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of social inequalities:
An innovative method to
grasp social inequalities
evolution on the territory**

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Temporal and spatial analysis of social inequalities: An innovative method to grasp social inequalities evolution on the territory

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Abstract

This paper puts forward a methodology to rank the population along a hierarchical continuum, from a lower level to a higher level of social precariousness. Going beyond the complex layered issues related to the concept of poverty, it rather explores the notion of deprivation with the idea of social inequalities which are observable according to specific socio-economic key dimensions. Part of a broader research – Destiny1 – focusing on both the spatial and the temporal evolutions of social inequalities in Belgium and Luxembourg, this method represents a first phase of the project. The social inequalities are addressed in an individual perspective with disaggregated data. This standpoint allowed the analysis of the whole population for Belgium and Luxembourg in a ten-year period (1991 and 2001). The method is based, on the one hand, on the national censuses from both countries – the only comprehensive data available on an individual basis –, and on the second hand, on the European Union - Study on Income and Living Conditions Panel (EU-SILC). These two data sources have been combined for accessing economic information from EU-SILC and transposed into the national censuses in both countries. The EU-SILC detailed data on household income were used as an indicator of social inequalities for three dimensions: education, socio-professional status and housing. This enabled to rank each individual on a ‘social continuum’. After a presentation of the methodological framework, individual ranking results are exposed and discussed on the basis of spatial analysis.

Keywords: Social inequality, Spatial inequality, Methodology, Census, Luxembourg, Belgium

JEL classification codes: J11; J21; J8; R1; R2

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Introduction

The literature shows the basic difficulty for measuring poverty among populations, and this, either in absolute or relative terms. Indeed, poverty, or related concepts such as deprivation, is a concept that evolves over time, differentiating itself on the territory and setting apart depending on societies and government systems. True challenges are then concerned by both theoretical and empirical problems. Firstly, the determination of thresholds above which the observation of specific states of poverty is possible through quantitative and / or qualitative dimensions for specific groups is under questions. Secondly, challenges are related to the choice of the dimensions to explore. If household income is obvious since it gives access to a range of resources and possibilities such as education or socio-professional status, housing and neighborhoods are also identified as strong determinants (Maurin, 2004). Basically, the observation of poverty situations is often targeted to precarious subgroups, by a spatial selection – such as suburban/periurban milieus –, or by specific social criteria – unemployment or part-time job working.

The DESTINY project is involved in this scientific and social debate. This empirically-based research focuses on three conceptual tracks. The poverty, deprivation and precarious situations are addressed with the multidimensional concept of social inequality. These notions have been explored for the whole populations of Belgium and Luxembourg from two years of observation: 1991 and 2001. The inequalities among individuals are addressed according to the differentiation of three individuals and households' dimensions related to both economic and socio-cultural environments (education level, access to employment and household comfort / equipment). In that regards, the indicators used are connected to a mixed relative-absolute perspective. The spatial facets of inequality that develop Mignot *et al.* (2006), Fitoussi *et al.* (2004) or Sélimanovski (2008) are therefore key topics that DESTINY borrows and develops according to cross-sectional and longitudinal perspectives. The proposed methodological framework allows the analysis of spatial phenomenon where disparities and inequalities are structured by territorial dynamics such as concentration and segregation.

1. Theoretical Background

1.1. Exploring social inequalities, which of a relative or absolute perspective to chose?

Poverty is a key concept closely concerned by incapacities for individuals as well as households to meet given needs. Thus it is an ‘absolute’ measure that reflects the inability to satisfy a number of – basic – needs (Concialdi, 1998): housing, food, clothes, transportation, etc. Numbers of studies are facing the difficulties of trying to establish specific levels as well as different nature of needs. Indeed, how to define significant thresholds that allow pointing out population to include or not in different precarious groups? What regard to the economical poverty, research shows interesting examples. While some studies consider that households having incomes below the 60% of population’s median income are in a poverty situation, others adopt alternative thresholds related to 50% or 40% of the median income. But more significantly, most of reviewed researches concerned by income or salary topics do not target the whole population; they rather examine specific sampled sub-groups.

Deprivation notions can also be studied by using definitions of basic needs that are ‘relative’. The factors that connect individuals to poverty situations may change according to the time or the cultural milieus (Sénécal, 2007). Indeed, individuals as well as households needs are related to given countries and / or given period of time in which the observations are made (Mignot, 2001: 10). In that concern, the social capital could be an explicit example. While a bachelor diploma was distinctive in the 70s, the increase of western societies’ level of education makes now more difficult to access the working market with the same bachelor degree.

The definitions of social inequalities are related to the concepts of ‘*social classes*’, ‘*hierarchies*’, ‘*power*’ and ‘*capital*’ (Bourdieu, 1979). With approaches such as Maurin (2004), which confers ‘*inequalities among different possibilities*’, we can well understand the explicit and the implicit dimensions of social inequalities, as well as their material and their symbolic characteristics. In those terms, social inequalities engage an uneven individual positioning – or groups of individuals – according to specific

dimensions of social life (employment, education, housing, health, etc.). In that regard, income is crucial for the individuals' access to these dimensions. While the unfairness of social inequalities is not to be forgotten, they must also be considered as cumulative.

