Excess Mortality in the Countries of Europe in the Early 21st Century, with Comparisons to the States of the United States

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Introduction

This is a near-complete paper dealing with natural decrease, i.e., excess deaths over births, among the countries of Europe in the first decade of the 21st century; comparisons are also made with the states of the U.S. for the same period. The present draft includes an introduction, a literature review, a data/methods section, and two results sections, one for Europe, one for the U.S. An incomplete section follows these dealing with factors associated with natural decrease in Europe and the U.S. The discussion and conclusion sections have not yet been written.

In Europe today there is no population growth. According to recent data from the Population Reference Bureau, the crude birth and death rates in Europe are both 11/1,000, resulting in a percentage rate of natural increase (RNI) of 0.0. Only two of Europe's 45 countries[1] have RNIs of 1.0 or higher, Kosovo (1.2%) and Ireland (1.0%). Sixteen of Europe's countries have negative RNIs, the highest being Bulgaria, Serbia and Latvia at -0.5, and Hungary, Romania and Ukraine at -0.4. The three countries with the largest populations in Europe all have negative RNIs: Russia with a population of 143.2 million has an RNI of -0.1; Germany at 81.8 million has an RNI of -0.2; and Italy has a population of 60.9 million and an RNI or -0.1.

Negative rates of natural increase result from an excess of deaths over births in the population; that is, in a particular year or over several years the population has more deaths than births. This phenomenon of excess mortality is known in demography as natural decrease. A long-term continuation of natural decrease will result in the continual diminution of the population, and eventually lead to its disappearance, unless the excess of deaths over births is not offset by population gains due to net migration.

To gain an appreciation of the implications of a negative rate of growth, demographers sometimes use the notion of "halving time," or the number of years it would take a population to become half as large if its negative RNI remains unchanged (Poston and Bouvier, 2010: 274-275). One divides the natural log of 2 by the RNI, and multiplies the result by 100. In the case of Bulgaria with an RNI of -0.5, if its RNI remains unchanged into the future, its population of 7.2 million would drop to 3.6 million in 139 years. If its negative RNI continued indefinitely, in less than 1,000 years, there would no longer be a country of Bulgaria.

Demographers have been analyzing the phenomenon of natural decrease since the late 1960s when Beale published his classic article in 1969 on "Natural Decrease of Population: The Current and Prospective Status of an Emergent American Phenomenon." Since the late 1960s, natural decrease has emerged as an important demographic phenomenon among the counties and other subareas of the United States. Almost half of all counties in the United States have experienced at least one year of natural decrease, and this has mainly occurred since the 1970s (Johnson,2011).

Natural decrease first occurred in the U.S. in the early 1930s. Although this form of excess mortality characterized a small number of U.S. counties at that time, "with the fertility increases which began (in many U.S. counties) in the late 1930s, incidences of natural decrease virtually disappeared within the next several years" (Poston, 1972: 239).

By far the bulk of demographic analyses of natural decrease has been conducted among the counties and subareas of the United States, and we discuss some of that literature below. Very few analyses of natural decrease have been undertaken among the subareas of the countries of Europe. Yet it is in Europe where there is a far greater amount of natural decrease than in the U.S. or elsewhere.

Indeed, in the circa 2000-10 time period, 774 (or 59%) of all 1,315 counties in Europe experienced natural decrease. If we restrict the comparison to only those European countries with at least 7 natural decrease counties, then 763 (or 62%) of 1,222 counties experienced natural decrease. These European percentages of 59% and 62% are more than twice the magnitude of the percentage of all U.S. counties, 27%, experiencing natural decrease in the 2000-09 period.

Clearly, it is among the subareas of most European countries where there is the greatest amount of natural decrease in the world. Yet, demographers know very little about excess mortality, among the subareas of the European countries.

