.199)	(11.455)
Observations	1865	1745	1865	1865	1865	1865
Number of region	120	120	120	120	120	120
R-squared	0.265	--	--	--	0.245	--
R-squared within	0.265	0.146	0.259	0.230	--	--
Spatial correlation (p-value)	0.888	--	--	--	--	--
Sargan-Hansen (p-value)	--	--	0.021	--	--	0.916
Hausman statistic	--	--	32.34**	35.38**	--	2.15

Notes: Table 4 refers to model specification (12) reported in Table 2. Standard errors are reported in brackets. *,**,*** illustrate the 10%, 5%, 1% significance levels, respectively. The test for spatial correlation is based on a Pesaran test of cross-sectional dependence. The FE vs. RE Hausman test rejects the consistency of the RE estimator with and without autocorrelation structure (Column 3 and 4). A performed heteroskedasticity and cluster-robust over-identification test confirms the later result by showing a Sargan-Hanson p-value of 0.021 (Column 3). FE: Fixed effects estimator; time and country dummies included. FE(AR): Fixed effects estimator controlling for potential 1st order autocorrelation of the disturbance term; time and country dummies included. RE: Random effects estimator; time and country dummies included. RE(AR): Random effects estimator with 1st order autocorrelation structure; time and country dummies included. PCSE(AR): Pooled AR(1) estimator with panel-corrected standard errors allowing for heteroskedasticity and correlation over regions; time and country dummies included. HT: Hausman-Taylor estimator; time and country dummies included.

Table 5: Static Panel: Robustness Tests for Model (11), Table 3

	(1) FE	(2) FE(AR)	(3) RE	(4) RE(AR)	(5) PCSE(AR)	(6) HT
Regional Wealth	0.607***	0.732***	0.188**	0.180**	0.140*	0.603***
	(0.126)	(0.181)	(0.082)	(0.089)	(0.079)	(0.124)
Regional Unemployment Rate	-4.561***	-2.552***	-4.579***	-3.201***	-3.152***	-4.574***
	(0.367)	(0.500)	(0.351)	(0.443)	(0.600)	(0.368)
Social Welfare Spending	0.007*	0.002	0.008**	0.003	0.003	0.007*
	(0.004)	(0.003)	(0.004)	(0.003)	(0.005)	(0.004)
Region's share of young people	-6.876***	-9.625***	-8.368***	-7.706***	-10.141**	-6.879***
	(1.788)	(3.184)	(1.656)	(2.335)	(5.002)	(1.781)
Social Filter	0.294***	-0.064	0.224***	0.086*	0.097**	0.291***
	(0.044)	(0.067)	(0.038)	(0.045)	(0.046)	(0.044)
Cultural and Amenity Services						
Recreation and Tourism	--	--	79.173***	44.899*	40.308***	111.213***
			(23.667)	(23.033)	(13.918)	(28.143)
Cultural and Artistic Information	--	--	-19.840	-26.270	-21.069	5.302
			(46.699)	(44.497)	(33.859)	(54.671)
Aesthetic Information	--	--	27.365***	34.175***	25.065***	26.143**
			(9.926)	(9.478)	(3.776)	(11.581)
Maintaining Ecological Structures						
Habitat for wild Plants and Animals	--	--	-110.112**	-72.156*	-65.035**	-171.289***
			(45.007)	(43.101)	(29.067)	(53.658)
Regulating Services						
Environment Regulation (climate)	--	--	22.524***	24.792***	22.673***	21.446**
			(8.709)	(8.267)	(7.615)	(10.151)
Supply natural products to people						
Wildlife Products	--	--	13.091**	9.832*	11.473***	19.079***
			(5.658)	(5.426)	(3.952)	(6.682)
Commercial Forest Products	--	--	-8.807	-9.343	-9.159***	-7.610
			(6.294)	(5.992)	(2.859)	(7.341)
Transportation and Housing	--	--	10.652	9.824	11.044	8.902
			(6.865)	(6.534)	(6.865)	(8.000)
National Growth Rate	-0.040	0.107	0.017	0.057	0.096	-0.039
	(0.083)	(0.082)	(0.083)	(0.080)	(0.163)	(0.083)
Constant	5.287**	4.106***	-0.516	-4.344	0.000	-7.512
	(2.645)	(1.590)	(8.031)	(7.977)	(0.000)	(9.350)
Observations	2073	1940	2073	2073	2073	2073
Number of region	133	133	133	133	133	133
R-squared	0.242	--	--	--	0.257	--
R-squared within	0.242	0.124	0.237	0.225	--	--
Spatial correlation (p-value)	0.239	--	--	--	--	--
Sargan-Hansen (p-value)	--	--	0.068	--	--	0.708
Hausman statistic	--	--	25.61	31.37**	--	1.04

