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Immigrant mortality in Belgium: The person and the place

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Immigrant mortality in Belgium: The Person and the Place

Abstract

Migrants generally have lower mortality than the indigenous population. In the present study we consider to what extent this migrant effect depends on the place in which the immigrants live. Working with matched records of the 9,978,654 residents enumerated in the 1991 Belgian census, followed up over almost six years (600,264 deaths), we computed the Cox survival models for each of the 588 Belgian communes. The communes were characterised by location, urbanisation and various Quality of Life indicators. By analysing the parameters of the Cox models, we were able to show that:

i. both men and women non-Belgians have a lower mortality risk than Belgian nationals, and this risk is even lower when personal characteristics are allowed for;
ii. immigrant status is a more important determinant of mortality risk in areas with a high proportion of immigrants, weak family structures and poor work conditions;
iii. in communes with a high proportion of immigrants, and where there are good work opportunities, non-Belgians tend to have a lower mortality risk.
iv. women's mortality risk are more sensitive to local conditions than are men's mortality risks.

We suggest in conclusion, that lower immigrant mortality may derive from the development, in areas with a high concentration of immigrants, of a supportive milieu, but this is less effective under conditions of poverty and unmployment.

Key Words: Immigrants; Mortality; Relative Risks; Community; Quality of Life indicators

Introduction

Migrants have a peculiar epidemiology. They often suffer poorer health, but nonetheless generally have lower mortality than the indigenous population (1-4) although their children may have a higher level of mortality (5). Various explanations have been offered for this phenomenon, from statistical artefact to genuine selection, but have often been found wanting (2). The weight of evidence does suggest, however, that in most cases, adult migrant mortality risks differ significantly from those of the parent and the host populations.

Initial analyses of the effect of place on mortality suggested that aggregate locality effects were little more than reflections of the characteristics of the individuals living in the localities. More sophisticated analyses (6-7), however, have indicated that there may be place effects on mortality which are independent of individual risk factors, or may even interact with them. In particular, the mortality risks of poorer individuals appear to be much more affected by neighbourhood quality than those of wealthier individuals. One particular aspect of these later analyses has been the characterisation of localities by macro–level, distributional, properties which are not mere aggregations of individual level characteristics.

Belgium is a particularly propitious location to study migrant demography, and the effects of location on migrant mortality in particular. Belgium is, and for long has been, a country of migrants. At the 1991 census, of the almost 10 million population enumerated, six percent were of foreign nationality born abroad, three percent were Belgians born abroad (including naturalised immigrants) and a further three percent were foreign nationals born in Belgium (8). Over the years the source, the composition and the location of migrants has changed (9-10), so that today's migrant population ranges from imported industrial and service workers, to top level European officials. Furthermore, the special geography of the Belgian urban system, a small country made up with a network of middle size interdependent cities, rather than one central metropolitan node overshadowing all others; and the multi-focal growth of the Belgian economy in the past half century, have led to migrants being dispersed over a large number of locations, rather than being concentrated at the centre or in a small number of migrant cities (in 1991, 30 percent of the foreign nationals were located in the city of Brussels, 40 percent in Wallonia and 30 percent in Flanders). To what extent do the different locations in which migrants have settled influence their mortality risks?

Method

Migrants have settled in all the major regions of Belgium. Our purpose in the present analysis is to compare the mortality of migrants from various backgrounds with that of the native, Belgian, population. In particular, we wish to isolate the effects of individual migrant characteristics (household, education, work, etc.) from the effects of the particular location and the broader effects of the socio-economic region or district, in which migrants are resident. To do so, we shall evaluate the mortality hazards of non-Belgian nationals and persons born abroad, by sex, relative to that of the native born Belgian population, in each of the 588 communes which make up the Belgian municipal system (one commune, with fewer than 100 residents, is excluded). Then, using the communes as cases, we shall look at the distribution of these hazard coefficients. If migrant mortality is a function of place characteristics then these hazard coefficients should correlate with the social variables characterising the Quality of Life (QoL) of the communes. However, if place is irrelevant, and only individual characteristics are important, then the hazard coefficients, calculated net of individual characteristics, should bear no relation to local level QoL indicators. The analysis is based on the population enumerated n the 1991 census, linked to the national register of deaths over almost six years.

Data

Data were taken from two sources. The population records from the census of March 1st, 1991 for the whole of Belgium were combined with information from the population registry covering the years 1991-1996 (11). We were thus able to note every death, and every migration abroad that occurred between March 1st 1991 and 31st December, 1996 – a total of 70 months. The population record also notes internal migration between communes. Migration within Belgium is not fully recorded in the database, and we have therefore treated all non-emigrants as continually resident in their commune of enumeration at the time of the census.

Using this data base, two sets of data were created:

1. Commune File. For each of the 589 communes, we computed a standardised ratio of the prevalence of various social conditions. These ratios were computed in the same way as a Standardised Mortality Ratio:

i. for the whole of Belgium we computed the proportion of total occurrences divided by the total population in each 5 year age group, from age 0-5 up to age 90 and over;
ii. These national age-specific proportions were then multiplied by the population in each age group in each commune, and the results summed to obtain a commune-specific expected value;
iii. the sum of total occurrences in each commune was divided by the expected value to obtain the commune specific standardised ratio;
iv. The ratios were logged (to base 10) to create symmetry between deviations above and below the mean national level.

These standardised ratios were then combined to create factors representing various measures of the quality of life in each commune. Each factor was the first Principal Component of its constituent measures, or a single variable, defined as follows:

a. *Family centeredness* (based on personal statuses within the household):
- Children living in adult-headed household
- Parents with child in the household
- Single-adults living alone (Negative)
- Married partners in households

Households living in owner-occupied home
Eigenvalue 4.35 / 6; 87% of common variance

b. *Work status*
Managerial responsibility for work of others
Unemployed (age < 65, neither working nor studying) (Negative)
Full Time incomes in the household (none, one or two)
Household social security incomes(none, one or two) (Negative)
Eigenvalue 3.29 / 4; 82% of common variance

c. *Education*
Graduation diplomas (0=none; 1=secondary; 2=tertiary)
Number of years full time education
Currently studying (including all children under age 6)
Eigenvalue 2.42 / 3; 81% of common variance

d. *Immigration*
Non-Belgian nationality
Born abroad
Eigenvalue 1.97 / 2; 98% of common variance

e. *Cohabitation*
Persons of opposite sex living jointly as heads of household, not married to each other and separated by less than 20 years in age. This variable did not correlate with other household variables, and was therefore included separately, as a measure of social anomia.

f. *Non-private Households*
Persons living in old-age homes, institutions, etc. Did not correlate with other variables, included because of the particularly high mortality risk of this population.