In this paper we endeavor to address this void. Using data from EUROSTAT (2011) for the subareas of the countries of Europe for the circa 2000-10 time period, we ascertain, country by country, the degree of natural decrease in their respective county-level areas; we look also at the extent to which some of these subareas offset their excess mortality with gains via net migration. To gain an initial understanding of the variation among the counties in each country in the rate of natural decrease, we examine the effect of population size on natural decrease. For comparisons, we also consider natural decrease among the counties of the states of the U.S. We turn next to a review of the limited literature, and then to a presentation of the data.

Review of Literature

A paper by Harold Dorn published in 1939 was one of the first articles ever published on excess mortality through natural decrease. Dorn (1939) noted that between 1935 and 1936 approximately 145 counties in the United States experienced natural decrease. These early experiences of natural decrease were due to the low fertility rates during the depression and were all but erased following the baby boom that began at the end of World War II. By 1950 only 2

counties in the United States were reporting more deaths than births (Beale,1969). Research starting in the 1960's showed a growth in the number of U.S. counties reporting natural decrease. By 1966 over 300 U.S. counties had more deaths than births (Beale,1969). Beale recognized this rapid increase in natural decrease among the U.S. counties and also noted that the cause was not necessarily declining fertility rates but rather a response to "age-selective net outmigration" from rural to urban areas (1969:93).

Beale's (1969) original conclusions have been substantiated by multiple researchers for nearly 50 years. Indeed, the pace of natural decrease has continued in the U.S. during the 1970's and the 1980's even in the face of overall natural increase in the U.S. population as a whole (Johnson,2011). We noted earlier that as of 2005, nearly half of all counties in the United States have experienced at least one year of natural decrease (Johnson,2011).

However, natural decrease does not necessarily mean overall population loss; it only means that there is an excess number of deaths over the number of births. Indeed, counties can simultaneously experience natural decrease and population growth. For example, we show later that of the 854 counties of the U.S. experiencing natural decrease between 2000-09, 318 of them (or almost 10% of all U.S. counties) actually increased in population during the 9-year time period.

Morrill (1995) has also shown that counties with high and positive rates of net in-migration may increase their populations while at the same time reporting more deaths than births. Yet, in order for these "favored areas" to grow, other communities will encounter population loss along with natural decrease as a consequence (Morrill,1995). Other researchers over the decades have conducted state-specific studies and found similar patterns of positive

growth rates of the populations of counties experiencing natural decrease (Adamchak,1981; Chang,1974; Poston, 1972).

Johnson (2011) has published some of the best current research on natural decrease; he has documented the prevalence of natural decrease counties in the U.S. focusing especially on the complex relationships between fertility, migration, age structures, and mortality (see also Johnson and Lichter, 2008). The future of many areas of the country experiencing natural decrease is far from certain. Thanks to new patterns of migration some areas prone to natural decrease are receiving an influx of immigrants (Johnson,2011). The majority of these immigrants are Hispanic; this has the twofold benefit of offsetting natural decrease through migration and increasing the overall fertility rate (Johnson and Lichter,2008; Lichter and Johnson,2006). Unfortunately, the future is not so bright for natural decrease counties in other developed countries, particularly in Europe.

Most of the research on excess mortality via natural decrease in the European countries has been conducted at the national level rather than at the county level as in the United States (Heilig, Buttner and Lutz,1990; Van De Kaa,1987). We noted above that as of 2012, 16 of Europe's 45 countries, including its three largest countries of Russia, Germany and Italy, were all experiencing natural decrease at the national level. Overall population loss among European countries with very low fertility rates is heavily dependent on net migration (Coleman and Rowthorn,2011). But at the county level in Europe, as is the situation among the counties of the U.S., not all counties experiencing natural decrease encounter population decline.

Furthermore, of the European countries with excess mortality, the extremely low fertility rates characterizing much of Europe have "exhausted positive demographic momentum" leading to populations with intermittent growth and overall decline (Coleman and Rowthorn,2011).