Notes: Table 5 refers to model specification (11) reported in Table 3. Standard errors are reported in brackets. *,**,*** illustrate the 10%, 5%, 1% significance levels, respectively. The test for spatial correlation is based on a Pesaran test of cross-sectional dependence. The FE vs. RE Hausman test rejects the consistency of the RE estimator with autocorrelation structure (Column 4) but fails to so without imposed autocorrelation (Column 3). A performed heteroskedasticity and cluster-robust over-identification test tends to confirm the former result by showing a Sargan-Hanson p-value of 0.068 (Column 3). FE: Fixed effects estimator; time and country dummies included. FE(AR): Fixed effects estimator controlling for potential 1st order autocorrelation of the disturbance term; time and country dummies included. RE: Random effects estimator; time and country dummies included. RE(AR): Random effects estimator with 1st order autocorrelation structure; time and country dummies included. PCSE(AR): Pooled AR(1) estimator with panel-corrected standard errors allowing for heteroskedasticity and correlation over regions; time and country dummies included. HT: Hausman-Taylor estimator; time and country dummies included.

Table 6: Cross-Section and Panel Data Estimations including regional Industry Mix Employment Growth

	(1) OLS	(2) OLS	(3) Panel-FE	(4) Panel-HT	(5) Panel-HT	(6) Pooled OLS	(7) Pooled OLS
Industry-Mix Employment Growth	8.701**	5.887*	-36.480	-33.086	-41.523	8.603	32.441
	(3.826)	(3.128)	(36.057)	(28.092)	(28.865)	(43.158)	(47.870)
Regional Unemployment Rate					-3.388***		-4.055***
					(0.627)		(0.497)
Region's share of young people	-20.352***	-22.377***	-12.811***	-12.504***	-8.046***	-20.676***	-11.422***
	(5.557)	(5.887)	(3.167)	(2.667)	(2.943)	(1.783)	(2.348)
Social Filter	-0.028	0.053	0.084	0.114*	0.163**	0.056	0.023
	(0.147)	(0.132)	(0.074)	(0.066)	(0.068)	(0.047)	(0.046)
Natural Amenities							
Precipitation - January	--	-1.884	--	-1.809	-1.236	-1.827***	-1.505**
		(1.644)		(1.590)	(1.532)	(0.588)	(0.590)
Precipitation - July	--	0.749	--	-0.601	-0.541	-0.531	-0.463
		(1.241)		(1.376)	(1.330)	(0.442)	(0.420)
Temperature- January	--	0.399	--	0.205	0.404	0.187	0.351**
		(0.560)		(0.433)	(0.423)	(0.167)	(0.172)
Cloudiness- January	--	-4.253	--	-6.942	-9.632*	-7.205***	-9.338***
		(7.449)		(5.700)	(5.501)	(2.776)	(2.709)
Cloudiness - July	--	-0.256	--	1.951	2.471	1.309	1.565
		(4.484)		(3.389)	(3.266)	(1.649)	(1.521)
Nature Conservation Area	--	1.316*	--	1.212**	1.205**	1.244***	1.233***
		(0.731)		(0.528)	(0.511)	(0.341)	(0.340)
Constant	15.847**	24.632**	53.915	50.536*	63.996**	23.369	-3.142
	(7.353)	(9.389)	(34.990)	(27.604)	(28.589)	(42.633)	(47.354)
Observations	91	91	960	960	935	960	935
R-squared	0.470	0.525	0.334	--	--	0.433	0.479
Spatial correlation (p-value)	--	--	0.783	--	--	--	--

Notes: Table 6 introduces an industry-mix growth variable in order to account for anticipated economic growth. While Regression (1) to (2) are based on a static calculation of the latter variable using the local industry mix of 1996 and EU total industry growth rates from 1996-2006, Regressions (3) to (7) are based on a dynamic (shift-share) calculation using year to year growth rates. Standard errors are reported in brackets. *,**,*** illustrate the 10%, 5%, 1% significance levels, respectively. All regressions include time and country dummies and have been estimated using clustered standard errors in order to account for potential heteroscedasticity and autocorrelation. The test for spatial correlation is based on a Pesaran test of cross-sectional dependence.