2. Proportional Hazards File. For each commune, we computed Cox proportional hazard models for the population resident in the commune on the date of the census. Three models were computed for each commune:

a. the relative risks of mortality by age, age-squared and sex;
b. the relative risks of mortality, by migration status (non-Belgian nationality and born-abroad), for men and women, controlling for sex, age and age-squared;
c. as (b), but controlling also for the other social variables used in constructing the Commune quality of Life indicators.

From these models, three sets of indicators were extracted:

a. the relevance of nationality and nativity for the mortality risk, defined as the gain in chi-squared (– 2*log-likelihood) attributable to the addition of the nationality and nativity variables in model (b);
b. the male and female nationality and nativity relative hazard coefficients in model (b), without controlling for individual characteristics;
c. the male and female relative hazard coefficients in model (c), controlling for individual characteristics.

Geographical Locations

Analysis was performed by commune, of which there were 589 at the time of the census. One commune (Herstappe, with a population of 93) was excluded from the analysis. These communes are administratively organised in 10 Provinces (five in Flanders, north of the language border; five in Wallonia, south of the border) and the Brussels Capital Region. However, the social meaning attributable to these provinces is limited. Willaert (12) has suggested the Belgian communes can be clustered within 17 "migration basins", each one focussed on one central urban area, and delimited by the density of the migration nexus within, and between the basins. The basins may be aggregated into four major groups: Brussels; Antwerp; other Flemish; Walloon (see Table 1). Most of the basins cross provincial boundaries and, except for Brussels, they are effectively unilingual (in Liège and Tournai the "minority" areas are less than one percent of the basin's population, and in Kortrijk less than five percent). The Brussels basin, which covers almost a quarter of the country's population, has about 40 percent of its population in the bilingual (but predominantly Francophone) Brussels Capital Region, another close-to 40 percent in the Flemish suburbs of Vlaams-Brabant, and the remainder in the Walloon suburbs of Brabant-Wallonie.

Table 1 About Here

Within the basins, we have distinguished between those communes which are strictly urban, and the other – suburban and rural – communes (12). The distributions are presented in Figure 1. Brussels is clearly the most urbanised of the divisions, with 43 percent of the population living in urban areas, followed by Wallonia (38 percent) and Antwerp (34 percent). Flanders, with only 30 percent living in urban areas, is the most suburban-rural of the four divisions.

Figure 1 About Here

The main questions we wish to ascertain are:
1. to what extent are there regional variations (by urbanisation and basin) in the effect of nationality and nativity status on the risk of mortality?
2. if such variations exist, to what extent do they reflect differences in quality of life, as measured by the factors defined above?

Results

1. National Estimates

Table 2 About Here

Table 2 presents the Cox regression models for the risk of mortality by age and sex (Model 1); with nationality and nativity added (Model 2) and with the social variables added (Model 3). The model is computed for the whole of the Belgian population, as enumerated at the census (9,978,654, of whom 600,264 died during the 70 months analysed). As this is a total population, the concept of significance has no meaning in terms of hypothesis testing, but is used merely as a guide to strength of relationships.

a. Men have a far higher mortality risk than women, rising from 1.76 in the first two models to almost double the risk in the final model, allowing for personal characteristics. Men's advantaged social position, relative to women, thus creates a more favourable mortality situation than would otherwise be the case;

b. The nationality and nativity variables are introduced nested within sex, that is, there are separate variables representing the hazard and relative risks for men and women of non-Belgian nationality and those born abroad. In the second model the effects are small, but mainly significantly negative (except for non-Belgian men, for whom the coefficient is non-significant but positive). When personal characteristics are introduced into model 3, the nationality coefficients become smaller (more negative), and for non-Belgian nationality are clearly significant, with the effect for women being greater in absolute value than the effect for men. The effects for being born abroad, however, remain small, though here too they are greater for women than for men. Among the personal characteristics, most of the effects are as expected: the household variables are relative to the omitted category of "other" (adult non householder), chosen in expectation that this group would have the highest relative risk. With the exception of Child, all household statuses have a negative coefficient (relative advantage). The positive Child coefficient may reflect a selectivity effect in young adulthood (below age 18 the variation for this variable is imperceptible). The Cohabiting status has little more than a third the coefficient value of the Married status, and less than the absolute value for living alone. Being in an old-age home or institution substantially increases the mortality risk, though here, too, there may well be a selectivity component at work; and social resources greatly reduce the mortality risk, in particular managerial responsibility and high levels of education. However it must be remembered that most of these variables are not independent, and their effects are cumulative: a manager with 20 years of education, a university degree and two full-time household incomes has 0.357 the expected mortality risk of an unemployed man with 10 years of education and one household social security income.

Taken across the whole of the Belgian population, we see that there is a minor negative effect on the mortality risk of being non-Belgian, an effect that is augmented (more negative) when social conditions are taken into account: in other words, the social conditions of non-Belgians are making for a less advantageous mortality situation than would otherwise be the case. This situation appears true for all non-Belgian nationals: substantively, being born in Belgium or abroad affects the mortality risk far less than does nationality. We now ask, how are these results affected by geography and the social conditions prevailing in the commune of residence?

2. Commune-Level Effects

The analyses presented in Table 2 were repeated for each of the 588 communes. Taking these communes now as our cases, we consider the distribution of the nationality and nativity effects, in order to see how they relate to the social characteristics of the communes, as defined by the Quality of Life factors defined above.

Figure 2 About Here

2.1 The reduction in uncertainty: We consider first the gross importance of nationality and nativity as predictors of mortality, as measured by the chi-square gain accruing from adding in these two variables over and above the age and sex effects. Figure2 plots the chi-square gain (logged$_{10}$ to approach a symmetrical distribution), by urbanisation – central cities versus the rest – and the four major divisions discussed above. In cities the log-likelihood gain is distinctly greater than in the rest of the country, but this extra gain is largely accounted for by the effects of Brussels (the Capital Region plus Halle, Nivelles, Ottignies-LLN and Vilvoorde). Note that for the non-city communes of the Brussels basin, the gain, i.e. the effect of nationality and nativity status on the mortality risk, is no different from that in the rest of the country.