Data and Methods

In this paper we use data from the *EUROSTAT Yearbook, 2011* (EUROSTAT, 2011) and examine the numbers of deaths and births in the county-level units of every country of Europe with at least eight counties. The periods of time covered vary somewhat for each country, ranging from 2000-09 to 2003-10. To be included in our analysis, we required that a country must have at least eight counties and must have birth and death data available for the the counties for at least 8 consecutive years in the 2000-10 period. If a country had fewer than eight counties, or had data for its counties for less than eight consecutive years, it was excluded. Turkey is a good example. Turkey has 84 counties, but only provided birth and death data for the four consecutive years of 2007-2010. So we did not include Turkey in our study. We excluded Finland, Denmark, and Slovakia for a similar reason. All our included countries provided the required demographic data through EUROSTAT for at least the consecutive years of 2003-2010.The European countries included in our paper and their respective time periods are listed in Table 1.

What is a "county" in a European country? How is a European county defined spatially and demographically? Sub-national regions, i.e., counties, in each European country vary from one country to the next. However, "Regulation (EC) No 1059/2003 of the European Parliament and of the Council adopted in May 2003" uses the Nomenclature of Territorial Units for Statistics (NUTS), a classification system we also use in this paper. (See Council of the European Communities [2003] and EUROSTAT [2007] for more detail.)

The purpose of NUTS is to create geographical divisions in each country that enable meaningful comparisons over time from one country to the next (Council of the European

Communities, 2003). Each country is divided into three levels (NUTS 1, NUTS 2, and NUTS 3) with the third level most closely resembling counties in the United States, although the median geographic size of NUTS 3 regions is slightly smaller than the average size of counties in the U.S (Ciccone,2002).

There are a total of 1,303 NUTS 3 regions in Europe, each consisting of a population ranging in size from 150,000 to 800,000. The NUTS designation takes into account existing geographic and political divisions in each country but provides a standard that allows for cross national comparisons. The NUTS 3 level refers to *Départements* in France, to *Kreise* in Germany, to *Provincie* in Italy, to *Provincias* in Spain, and to *Counties* in the United Kingdom. In our paper we will refer to the NUTS 3 regions in all the European countries as "counties."

For comparative purposes, we also examine the numbers of deaths and births in the counties of each of the states of the U.S. during the 2000-09 period. Listed in Table 2 are the fifty states, the District of Columbia, and Puerto Rico, and their respective number of counties. According to the U.S. Census Bureau, the "primary legal divisions of most states are termed counties. In Louisiana, these divisions are known as parishes. In Alaska, which has no counties, the equivalent entities are the organized boroughs, city and boroughs, municipalities, and census areas"; and in Puerto Rico these divisions are known as municipios (U.S. Census Bureau, 2011). As with our analysis of the European countries, we use the term "county" to refer to these primary legal divisions in all the states, the District and Puerto Rico.

Natural Decrease in the Countries of Europe

In Table 1 we list for each of the 22 European countries in our study its number of natural decrease counties and its percentage of all counties that experienced natural decrease in the circa

2000-10 period. In eight of the 22 countries, more than one-half of its counties experienced natural decrease in the time period (recall that the time period in each country for determining the existence of natural decrease in its counties varies slightly from country to country). All of Lithuania's 10 counties experienced natural decrease, and almost 91 percent of Croatia's 21 counties experienced natural decrease; these are followed by 82 percent of Germany's 429 counties, and 81 percent of Romania's 42 counties; other countries with more than half its counties experiencing natural decrease are Greece (71 %), Italy (64 %), Portugal (63 %), Sweden (62 %), and Slovenia (58 %). Almost 60 percent of all the counties in Europe experienced natural decrease in the circa 2000-10 period.

EUROSTAT has published in their recent Yearbook (EUROSTAT, 2011) a map showing the rates of natural change for all the counties of all the European countries. We present this map as Figure 1. The map shows for each county its rate of natural change for the year of 2008, as calculated by:

$$(\text{Births}_{2008} - \text{Deaths}_{2008} / \text{Population}_{2008}) * 1{,}000 \qquad (1)$$

Negative rates of natural change, i.e., natural decrease, are shown in the map in various shades of blue, with the darker the blue the more negative the rates of natural decrease. Positive rates of natural change are shown in shades of yellow; the darker the yellow the greater the excess of births over deaths. The map clearly shows that Europe is much more blue than it is yellow.