Then, what to consider regarding the complexity of social-life to catch the realities of social inequalities? Dimensions such as employment, education, access to social security, housing and household equipment are key variables allowing the observation of deprivation and poverty situations. If the recent research shows the relevance of a relative approach, it also points out the absolute character of poverty. If being in a precarious position is relative reality, as the example above about the level of education that evolves through the time, the precariousness calls inevitably to social / normative thresholds that are absolute such as living in a minimally salubrious dwelling. These two perspectives then could not be ignored.

Accordingly, taking into account more than a few types of indicators could be an alternative: income and economic resources, living conditions, perceived poverty, accessibility to resources, and so on. Secondly, literature shows the relevance of combining indicators from both relative and absolute approaches. From these points of view, the Destiny project explored three dimensions that allow approaching key determinants of poverty (David *et al.*, 2006) which are relevant for social inequalities. Income inequalities have been used and linked with three dimensions of daily life: education level, socio-professional status and housing conditions.

1.2. Social inequalities, between household resources and individual assets

On the one hand, poverty is an absolute concept that reflects the inability to satisfy a number of basic needs (e.g. Concialdi, 1998). On the other, the definition of basic needs is depending on the countries and the periods of observation (e.g. Mignot, 2001). As a result the current research trends lead to combine the types of indicators of poverty (monetary conditions, subjective, administrative, access to resources like mobility, etc.). To explore social inequalities, the Destiny project addressed the three selected key dimensions in both absolute and relative perspectives. In that sense, an individual can be

in good position in one dimension (e.g. higher education) and disadvantaged in another (e.g. unemployed).

This standpoint echoes theoretical frameworks derived from the Karl Polanyi's concept of economic integration. This perspective allows the individual the capacity to exit (or not) from a negative situation. In that regard, from the selected key dimensions, different attributes could be combined in order to reflect the complexity of the individual reality (e.g. employment / unemployment, different housing conditions, higher or lower education, and so on). This approach considers specific resources / capitals that the individual possesses, those assets giving to him a specific social position at a given time in a specific geographical or cultural context. While the possession of a personal computer / cellular phones was distinctive characteristic for the upper / mid classes in the 1990s, the high occurrence of these technologies in nowadays households can no longer distinguish the individuals at the top of the socio-economic continuum.

The resources / capitals related to the education level and the socio-professional status can be considered according to the individual and not his / her household. In a case of separation or divorce, these individual assets remain despite changes in family structure. This is well reflected by the situation of a female "at home" with a higher level of education. In that example, this woman does not directly activate her educational asset on employment market, but she could reintegrate the market in better position than another less educated. The dwelling dimensions can be addressed with a combined absolute / relative approach. However, because the dwelling attributes are shared among a family / household, they must be addressed in terms of household. No threshold has to be identified to consider individual / household positioning, but the construction of different housing configurations could introduce a bare minimum level of comfort which could be followed by relative dwelling components. A first absolute threshold of comfort can easily be recognized: presence of a bathroom or toilet. Therefore this low level could be improved according to significant dwelling attributes / equipments available to the household: central heating, number of rooms, telephone, computer, etc. These determinants have been correlated to the occurrence of social inequalities (Berger, 2004; Maurin, 2004; Van Kerm, Fusco, 2008).

2. An Empirical Challenge

Two main issues have driven the first empirical part of the research: 1) How to rank each individual among the population according to the three selected dimensions? 2) How to obtain comparable socio-economic scales between Belgium and Luxembourg but also between variables of different nature?

We developed an empirical framework that integrates both individual and household resources / capitals. Because each of the national censuses has no economical information, the standardized household income available in EU-SILC panel² has been used as a proxy of social inequalities at the individual level. Therefore empirical data coming from four databases had to be harmonized: two waves of EU-SILC panels (1994 and 2003) and two national censuses (1991 and 2001) for both Luxembourg and Belgium. Much of this part of empirical work was to match and validate the association of variables from the different databases but also to control a scoring method allocating a position for each individual of the population from Belgium and Luxembourg.

2.1. Data available and harmonization of databases at individual level

The project has mainly focused on Belgian and Luxembourgish national censuses. The EU-SILC databases were used only for economic purpose in order to rank the individuals. National census data correspond to 1991 and 2001. The data from the EU-SILC panels are related to 1994 (for 1991 census) and 2003 (for 2001 census). The years of reference of EU-SILC data are justified by two motives. Firstly, these years are very close to available national censuses. Secondly, 1994 and 2003 EU-SILC are both the first year of a ‘panel’ survey type. In that regard, they represent the best of concerned populations – this is not the case for following years because of typical attrition associated to panel methods.

Data quality for Belgian and Luxembourgish censuses has been studied in the light of assumptions discussed above. A critical analysis of databases has highlighted that

² In Luxembourg, the PSELL survey (Panel Socio-Economique Lieven zu Letzëbuerg) has been used. It is a more detailed panel study where the EU-SILC data comes from.

they are of relatively good quality for both Belgium and Luxembourg. These two national censuses are almost systematic by covering the whole population. For both the census and EU-SILC databases, the three dimensions require combining 12 variables (two for education, two for socio-professional status, and eight for dwelling). Although, the presence of missing data occurs when specific variables are cross-compared in Belgium and Luxembourg. Table 1 shows, with the example of 2001 education dimension, the matching procedure that has been conducted for each variable to analyze. Major work of harmonization was necessary to allow the coupling of databases for the two countries, but also between corresponding values in each variable to be analyzed.