May it not be, however, that this extra gain in Brussels derives from there being a greater concentration of migrants in the central Brussels communes than elsewhere? To consider this proposition, we regressed the log(chi-square gain) on the variables of City, Division, their interaction, and the relevant Quality of Life (QoL) factors. The results, below the figure, indicate that even with the QoL variables included, the effect remains significantly greater in the Brussels basin, city and other areas alike. In the other divisions, there is a contrast between Flanders, where the effect is greater outside the main cities, and Wallonia, where it is greater in the cities. With respect to the QoL variables, the main influences are the migration concentration, where the effect of nationality and nativity is enhanced, and family centeredness and work, where it is significantly and substantially diminished. Thus, although there are major effects of migration concentration and social structure on the importance of nationality and nativity in determining residents' mortality risks, significant differences do remain between different regions of the countries, and between some of the urban forms.

Figure 3 About Here

2.2 The Gross effect of Nationality To see how nationality and nativity actually affect the mortality hazard in the different communes, Figure 3 presents a similar analysis for the hazard coefficient of being of non-Belgian (versus Belgian) nationality. As before, the analysis is weighted by commune size (population). Communes with too few deaths in the relevant categories have been excluded. The left hand column presents the analysis for males. Within cities there is far less variation in the coefficient than in other localities, but this is largely the effect of population size, and is offset by using a weighted analysis. The two plots, comparing divisions within urban type indicate a small negative effect for cities, and no significant effect for division (details not shown). When QoL variables are introduced, however, this effect disappears, and only the immigration factor is shown to have any affect on the size of the mortality risk, with the risk diminishing slightly as immigration concentration increases. For females (right hand column), city dwellers have a significantly smaller coefficient than residents of other areas and the Brussels Region less than other Divisions. However, again, when QoL variables are introduced into the equation, these effects disappear, and we are left with large negative effects for the immigration and work factor, and smaller, but still significant, effects for the overall mortality level and the proportion living in non-private households. We note that family is not a significant contributor to these equation. However, the family factor is closely correlated with the immigration factor (weighted $r = -0.7$), and the two are difficult to disentangle – a high negative effect for immigration implies a high positive effect for family centredness.

Figure 4 About Here

2.3 The Gross Effect of Nativity Figure 4 presents the same analysis for the gross effects of being born outside Belgium on the mortality hazard. For males, the hazard is lower in the Antwerp, Brussels and Wallonia divisions than in Flanders, and it is also slightly smaller in the cities. This effect, small though it is, remains after considering QoL indicators, but the hazard coefficient increases the more the commune is family-centred in its social structure. For females there is no city effect, and Antwerp is the division with the lower hazard coefficient for those born abroad, with no QoL affects at all. However, in both cases, the size of the effect is extremely small ($R^2 \approx 2$ percent) and should be treated with caution.

Figure 5 About Here

2.4 The Net Effect of Nationality Figure 5 repeats the Figure 3 analysis for the coefficients of non-Belgian nationality, controlling (stepwise) for the effects of the individual measures of quality of life, as in Table 2. Coefficients remain significantly lower in the cities than in other communes, and lower in the Brussels basin than elsewhere (details not shown). When commune level QoL factors are introduced, however, these effects disappear and we are left with a result which is very similar to Figure 3: the coefficient is smaller, and the relative risk lower, in communes with a high proportion of immigrants, and there is also a minor effect of a high level of education in the commune. For females, too, coefficients are lower in the cities than elsewhere, but Antwerp and Wallonia now have coefficients that do not differ significantly from the Brussels migration basin, and only in Flanders are they higher. Again, introducing the QoL factors reproduces, effectively, the results in Figure 2, with lower coefficients in particular where there is a high level of immigration and a high work factor. Controlling for individual social characteristics, therefore, does not substantively affect the relation between non-Belgian nationals' mortality risks and the social structure of the areas in which they live.

Figure 6 About Here

2.5 The Net Effect of Nativity Figure 6 repeats the analysis in Figure 4, again, focussing on the effects of nativity after controlling for individual social characteristics. As in the comparison for nationality, so too for nativity the introduction of social controls at the individual level does not affect the distribution of hazard coefficients at the commune level. For males the coefficients are marginally higher in the Flemish migration basins (excluding Antwerp), and for females in the Antwerp basin. For males there is a small positive effect for family-centeredness, but not for females, and the coefficients and the R-squared values remain approximately the same.

Discussion

Mortality, as a social phenomenon, is multi-faceted. Various studies have shown that it is responsive to individual characteristics, not only sex and age, but also background characteristics such as education and migrant status, and current wealth, employment and living arrangements. At the same time, there is growing evidence of the effects of location, an effect that cannot be explained solely in terms of the aggregate characteristics of those living in that particular location. In the present analysis we have sought to take a further step towards disentangling these various components, using the particular advantages that Belgian society, and the data available, provide. For each of the 588 communes in Belgium we computed the Cox hazard coefficients for non-Belgian nationality and non-Belgian nativity for males and females, and considered whether these coefficients were randomly distributed with respect to the location, level of urbanisation and particular social characteristics of the communes. At the gross level, of the effects of nationality and nativity, net of age and global sex effects, but without allowing for individual social characteristics, we saw that they were of greater significance in Brussels than elsewhere, and in locations with high levels of immigration and low levels of family centeredness and work. We also saw that the specific effects of locality on the mortality hazard of being of foreign nationality and being born abroad did not depend on residents' individual characteristics: the variation in the hazards coefficients was the same with respect to location and social characteristics whether we controlled statistically for individuals' social characteristics or not.

Conclusion

We find in these results evidence that the risk of mortality is responsive both to individual characteristics and to the social environment in which they live. We may speculate that the greater sensitivity of nationality than nativity to social conditions is indicative of the creation of migrant-focussed milieus, including first and second generation migrants, in those communes in which there are large migrant communities. The lower relative mortality risks for migrants living in communes with a relatively high concentration of immigrants indicates that these milieus then serve to strengthen migrant resilience. At the same time, the significance of the work status and education factors suggests that this is most efficacious where work opportunities are to be found – poverty and unemployment do not appear to be conducive to the generation of strong and supportive networks. The greater sensitivity of women than men to these conditions, as indicated in the larger coefficients and the larger goodness of fit measures is intriguing, but runs counter to other evidence that men are usually more sensitive to social conditions. More evidence is required on the ways in which particular community situations translate into a lowering of men and women migrants' mortality risks. The evidence from this study does clearly suggest, however, that these risks do vary according to the local situation in which migrants live, but there is far more work that needs to be done in order to unravel the relationship.