Excess deaths over births are widespread in Europe and characterize more than half of Europe's counties. There is natural increase in all of Ireland and Turkey, and in the central counties of the United Kingdom, and in many counties of France, Belgium, the Netherlands,

Luxembourg, Switzerland, Iceland, Liechtenstein, Denmark, and most of Norway (EUROSTAT, 2011: 20, 25).

But there is excess mortality in most all the counties of Germany, Hungary, Croatia, Romania and Bulgaria, and in the Baltic States in northern Europe, and in most of Greece and Italy in southern Europe. "One major reason for the slowdown in the natural growth of the (European) population is that the EU's inhabitants are having fewer children than they used to" (EUROSTAT, 2011: 25). The aggregate total fertility rate of the 27 countries that form the European Union has dropped from 2.5 births per woman in the early 1960s to 1.6 for the 2006-08 period (EUROSTAT, 2011: 25).

Remember that the EUROSTAT data shown in the map in Figure 1refer only to the year of 2008. The natural decrease data we show in Table 1 and mentioned earlier in this section refer to natural decrease for at least eight consecutive years in the 2000-10 time period. So it is certainly the case that some of the European natural decrease counties shown in the map have not experienced natural decrease for eight or more consecutive years in 2000-10. To illustrate, almost all of Germany's counties have rates of natural decrease in 2008, whereas a slightly smaller number of them (82 %) experienced natural decrease in the 2000-09 period (Table 1).

Are most of the natural decrease counties in Europe also net losers of total population in the time period? We show in the last two columns of Table 1 for each of the European countries the number of natural decrease counties that also lost population in the circa 2000-10 period, and the percentage of all counties represented by these counties. For example, 353 of Germany's 429 counties experienced excess deaths over births in the 2000-09 period. Of these 353 counties 211 of them lost overall population during the period. So whereas 82 percent of Germany's counties

were natural decrease counties, only 49 percent of all the counties were both natural decrease and population loss counties.

The natural decrease counties in some of the European countries were almost always population loss counties. In Bulgaria, almost 93 percent of all its counties were both natural decrease and population loss counties. In Romania 76 percent of the counties were so classified, and in Croatia it was 67 percent, and it was 53 percent in Greece. Other countries had much smaller percentages of all its counties experiencing both natural decrease and population loss. None of Belgium's or Norway's natural decrease counties were also population loss counties. Only 7.5 percent of all the counties in the United Kingdom were both natural decrease and population loss; it was 10 percent in Spain, 7 percent in Italy, and 5 percent in France. Most of the natural decrease counties in these countries were able to offset their excess mortality with positive net in-migration. We turn in the next section to a comparative analysis of the counties in the U.S.

Natural Decrease in the States of the United States

The United States has 3,221 counties distributed among the fifty states, the District of Columbia and Puerto Rico. We will refer to all 52 of these areas as states. They are shown in Table 2 along with their respective numbers of counties. Texas has the largest number of counties, 254, followed by Georgia with 159 and Virginia with 134. Delaware has only 3 counties, and Rhode Island 5. The District of Columbia has only one county.

Of all 3,221 counties in the U.S., almost 27 percent of them experienced natural decrease in the 2000-09 period. Of the 52 states (remember we are referring to the District and to Puerto Rico also as states), only four had more than half their counties showing natural decrease in the

time period: West Virginia (75 %), North Dakota (66 %), Montana (54 %), and Kansas (51 %). By comparison, in six states, none of their counties experienced natural decrease in the period under study (Arkansas, Connecticut, District of Columbia, Delaware, Puerto Rico, and Utah). In the 46 states with at least one natural decrease county, 21 had one-quarter or less of its counties experiencing natural decrease: Arizona (13 %), California (21 %), Connecticut (14 %), Georgia (6 %), Idaho (9 %), Indiana (5 %), Kentucky (18 %), Massachusetts (14 %), Maryland (21 %), Mississippi (2 %), North Carolina (25 %), New Hampshire (20 %), New Jersey (5 %), New Mexico (18 %), New York (15 %), Ohio (7 %), Rhode Island (20 %), South Carolina (4 %), Texas (24 %), Washington (23 %), and Wyoming (13 %). This description of natural decrease in the U.S. states, compared with the earlier description of the phenomenon in the European countries, shows clearly that natural decrease has a much greater prevalence in Europe.