Thus, for both countries, data on key dimensions from 1991 and 2001 censuses were mapped from four data sources. The research teams have encountered significant difficulties for this empirical matching not only for the two years of both national censuses (in each country), but also in terms of settling the two sources of information from different approaches and methodologies (between countries). The only possible couplings between Belgium and Luxembourg have been selected. The retained option was to consider, in a comparative analysis point of view, the lowest common denominators with the highest population frequency for both countries. This pragmatic choice does not prevent subsequent more detailed studies and accurate investigation in each country and / or between countries.

Table 2 summarizes the final values for each key dimension harmonized in Belgium and in Luxembourg for 1991 and 2001. The education and socio-professional dimensions counts respectively five and 10 values that are individual and relative. Housing dimension is constructed with both absolute and relative perspective but is related to the household of the individual. This dimension counts 6 values. The first is an absolute value that corresponds to the household living in corresponding dwelling with no toilet and / or bathroom, independently if the household is residing in a residence with more comfort or equipment. The following values are relative and additive according to renter or owner status. For example, a household living in a dwelling of the fourth value (living in a dwelling with central heating) then possesses also characteristics related to above values (with phone and more than one room per person; only toilet and / or bathroom; no toilet and / or bathroom).

	Luxembourg		Belgium	
Sources	2001 Census	2003 EU-SILC	2001 Census	2003EU-SILC
	Variable name: <i>Instruc</i>	Variable name: <i>ppe040</i>	Variable name: <i>Q9A</i>	Variable name: <i>PE040</i>
0. No diploma	(0) No diploma	(0) No diploma	(0) No answer	(1) No diploma
1. Primary	(1) Primary	(1) Primary (2) Higher primary (3) Complementary school	(1) Primary	(2) Primary
2. Technical / professional	(2) Technical secondary, lower cycle (3) Professional diploma (4) Master secondary (6) Technical secondary teacher diploma	(4) Certificate of lower secondary technical education (5) Certificate of professional learning (6) Certificate of Capacity Manual (7) Certificate of Technical initiation and professional (8) Certificate of technical aptitude and professional education (9) Technician diploma (until 13 th technician regime) (10) Technical college education (until 13 th or 14 th technical regime) (13) Craftsmanship Education	(2) Technical secondary, lower cycle (3) Artistic secondary, lower cycle (4) Professional secondary, lower cycle (5) Technical secondary, high secondary (6) Artistic secondary, high secondary (7) Professional secondary, high secondary (8) General secondary, lower cycle	(3) General secondary, lower cycle (4) Technical secondary (5) Artistic secondary (6) Professional secondary
(3) General secondary	(5) Secondary study diploma	(11) Lower secondary study diploma (12) Higher secondary study diploma	(9) General secondary, higher cycle (10) Post-secondary but not superior	(7) General secondary, higher cycle
(4) High secondary / University	(7) Superior education < 4 years (8) Superior education > 4 years	(14) Higher education (college +2 years of university) (15) Higher education (college +3 years of university) (16) Higher education (college +4 years of university) (17) Higher education (college +5 years of university without Ph.D.) (18) Higher education (+5 years of university + Ph.D.)	(11) Superior education	(8) Superior education
(A) Other	(9) Non applicable		(12) Non applicable	(9) Other
(M) Missing	(a) Non applicable		(13) Missing	(10) Missing

Table 1 – Example of the four databases harmonization for education dimension in 2001 for Luxembourg and Belgium

Education dimension	Socio-professional status dimension	Housing dimension ^a
0. No diploma 1. Primary 2. Technical and professional 3. Secondary general 4. Superior / university	1. Unemployed 2. Worker 3. At home 4. Retired 5. Unspecified active 6. Other inactive 8. Independent / Professional 9. Public employee 10. Private employee	1. No toilet and / or bathroom (renter) 2. No toilet and / or bathroom (owner) 3. Only toilet and / or bathroom (renter) 4. Only toilet and / or bathroom (owner) 5. With phone and >1 room per person (renter) 6. With phone and >1 room per person (owner) 7. With central heating (renter) 8. With central heating (owner) 9. With >2 room per person (renter) 10. With >2 room per person (owner) 11. With computer (renter) ^b 12. With computer (owner) ^b
<i>a Cumulative according to renter or owner status.</i> <i>b Value calculated only for Luxembourg.</i>		

Table 2 – Harmonized key dimensions for Belgium and Luxembourg in 1991 and in 2001

2.2. Scores calculation for three key dimensions

The Destiny project that focuses on the whole population then uses the national censuses for both Luxembourg and Belgium. With regard to social inequalities, this faces major difficulty because these extensive databases do not contain any variables related to income. According to the literature, the economic dimension is however a basic determinant to include to fit the analysis of social inequalities as well as poverty situations. Therefore, data from the EU-SILC have been utilized and crossed with the three key dimensions from national censuses (education, socio-professional status, housing). The EU-SILC panel contains detailed data on income and several dimensions related to poverty. This panel involves weighted samples, which are statistically representative of population in Luxembourg (n=10 923 for 1995; n=9 580 for 2003) and Belgium (n=8741 in 1995; n=10146 in 2003). Therefore, the economic data related to income have been considered as a ‘proxy’ that reveals social inequalities. A ‘score’ associated to the household income has been calculated for each key dimension to be analyzed in national censuses. This score then allows the possibility to rank all the population on a ‘socio-economic continuum’.