[1]A company's profit function in region i in period t, Π^i_t may be expressed as: $\Pi^i_t = \Pi^i_t (w^i_t, l^i_t, R^i_t)$, with profits being negatively correlated with wages (w^i) and land rents (l^i). The impact of exogenous natural or socio-economic features (R^i_t) is likely to depend on the type of the latter as well as on the firm's activities (Faggian et al., 2011).

[2] d represents the discount rate.

[3] C^{ij} represents the net present value of (pecuniary and psychological) moving costs from region i to region j.

[4] In order to evaluate different landscape functions, Kienast et al. (2009) have gathered input data from several independent sources, including CORINE, LANMAP2, EPSON, the European Environmental Agency (EEA), the World Database of Protected Areas (WDPA) and the GEO data portal (cf. Kienast et al., 2009, Table 2: 1104). The construction of the indices is based on an assessment of "expert- and literature-driven binary links expressing whether specific land uses or other environmental properties have a supportive or neutral role for given landscape functions" (Kienast et al., 2009:1099).

[5] Kienast et al.'s (2009) definition of the different landscape functions follows the suggested classification in the corresponding literature (cf. Costanza et al., 1997; Hein et al., 2006) and distinguishes between production, regulation, habitat, and information functions (for more details see Kienast et al., 2006; and Kienast et al., 2009). Apart form an expert-panel and literature-based landscape assessments, the "usability and practicability" of the obtained results is verified using "landscape function maps with qualitative and – where not possible – visual inspection" (Kienast et al., 2009:1108).

[6] A detailed overview of the precise land uses and environmental properties associated to the different landscape functions based on expert-panel, literature and limited quantitative judgements can be found in Kienast et al. (2009: 1106-1107).

[7] Nomenclature of Territorial Unit for Statistics as defined by the European Commission (http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction; last visit August, 2011).

[8] This was the case for Denmark, Ireland, and Luxemburg. The exclusion of these countries is caused by introducing the national growth-rate in order to control for national effects.

[9] The regions excluded due to missing data are: Ceuta and Melilla, Canary Islands, all French overseas departments (Guadeloupe, Martinique, Guyane, Réunion), Länsi-Suomi, Trento, Açores, and Madeira.

[10] FE and RE estimations have been compared by means of various Hausman tests applied to several model specifications with and without time-invariant regressors. The main results (including time-constant amenity variables) are reported in Tables 4 and 5 (Columns 3 and 4).

[11] In the chosen Hausman-Taylor (HT) procedure the (time-varying) social welfare variable has been classified as strictly exogenous. The appropriateness of the latter specification is confirmed by the Sargan-Hanson tests reported at the bottom of Table 2 and Table 3 as well as by the FE vs. HT Hausman test examining the underlying exogeneity assumptions (cf. Baltagi et al., 2003:362).

[12] With this method we assume that migration decisions are based on past values and behaviors (Greenwood, 1985).

[13] Due to missing amenity data for Greek regions, the static model assessing the impact of natural amenities (Table 2) includes only 120 regions.

[14] Omitting regional wealth (i.e. GDP per captial), due to potential endogeneity concerns, leaves the results in Table 2 almost unchanged apart from January temperatures in regressions (9) to (12), which, although still positive, become insignificant. July cloudiness when introduced as the sole natural amenity variable (cf. Regression (4)) loses its significance. The strong impact of January cloudiness and nature conservation areas is confirmed.

[15] The exclusion of regional wealth, in order to account for potential endogeneity, results in only minor changes. First, the signs of cultural and artistic information coefficients in Regression (9) and (11) become negative, Both remain, however, statistically insignificant. Second, the previously non-significant positive impact of transportation and housing in Regression (11) becomes significant, corroborating the results in Regression (9) and (10).

[16] Industry-mix employment growth is calculated as $\Sigma_i [(e_{i(t)}/E_{(t)}]*g_{i(t)}$, where $e_{i(t)}$ denotes the regional level of employment in industry i, $E_{(t)}$ total regional employment and $g_{i(t)}$ represents EU total industry growth rates. Due to limited data availability, we use for the static local industry share employment calculation 1996-data and EU industry level growth rates from 1996-2006. The static model thereby focuses on the average net migration rate between 1996 and 2006. The dynamic (shift-share) analysis focuses on year-to-year changes in local industry composition and growth rates and may result in more muted findings since we do not expect dramatic annual changes in industry mix shares and growth rates. Moreover, limited data availability leads to the exclusion of Bristish and Dutch regions from the analysis.