How many of the natural decrease counties in the U.S. are simultaneously population loss counties? Recall that among the European countries included in this paper, in four of them, over half of their counties experienced both natural decrease and population loss: Bulgaria (93 %), Romania (76 %), Croatia (76 %), and Greece (53). Among the states of the U.S., in only two of them are one-half or more of its counties both natural decrease and population loss: North Dakota (66 %) and Kansas (50 %). In fact, among the states with at least one natural decrease county, in two of them, Arizona and Maryland, none of its natural decrease counties were also population loss counties. For the most part, it is much more the situation among the U.S. states than among the European countries that counties experiencing natural decrease are able to offset the population losses due to excess deaths via positive net migration. We turn in the last section of this paper to factors influencing natural decrease.

Factors Influencing Natural Decrease in Europe and the U.S.

As noted in the first paragraph of this paper, this section of the paper is still being written. We present here the work we have done to date, and we indicate the work to be completed. This will give the reviewer an idea of the kind of paper we would be delivering at the PAA meetings if our paper is accepted for presentation.

The best paper in the literature, in our opinion, on factors influencing rates of natural population change is Johnson's (2011) analysis of U.S. counties in the last decade of the 20th century. His dependent variable was the "ratio of the number of births between 1990 and 2000 to the number of deaths multiplied by 1,000. Values of less than 1,000 would indicate an excess of deaths over births" (Johnson, 2011: 90-91). The independent variables he found to have statistically significant effects on natural change in his multivariate analysis included median income, recreational activity of the county, percentage Hispanic, net migration of 15-34 year olds, net migration of 50+ year olds, fertility, and median age (Johnson, 2011: 92). Another variable shown in the literature to influence the rate of natural decrease is county population size (Poston et al., 1972). We will not be able to replicate Johnson's analysis for the counties in each of the European countries. But we do plan to take several of his statistically significant independent variables and examine their bi-variate associations with rates of natural decrease.

To illustrate, we have taken the variable of county population size at the beginning of the time period and correlated it with the rate of natural decrease experienced by the counties in each of the European countries. We would expect that the larger the county's population at the beginning of the time period, the lower its rate of natural decrease during the time period. This

reasoning is grounded in human ecological theory positing a relationship between overall population size and economic opportunities. The larger the population of the area, the greater its economic activities, and the more likely it will experience net in migration than net outmigration, thus minimizing the likelihood of having more deaths than births in the period under investigation (Poston and Frisbie,1998,2005).

In Figure 2 we present this relationship for the counties of France. Notice that the rate of natural decrease is measured as births minus deaths in the 2000-09 period divided by population size at the beginning of 2000. The natural decrease rate is represented in the scatterplot on the Y-axis, and ranges from a low value of -.008 to a high value of 0. Population size in 2000 is shown on the X-axis. The correlation coefficient is .37 (see Table 3). This means that the larger the population of the county, the higher its rate of natural decrease (remember the highest value of the natural decrease rate is close to zero). The larger the natural decrease county in France, the closer its rate of natural decrease will be to zero. Our correlation results in Table 3 show that our hypothesized association between size and natural decrease is found in all the countries of Europe, except for Sweden.

In Table 4 we report the results of similar analyses for the states of the U.S. We only calculated correlation coefficients for U.S. states with at least six natural decrease counties in the 2000-09 period. Correlations between population size and natural decrease rate are shown in Table 4 for 32 states. In all but six of them was our hypothesized relationship between size and natural decrease rate confirmed. The correlations were as high as .58 among the counties of New York, .55 among the counties of Maine, and .52 among the counties of Oklahoma.