The income per consumption unit from EU-SILC, the *equivalized disposable household income* (EDHI) from OECD, has been used for the calculation of a score at the individual level. The usual weighting has been applied to: head household (1.0),

spouse or person 14 years or more (0.5), and person 13 years or less (0.3). This household income has been standardized.³ With a mean replaced with a zero value this standardization allows comparison between countries and between variables without affecting the individual distributions of the population. The underlying assumption for taking into account household income (EDHI), for individual which are composing it, is theoretically based on the access to household's resources; and this even if an individual is active, not active or post-active. Only individuals aged over 18 who have completed their studies and living in private households were selected. For each value of the three key dimensions examined in censuses (education, socio-professional status, housing), a score was calculated in the EU-SILC and then imputed to the individuals that possess the corresponding values in Belgian and in Luxemburgish censuses. The following sections expose the scores using graphs; all these scores are also presented in the appendix using tables.

Scores for education dimension

Figures 1 and 2 show scored values for education dimension for Luxembourg and Belgium. As expected in both countries, the scores ranking is consistent with the number of years of education. In Luxembourg this ranking remained the same between 1995 and 2003. The magnitude of inequality for the education dimension has declined in the country, from -0.68 to 0.66 in 1995 to -0.67 to 0.46 in 2003. While a score improvement can be observed for 'primary' and 'secondary general' diplomas, there is a relative drop of the 'technical and professional' and 'secondary superior / university' diplomas. These scores and their evolution reflect the overall improvement level of education in the Luxembourg (Klein, 2007) with the 'secondary general' diploma score that is positioned close to the average.

³ $(EDHI - \text{Mean } EDHI) / \text{Standard deviation } EDHI$.

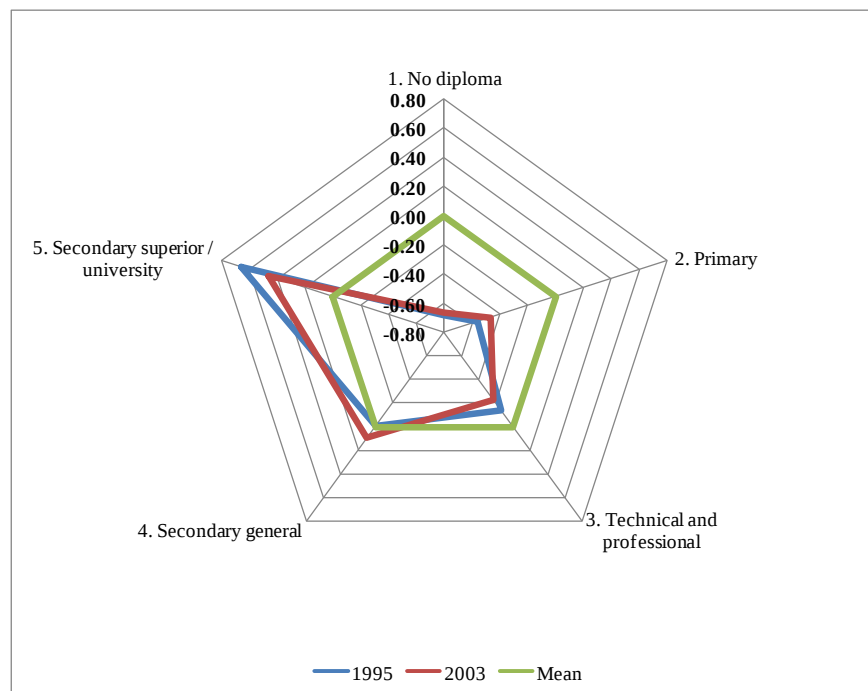


Figure 1 – Standardized calculated scores for education dimension in Luxembourg from EU-SILC in 1995 and in 2003