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Table 1: Migration Basins

Migration Basin	Division	Provinces	Language area	Communes	Population
Antwerp	Antwerp	Antwerp	Flemish	70	1,605,165
		E. Flanders		8	213,164
		Vlaams-Brabant		5	64,200
Arlon	Wallonia	Luxemburg	Walloon	25	143,809
		Namur		2	5,692
Brugge	Flanders	West Flanders	Flemish	12	286,430
Brussels	Brussels	Brussels	Bilingual	19	954,038
		East Flanders	Flemish	17	381,101
		Vlaams- Brabant	Flemish	37	562,365
		Brabant wallon	Walloon	27	321,144
		Hainaut	Walloon	16	165,938
		Liege	Walloon	3	16,484
		Namur	Walloon	2	25,870
Charleroi	Wallonia	Hainaut	Walloon	22	465,777
		Namur			122,067
Gent	Flanders	East Flanders	Flemish	40	741,526
		West Flanders		1	4,933
Hasselt-Genk	Flanders	Vlaams-Brabant	Flemish	4	49,053
		Limburg		42	746,113
Kortrijk	Flanders	West Flanders	Flemish	21	398,336
		Hainaut	Walloon	1	17,849
La Louvière	Wallonia	Hainaut	Walloon	7	177,970
Leuven	Flanders	Vlaams-Brabant	Flemish	19	295,096
Liège	Wallonia	Liege	Walloon	56	740,964
		Limburg	Flemish	2	4,319
		Luxemburg	Walloon	18	87,537
		Namur	Walloon	3	18,698
Mons	Wallonia	Hainaut	Walloon	14	273,080
Namur	Wallonia	Luxemburg	Walloon	1	1,467
		Namur		20	250,990
Oostende	Flanders	West Flanders	Flemish	14	206,813
Roeselare	Flanders	West Flanders	Flemish	15	208,517
Tournai	Wallonia	West Flanders	Flemish	1	1,797
		Hainaut	Walloon	9	178,173
Verviers	Wallonia	Liege	Walloon	25	242,196

Table 2: Mortality Risks by Sex, Age, Nationality, Nativity and Personal Characteristics

Variable	Coefficient *(Standard Error)*	Relative Risk	Coefficient *(Standard Error)*	Relative Risk	Coefficient *(Standard Error)*	Relative Risk
Model	Age and Sex		Nationality and Nativity		Characteristics	
Sex	0.570 *(0.00264)*	1.77	0.567 *(0.00275)*	1.76	0.683 *(0.00288)*	1.98
Age (centred on 40)	0.0778 *(0.000182)*	1.08	0.0777 *(0.000183)*	1.08	0.0780 *(0.000303)*	1.08
Age squared	0.000404 *(0.00000356)*	1.00	0.000403 *(0.00000357)*	1.00	0.000238 *(0.00000506)*	1.00
Non-Belgian Nationality (M)			0.00246^{x} *(0.0116)*	1.00	-0.112 *(0.0117)*	0.894
Non-Belgian Nationality (F)			-0.0834* *(0.0121)*	0.920	-0.164 *(0.0122)*	0.849
Born Abroad (M)			-0.0263** *(0.00976)*	0.974	-0.0263** *(0.00975)*	0.974
Born Abroad (F)			-0.0285 *(0.00832)*	0.972	-0.0490 *(0.00834)*	0.952
Child					0.0929 *(0.0130)*	1.10
Parent					-0.0855 *(0.00432)*	0.918
Living Alone					-0.215 *(0.00470)*	0.806
Married					-0.378 *(0.00455)*	0.685
Owner-Occupier					-0.188 *(0.00292)*	0.828
Cohabiting					-0.145 *(0.00967)*	0.865
Non-Private Household					0.245 *(0.00659)*	1.28
Diploma (1=2^{ry}; 2=3^{ry})					-0.123 *(0.00310)*	0.884
Years Education					-0.0137 *(0.000386)*	0.986
Currently Studying					-0.231 *(0.0198)*	0.794
Managerial Responsibilities					-0.243 *(0.0114)*	0.785
Unemployed					0.116 *(0.00425)*	1.12
Household Full Time Incomes					-0.135 *(0.00390)*	0.874
Household social security incomes					0.0169 *(0.00228)*	1.02
Model −2 Log Likelihood	1,684,745		1,684,885		1,725,992	
Total -2 Log Likelihood		19,300,413				

Note: all coefficients significant at p<.001 except ^{x} $p > 0.05$; * $p < 0.05$; ** $p < 0.01$