In the rest of this section we will report similar bi-variate analyses of several others of the variables shown in the literature to be significantly associated with natural decrease.

Discussion and Conclusion

To be written.

Endnote

1. The Population Reference Bureau (PRB) provides data on its 2012 World Population Data Sheet for all the countries of the world. A geopolitical entity is defined by the PRB as a country if it has a population of at least 150,000 or more persons and/or if it is a member of the United Nations. Thus the PRB countries “include sovereign states, dependencies, overseas departments, and some territories whose status or boundaries may be undetermined or in dispute” (Population Reference Bureau, 2012).

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Table 1 Natural Decrease Counties in the Countries of Europe and the United States, Circa 2000-10

Country	Time Period	Total Counties	Natural Decrease Counties		Natural Decrease Counties Also Experiencing Population Loss	
			Number	Percent of all Counties	Number	Percent of all Counties
Austria	2002-2010	35	17	48.57	9	25.71
Belgium	2000-2009	44	14	31.82	0	0
Bulgaria	2000-2009	28	28	100	26	92.86
Croatia	2002-2010	21	19	90.48	14	66.67
Czech Republic	2002-2010	14	7	50	2	14.29
France	2000-2009	100	26	26	5	5
Germany	2000-2009	429	353	82.28	211	49.18
Greece	2001-2010	51	36	70.59	27	52.94
Hungary	2003-2010	20	20	100	17	85
Ireland	2002-2010	8	0	0	0	0
Italy	2002-2010	107	69	64.49	7	6.54
Lithuania	2000-2009	10	10	100	10	100
Netherlands	2003-2010	40	3	7.5	3	7.5
Norway	2001-2010	19	3	15.79	0	0
Poland	2001-2010	66	26	39.39	24	36.36
Portugal	2000-2009	30	19	63.33	12	40
Romania	2000-2009	42	34	80.95	32	76.19
Slovenia	2003-2010	12	7	58.33	4	33.33
Spain	2001-2010	59	22	37.29	6	10.17
Sweden	2000-2009	21	13	61.90	9	42.86
Switzerland	2000-2009	26	5	19.23	3	11.54
United Kingdom	2001-2009	133	43	32.33	10	7.52
United States	2000-2009	3221	854	26.51	536	16.64

Table 2 Natural Decrease Counties in the States of the United States, 2000-09

State	Total Counties	Natural Decrease Counties		Natural Decrease Counties Also Experiencing Population Loss	
		Number	Percent of all Counties	Number	Percent of all Counties
Alabama	29	0	0	0	0
Alaska	67	20	29.85	12	17.91
Arkansas	75	25	33.33	15	20
Arizona	15	2	13.33	0	0
California	58	12	20.69	2	3.45
Colorado	64	9	14.06	6	9.375
Connecticut	8	0	0	0	0
District of Columbia	1	0	0	0	0
Delaware	3	0	0	0	0
Florida	67	22	32.84	1	1.49
Georgia	159	10	6.29	4	2.52
Hawaii	5	1	20	1	20
Iowa	99	42	42.42	38	38.38
Idaho	44	4	9.09	2	4.55
Illinois	102	38	37.25	30	29.41
Indiana	92	5	5.43	3	3.26
Kansas	105	54	51.43	52	49.52
Kentucky	120	21	17.5	15	12.5
Louisiana	64	3	4.6875	2	3.125
Massachusetts	14	2	14.29	2	14.29
Maryland	24	5	20.83	0	0
Maine	16	7	43.75	2	12.5
Michigan	83	26	31.33	22	26.51
Minnesota	87	26	29.89	22	25.29
Missouri	115	38	33.04	17	14.78
Mississippi	82	2	2.44	1	1.22
Montana	56	30	53.57	19	33.93
North Carolina	100	25	25	4	4
North Dakota	53	35	66.04	35	66.04
Nebraska	93	41	44.09	39	41.94
New Hampshire	10	2	20	1	10
New Jersey	21	1	4.76	1	4.76
New Mexico	33	6	18.18	4	12.12
Nevada	17	5	29.41	2	11.76
New York	62	9	14.52	3	4.84
Ohio	88	6	6.82	3	3.41
Oklahoma	77	25	32.47	13	16.88
Oregon	36	13	36.11	6	16.67
Pennsylvania	67	32	47.76	23	34.33
Puerto Rico	78	0	0	0	0
Rhode Island	5	1	20	1	20
South Carolina	46	2	4.35	1	2.17
South Dakota	66	27	40.91	25	37.88
Tennessee	95	28	29.47	4	4.21
Texas	254	61	24.02	32	12.60
Utah	29	0	0	0	0
Virginia	134	54	40.30	24	17.91
Vermont	14	4	28.57	3	21.43
Washington	39	9	23.08	2	5.13
Wisconsin	72	20	27.78	14	19.44
West Virginia	55	41	74.55	26	47.27
Wyoming	23	3	13.04	2	8.70