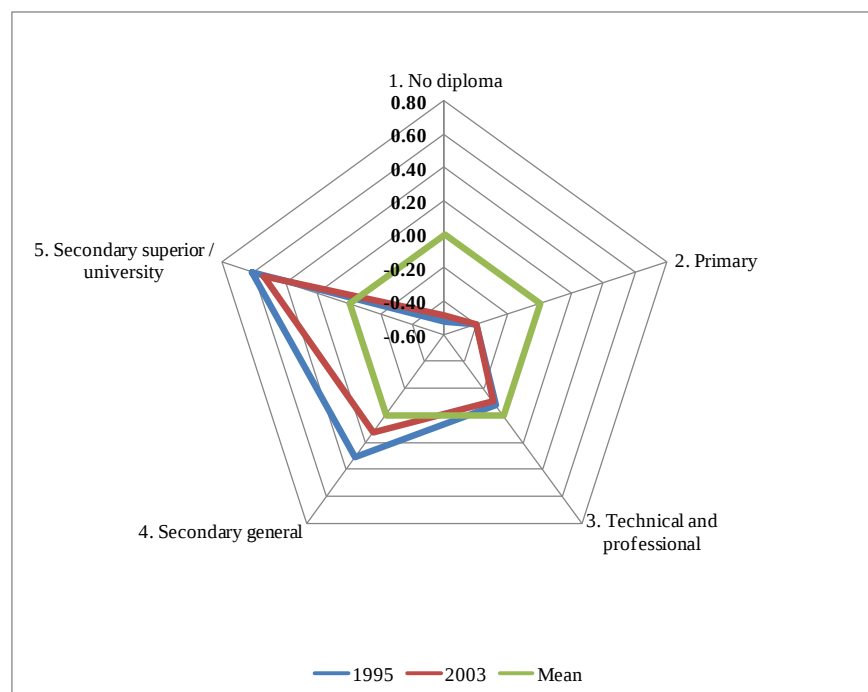


Figure 2 – Standardized calculated scores for education dimension in Belgium from EU-SILC in 1995 and in 2003

Belgium has strong similarities with Luxembourg in regard to the education dimension. Scores steadily increase in 2003 compared to 1995 according to the length of school career, from the value ‘*No diploma*’ to ‘*Superior / University*’. Between 1995 and 2003, if the rank between values remains the same for ‘*Superior / University*’, the ‘*Secondary general*’ felt down closer to the mean. As in Luxemburg, this evolution may reflect the lengthening of school career affecting the income of individuals.

Scores for socio-professional status dimension

Figure 3 and 4 expose the scores for socio-professional status dimension in Luxembourg and in Belgium. For Luxembourg, as for education dimension, a reduction is observed in the range of the social inequalities from -0.89 to 0.30 in 1995 to -0.62 to 0.04 in 2003. The lowest values for this dimension in 1995 have been significantly improved in 2003 (‘unemployed’, ‘workers’). ‘*Retirees*’ and individuals ‘*At home*’ stayed virtually unchanged for the country. Basically, this stability means no global improvement for these non-active statuses in regard to the whole population. Though for both years, only active statuses have positive scores – values higher than mean (0.0) with the exception of ‘*other inactive*’ in 1995. While the ‘*Employees*’ from ‘*Private*’ or ‘*Public*’ sectors drop slightly, the ‘*Independents / Professional*’ increased noticeably their scores. These evolutions for socio-professional scores statuses well represent the establishment of welfare and social Luxemburgish policies (Klein, 2007). Moreover refocused scores close to the mean value also echoes the overall improvement employment situation for the country, especially the desindustrialization transition to an economy based on services activities and finance (Klein, 2005; Tibesar, 2005).

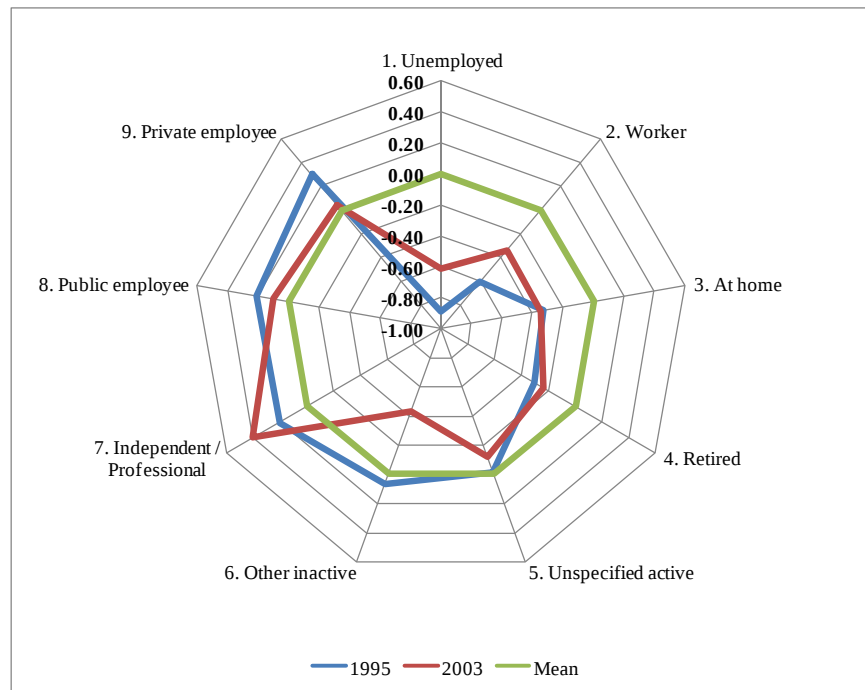


Figure 3 – Standardized calculated score for socio-professional status dimension in Luxembourg from EU-SILC in 1995 and in 2003