Figure 1: Population by Division and Urban Types

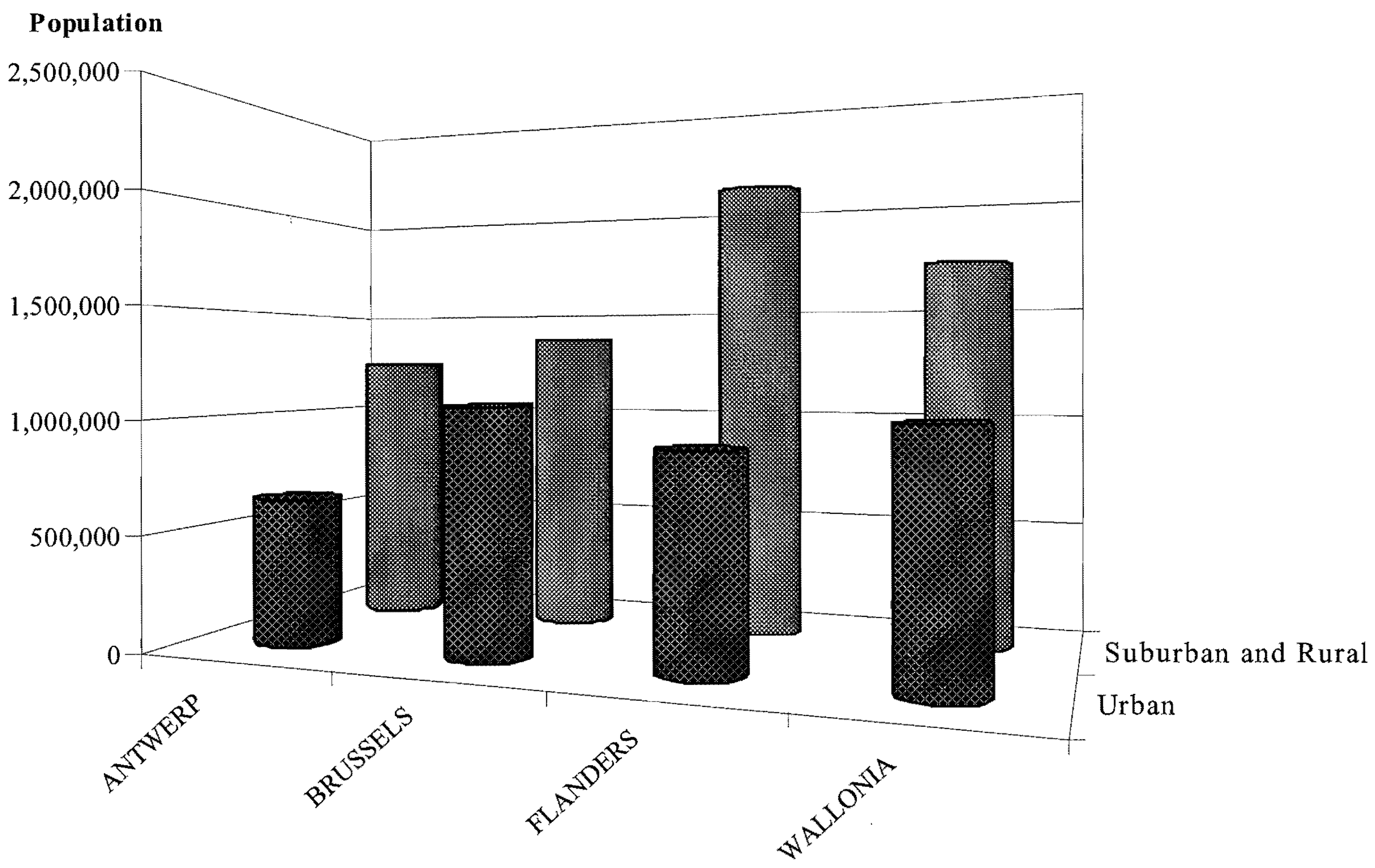
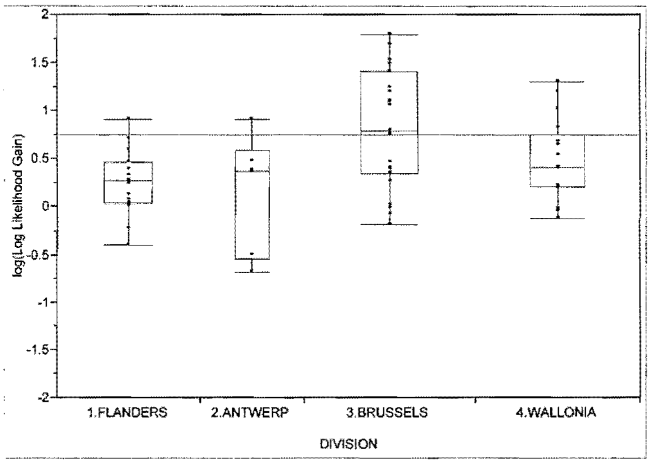
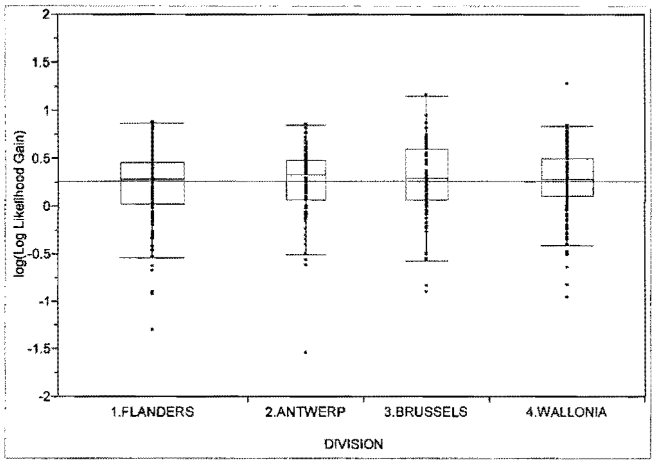


Figure 2: Oneway Analysis of log(Log Likelihood Gain) By Division
Communes weighted by population

1. Urban



2. Others



3. Regression Analysis

Term	Coefficient *(Standard Error)*
Intercept	0.441*** *(0.0175)*
Mortality (SMR)	– 1.28* *(0.597)*
Immigration	6.50** *(2.51)*
Family	– 13.4*** (2.06)
Work	– 8.10*** (1.85)

Division \ Urbanisation	Urban	Other	Total
Antwerp	0.00117 *(0.0312)*	– 0.00117 *(0.0312)*	0.00351 *(0.0316)*
Brussels	0.00370 *(0.0302)*	– 0.00370 *(0.0302)*	0.0900** *(0.0319)*
Flanders	– 0.0840** *(0.0277)*	0.0840** *(0.0277)*	– 0.0545 *(0.0326)*
Wallonia	0.0792** *(0.0284)*	– 0.0792** *(0.0284)*	– 0.0389 *(0.0366)*
Total	– 0.0160 *(0.0292)*	0.0160 *(0.0292)*	

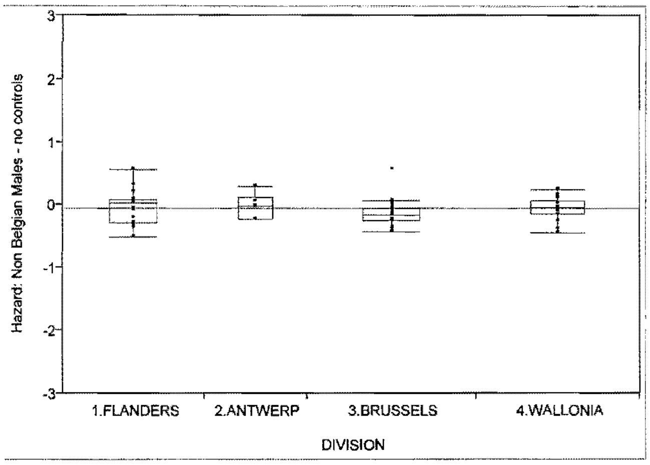
$R^2 = 0.463$

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
Coefficients for nominal variables (Division, Urbanisation and interactions) are deviations from grand mean and sum to 0 across rows and column.