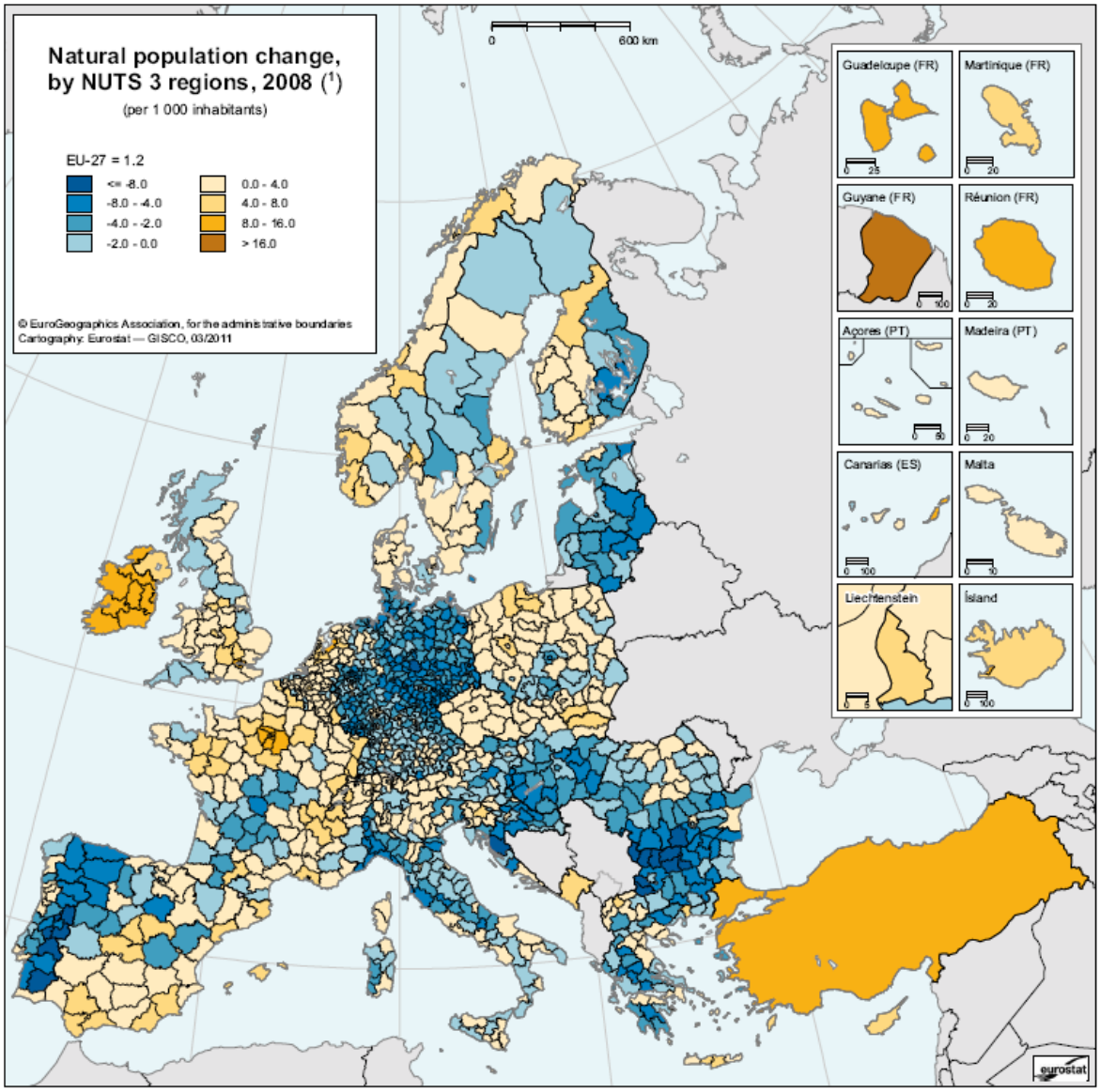
Table 3 Correlation Coefficients between Population Size and the Rate of Natural Decrease: Counties of the Countries of Europe, circa 2000-2009