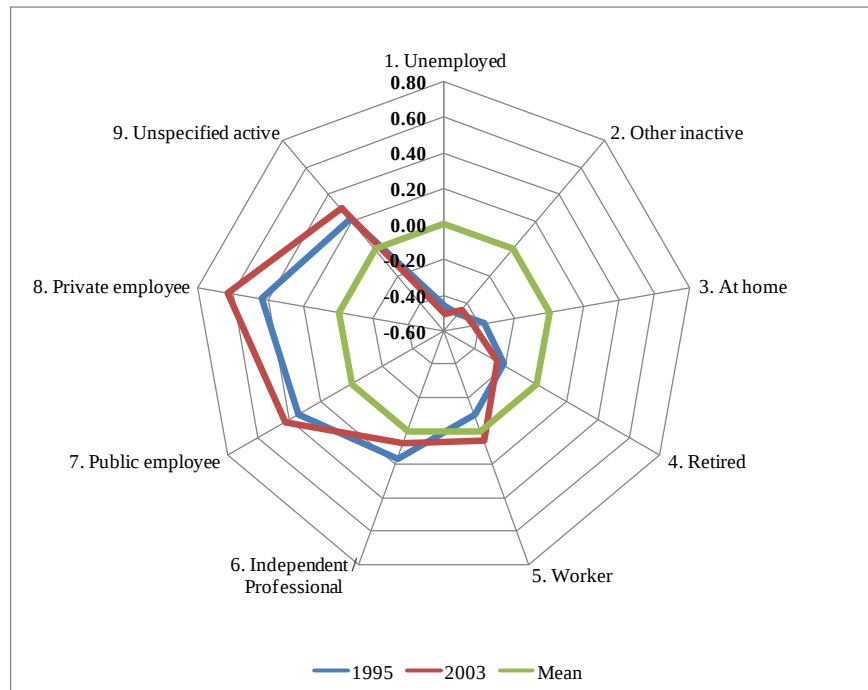


Figure 4 – Standardized calculated score for socio-professional status dimension in Belgium from EU-SILC in 1995 and in 2003

The range of social inequalities observed in Belgium is larger than in Luxembourg. In addition, it tends to increase when comparing the two years of reference. The lowest values in 1995 (*Unemployed*, *Retired*) slightly decreased before 2003. Overall, the scores for socio-professional status in Belgium and in Luxembourg have not the same ranking. The *Unemployed*, *Workers*, *At home* and *Retired* values are at the bottom of the social continuum. However, the situation is more precarious in Belgium than Luxembourg. Indeed, while the position of the *Unemployed* is similar in both countries, *Workers*, *Retired* and *At home* scores are not similarly positioned. If Belgian *Workers* have a better position, at the opposite to Luxembourg, *Retired* and *At home* in Belgium have scores relatively close to the *Unemployed* value. National differences can also be observed regarding the score for the *Independent / Professional*, a slight decrement is observed for Belgium, but an improvement for the Luxembourg. Another national dynamic can be observed for *Private and Public Employees*, those significantly improve their positions in Belgium and are downscaled in Luxembourg.

Scores for housing dimension

The housing conditions have improved considerably in Luxembourg between the two survey panels, especially in terms of magnitude of inequalities and improvement for the lowest values. Indeed, as well least scores (insalubrious dwelling) as better ones (more than two pieces per person with computer) have moved closer to mean (0.0). Thus, if the lowest values tended to increase, the highest values have declined. This reflects the overall improvement of living conditions in housing that the country has been through. Finally the distribution of scores is also consistent with a structure related to housing tenure, to the extent that owner value is almost always higher than tenant corresponding value.

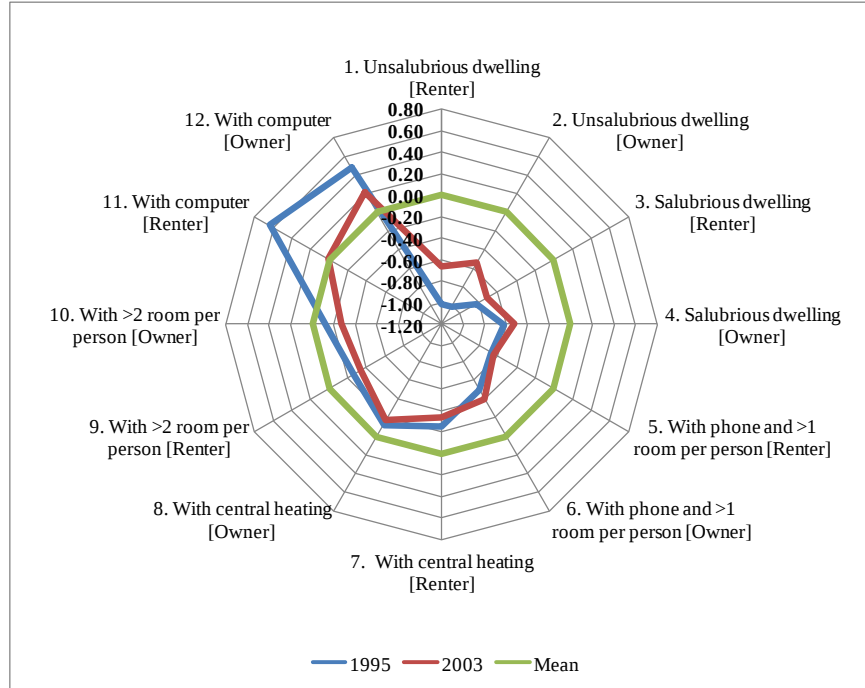


Figure 5 – Standardized calculated score for dwelling dimension in Luxembourg from EU-SILC in 1995 and in 2003