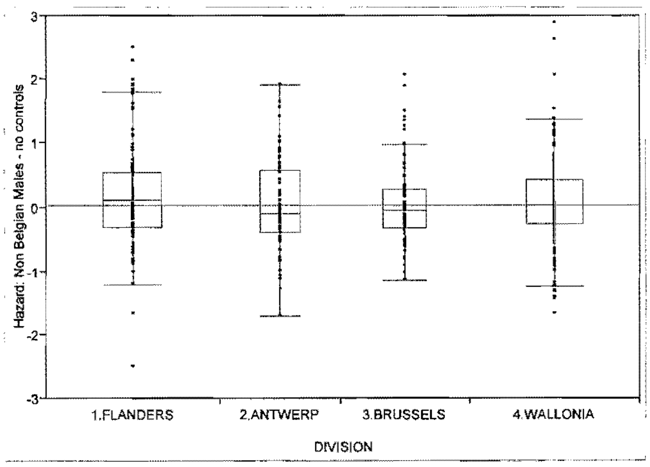
Figure 3: Division, City and Social structure Effects on the Mortality Hazard by Nationality *without* controls for individual social characteristics

Males

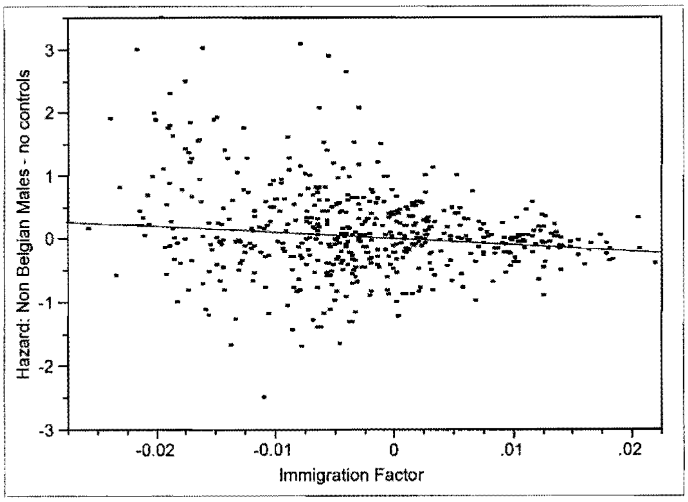
1. Urban



2. Others



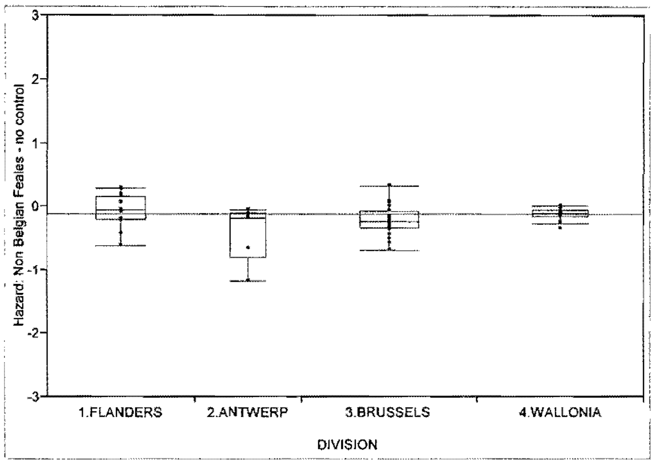
3. Regression: the Immigration Factor



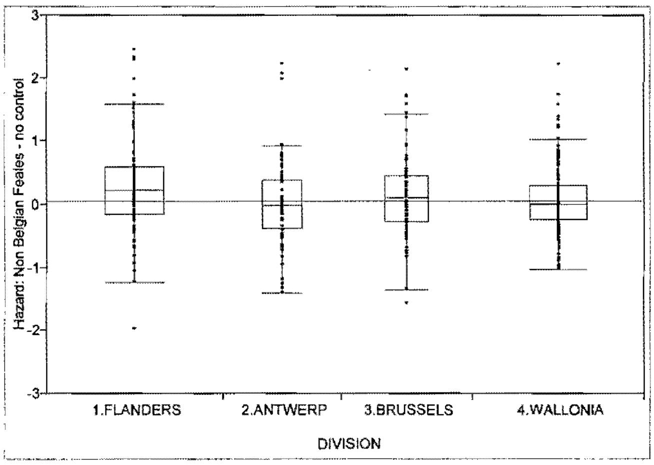
Hazard: Non Belgian Males - no controls
= 0.0129 – 9.61 * Immigration Factor
$R^2 = 0.039$

Females

1. Urban



2. Others



3. Regression Analysis

Term (Standardised Ratio)	Estimate *Std Error*
Intercept	0.00229 *(0.0213)*
Mortality	-1.47^{*} *(0.694)*
Non-Private Households	-0.142^{**} *(0.0486)*
Immigration	-22.6^{***} *(2.78)*
Work	-8.39^{***} *(2.41)*

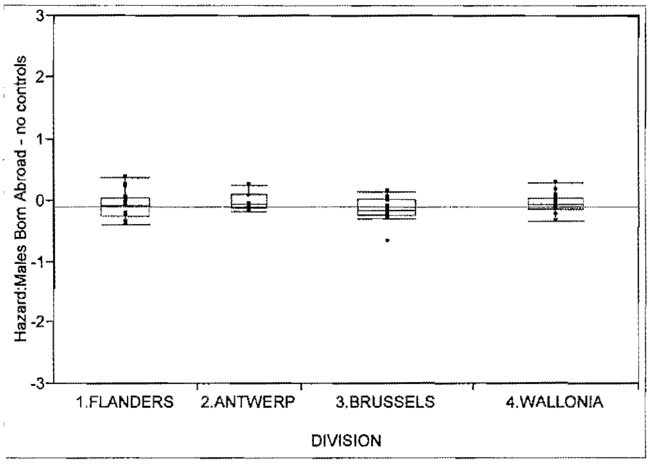
$R^2 = 0.14$

For Notes see Figure 1.