Country	Number of Natural Decrease Counties, Circa 2000-09	Percentage of Natural Decrease Counties, Circa 2000-09	Correlation Coefficient
Austria	17	48.6	0.3442
Belgium	14	31.8	0.2725
Bulgaria	28	100.0	0.134
Croatia	19	90.5	0.2446
Czech Republic	7	50.0	0.1802
France	26	26.0	0.3664
Germany	353	82.3	0.0719
Greece	36	70.6	0.3553
Hungary	20	100.0	0.1789
Italy	69	64.5	0.224
Lithuania	10	100.0	0.1917
Netherlands	3	7.5	0.5908
Poland	26	39.4	0.2221
Portugal	19	63.3	0.3399
Romania	34	81.0	0.1378
Slovenia	7	58.3	0.2216
Spain	22	37.3	0.3141
Sweden	13	61.9	-0.0532
Switzerland	5	19.2	0.3297
United Kingdom	43	32.3	0.338

Table 4 Correlation Coefficients between Population Size and the Rate of Natural Decrease: Counties of the States of the United States, 2000-2009

State	Number of Natural Decrease Counties, circa 2000-09	Percentage of Natural Decrease Counties, circa 2000-09	Correlation Coefficient
Alaska	20	29.9	0.1653
Arkansas	25	33.3	-0.1554
California	12	20.7	0.3813
Colorado	9	14.1	0.2457
Florida	22	32.8	-0.0416
Georgia	10	6.3	-0.0481
Iowa	42	42.4	0.3509
Illinois	38	37.3	0.3561
Kansas	54	51.4	0.471
Kentucky	21	17.5	0.3553
Maine	7	43.8	0.5478
Michigan	26	31.3	0.3476
Minnesota	26	29.9	0.3275
Missouri	38	33.0	0.397
Montana	30	53.6	0.2952
North Carolina	25	25.0	0.3134
North Dakota	35	66.0	0.4052
Nebraska	41	44.1	0.431
New Mexico	6	18.2	-0.4411
New York	9	14.5	0.5827
Ohio	6	6.8	0.1718
Oklahoma	25	32.5	0.5232
Oregon	13	36.1	0.1354
Pennsylvania	32	47.8	0.1063
South Dakota	27	40.9	-0.1183
Tennessee	28	29.5	0.251
Texas	61	24.0	0.2223
Virginia	54	40.3	0.321
Washington	9	23.1	-0.0958
Wisconsin	20	27.8	0.1805
West Virginia	41	74.6	0.3517

Figure 1. Natural Population Change, Counties of the European Countries, 2008.



(1) Belgium, 2007; United Kingdom, 2007 and NUTS 2 regions; Turkey, national level.

Source: Eurostat (online data code: demo_r_gind3 and demo_gind).

Figure 2

Scatterplot of Population Size on Rate of Natural Decrease: 26 Counties of France, 2000-09