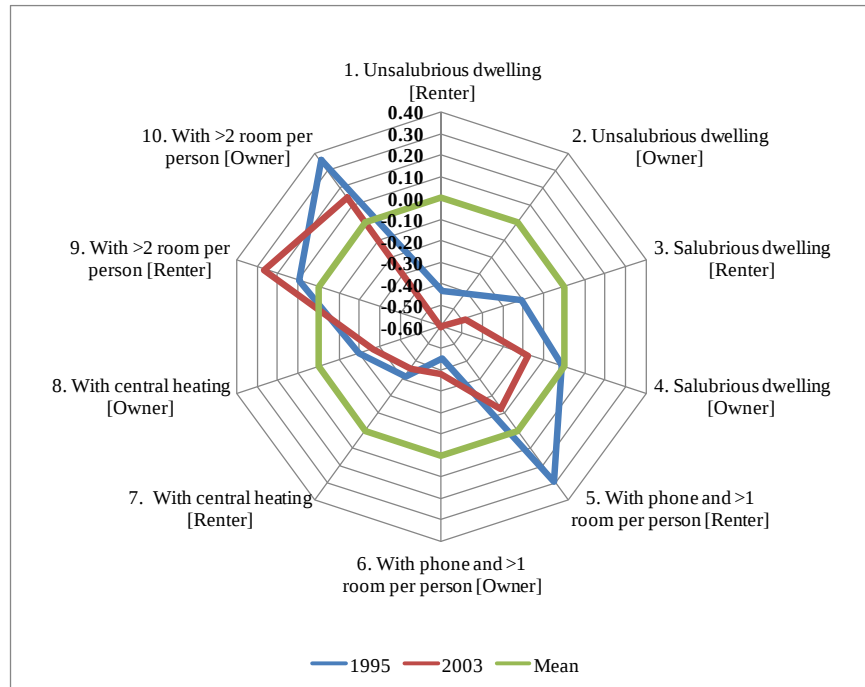


Figure 6 – Standardized calculated score for dwelling dimension in Belgium from EU-SILC in 1995 and in 2003

The changes in housing scores structure in Belgium are much more mixed or even complex than Luxembourg. If the overall magnitude of inequality tended to lightly decline, the position of each value is not the same. In addition, some values that were well positioned in 1995 find themselves situated lower in 2003. Besides the insalubrious dwelling, this is particularly true of mostly all tenants' positions. Unlike in Luxembourg where the whole country has moved closer to the average, Belgium rather saw its top scores reversed, and its worst ones considerably moved away from the average.

2.3. Imputation of scores to individuals in census and validation

Each individual listed in Luxembourgish and Belgian national censuses has been characterized by the scores related to the three dimensions (for 1991 and 2001) described above. Before establishing final scores presented in the previous section, a two-stage validation procedure for both calculation and allocation of individual scores has been performed.

Validation of harmonized variables values

The harmonization of variables values was achieved to obtain the lowest common denominator for the two used datasets (national censuses, EU-SILC) in both countries (Luxembourg, Belgium) and for the two years (1991, 2001). The major concern was to preserve the greatest information complexity related to individual dimensions (e.g. maximum number values per variable) as well as to maintain forceful comparisons between data sources (e.g. between countries and years).

A significant back and forth adjustment work has been made, first, to ensure sufficient data frequencies in all databases for each variable and, secondly, to obtain mean scores significantly different between values of a single variable. The choice of final values has been validated by controlling the confidence intervals of scores values calculated for each dimension (education, socio-professional status, dwelling). The main objective that has guided this validation steps was to obtain consistent ranked scores that

are significantly different. That is to ensure scores values with confidence intervals (<0.95) with the least possible encroachment on each other.