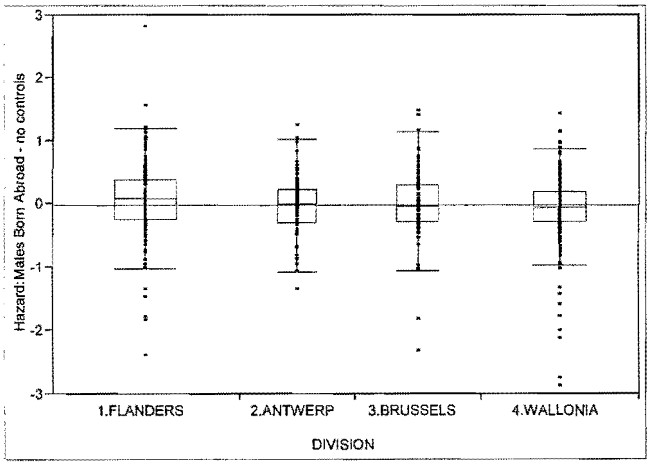
Figure 4: Division, City and Social Structure Effects on the Mortality Hazard by Nativity *without* controls for individual social characteristics

Males

1. Urban



2. Others



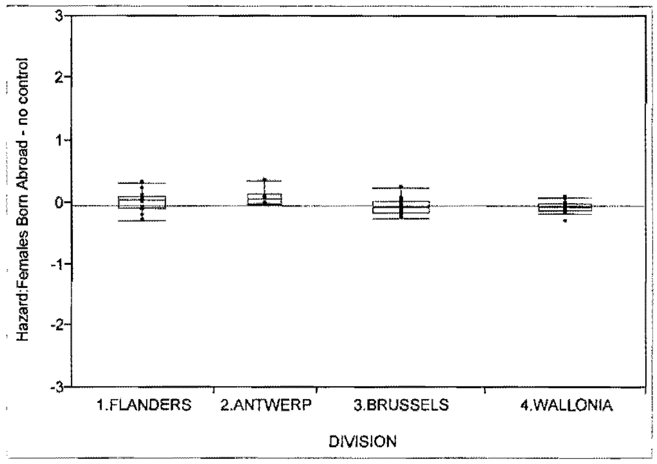
3. Regression Analysis

Term	Estimate *Std Error*
Intercept	−0.0443** *(0.0166)*
Flanders	0.0586* *(0.0282)*
Antwerp	−0.00670 *(0.0315)*
Brussels	−0.0246 *(0.0300)*
Wallonia	−0.0273 *(0.0278)*
Family (Standardised Ratio)	2.32* *(1.10)*

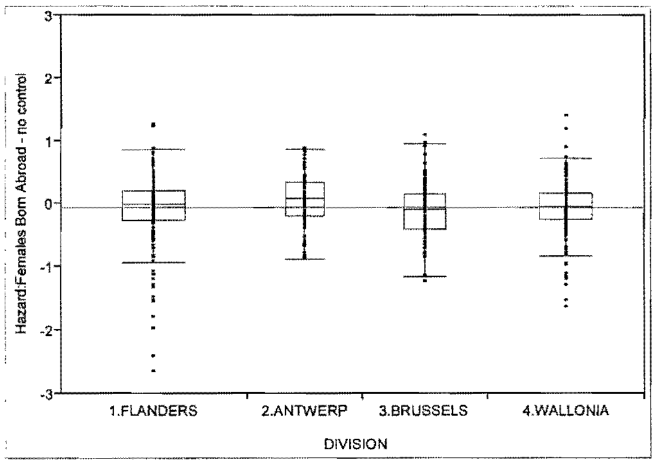
Rsquare = 0.0229

Females

1. Urban



2. Others



3. Regression Analysis

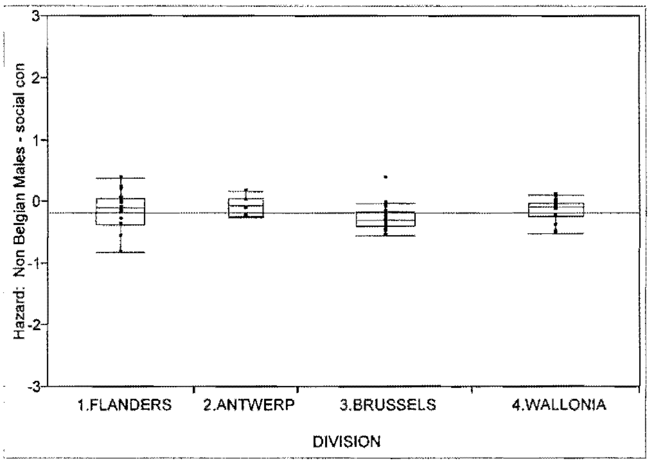
Term	Estimate *Std Error*
Intercept	−0.0428** *(0.0138)*
Flanders	−0.00450 *(0.0224)*
Antwerp	0.0860** *(0.0260)*
Brussels	−0.0584* *(0.0238)*
Wallonia	−0.0230 *(0.0229)*

R^2 = 0.0219

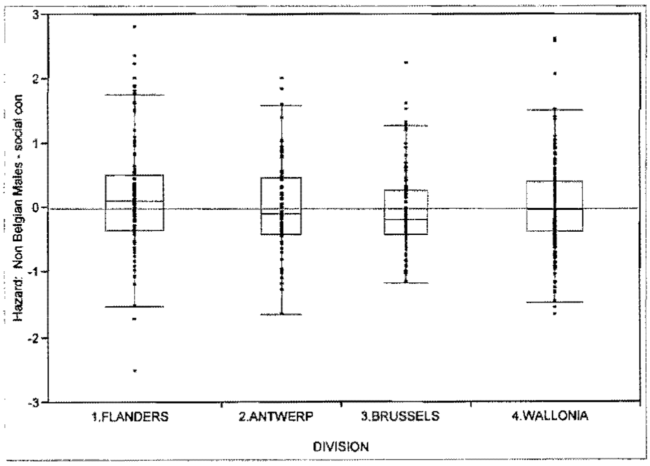
Figure 5: Division, City and Social Structure Effects on the Mortality Hazard by Nationality *controlling* for individual social characteristics

Males

1. Urban



2. Others



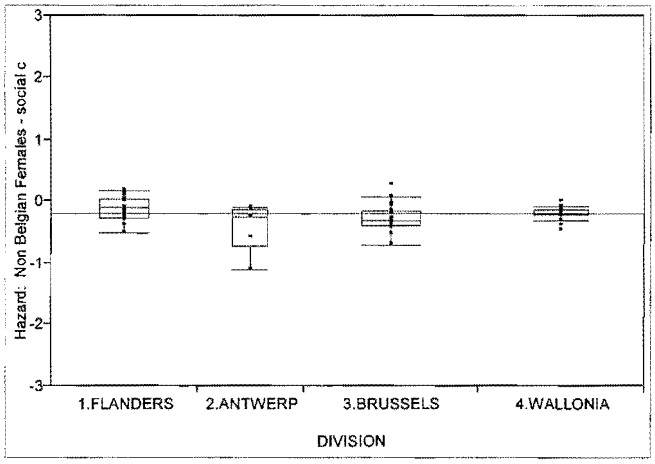
3. Regression Analysis

Term (Standardised Ratios)	Estimate *Std Error*
Intercept	−0.0707 *(0.0217)*
Immigration	-11.6^{***} *(2.11)*
Education	-3.75^{*} *(1.81)*

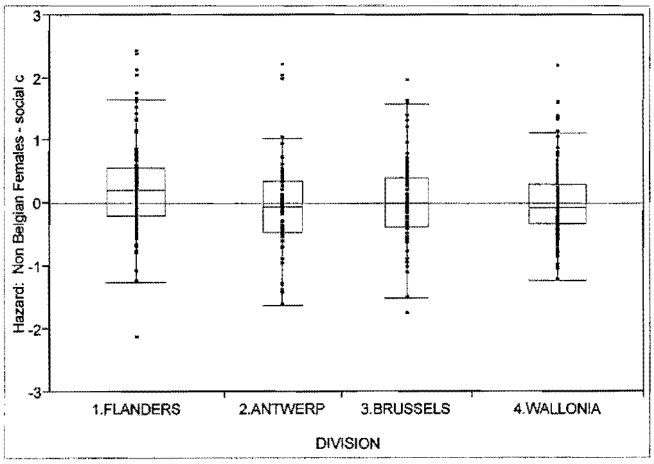
$R^2 = 0.0580$

Females

1. Urban



2. Others



3. Regression Analysis

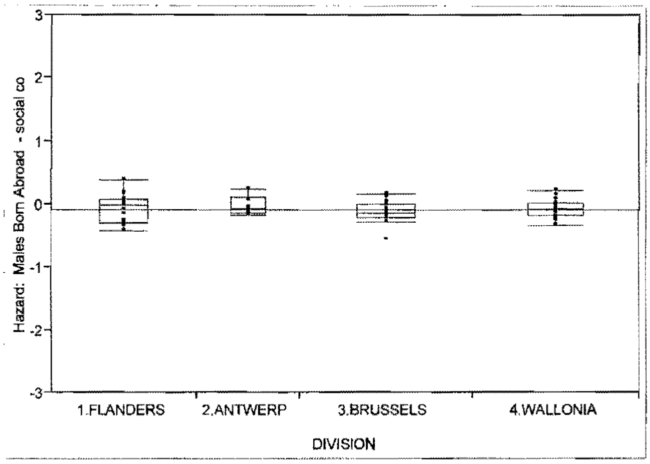
Term (Standardised Ratios)	Estimate Std Error
Intercept	-0.0730^{***} *(0.0214)*
Mortality	-1.50^{*} *(0.698)*
Non−Private Households	-0.162^{**} *(0.0489)*
Immigration	-20.8^{***} *(2.80)*
Work	-8.26^{***} *(2.42)*

$R^2 = 0.130$

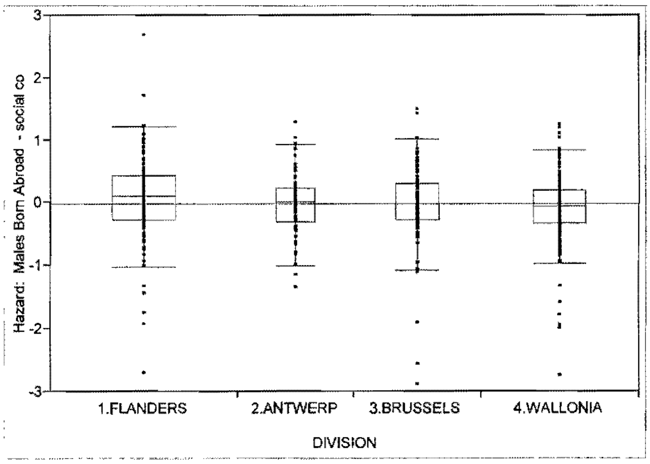
Figure 6: Division, City and Social Structure Effects on the Mortality Hazard by Nativity *controlling* for individual social characteristics

Males

1. Urban



2. Others



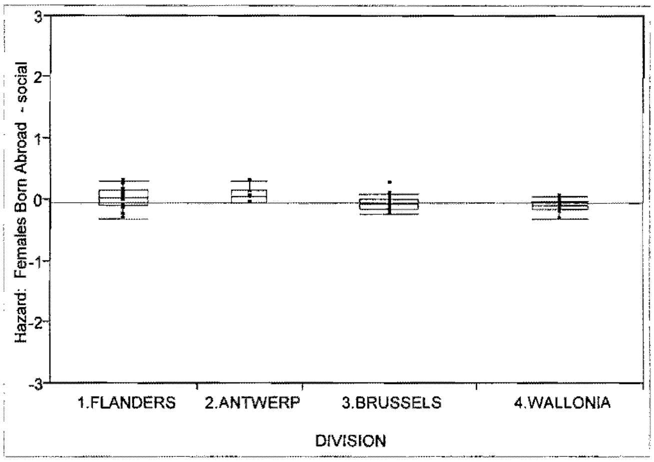
3. Regression Analysis

Term	Estimate *Std Error*
Intercept	−0.0479** *(0.0166)*
Flanders	0.0507† *(0.0282)*
Antwerp	−0.00357 *(0.0316)*
Brussels	−0.0125 0.0301
Wallonia	−0.0346 *(0.0278)*
Family (Standardised ratio)	2.08† *(1.10)*

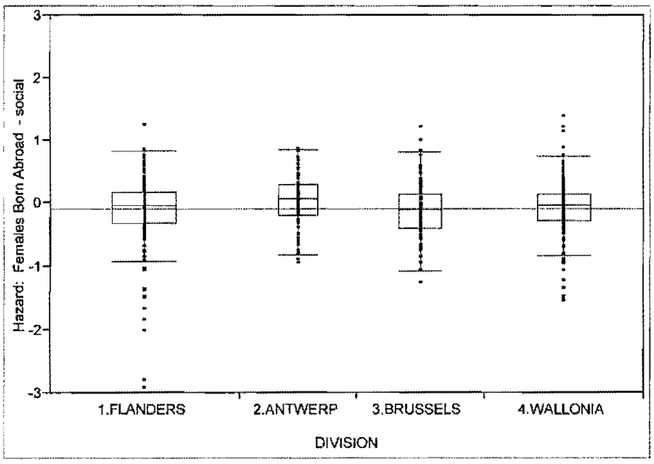
$R^2 = 0.0181$

Females

1. Urban



2. Others



3. Regression Analysis

Term	Estimate *Std Error*
Intercept	−0.0630*** *(0.0139)*
Flanders	−0.0110 *(0.0226)*
Antwerp	0.0908*** *(0.0263)*
Brussels	−0.0530* *(0.0241)*
Wallonia	−0.0268 *(0.0231)*

$R^2 = 0.0222$