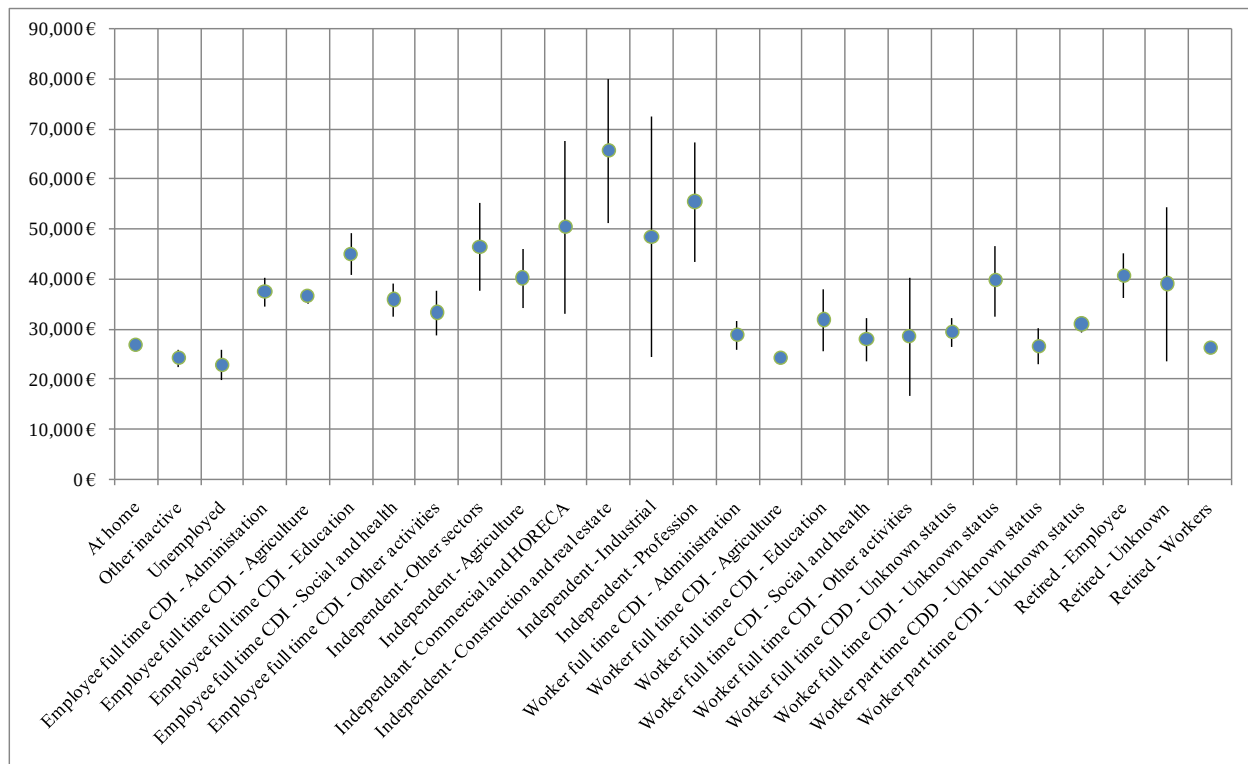


Figure 7 – Example of comparable values between all used databases for socio-professional status in Luxembourg for 2001

Figure 7 shows an example of comparable values between all datasets for the socio-professional status dimension in Luxembourg for 2001 (with non-standardized EDHI). The points show the scores value along with the extent of their confidence intervals. A considerable number of values can be observed. However, these scores cannot be cross-compared because of encroachment according to their confidence intervals (e.g. values with scores not significantly different among other). An illustrative example is the overlapping scores for '*Independent in agriculture*', '*Independent in construction*' and '*Independent in commerce and HORECA*'. Figure 8 shows a simplified harmonization solution for the same variable in Luxembourg for 2001. The points show the scores value along with the extent of their confidence intervals. Although the solution is offering fewer values, the latter are statistically stronger.

However, maintaining a purely statistical approach has not been possible, especially for the housing dimension. As observed on figure 8, specific variable values scores are relatively similar. This is not necessarily inconsistent with a social approach where individuals with similar position (EDHI) for the education dimension can be placed on different position according to their life cycle. Though different positioning could be observed according to employment (unemployed or employee) and dwelling (house or studio) dimensions. Such cases have been checked later in the project with illustrative variables available in national censuses (age, household type, nationality, etc.).

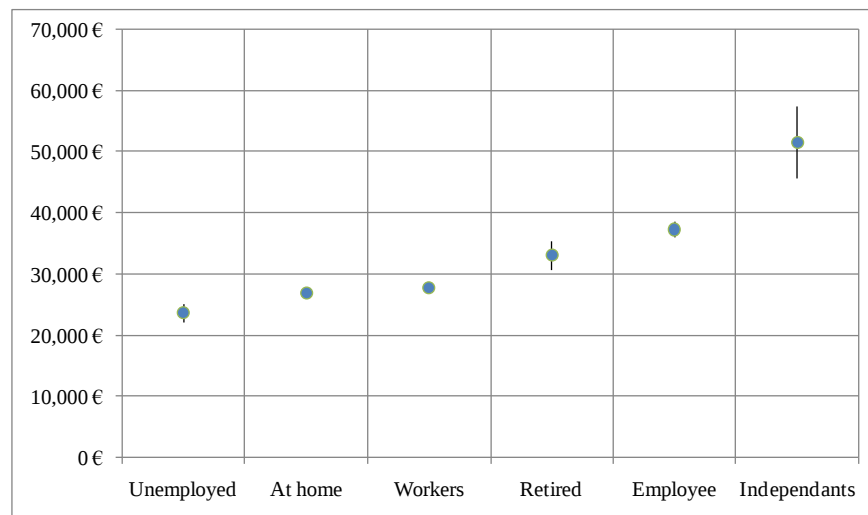


Figure 8 – Example of aggregated values for socio-professional status in Luxembourg for 2001

Validation of scores calculation and individual imputation method

Another validation procedure was interested in the scores calculation and their imputation methodology from the EU-SILC to both Luxembourgish and Belgian censuses. It concerned the education and socio-professional dimensions only. Since these variables are related to individual resources / capitals, contrary to dwelling for the whole household, two calculation methods and imputation scores were conducted and validated by the range of the inequalities results - the purpose being to maintain the greatest range between the top and the bottom of the socio-economic scale.

The first method used the entire representative sample of the EU-SILC panel to calculate each dimensions scores, as well for active as inactive persons. The standardized EDHI median for each variables value (e.g. primary diploma, bachelor degree, etc.) was subsequently imputed to the individuals with the same value in the national census for the year of reference (1995 for 1991; 2003 for 2001). The second method considered only sub-groups in population for calculating standardized EDHI scores: only active individuals for education dimension; only head of household for socio-professional statuses. The underlying assumption was trying to consider only individuals who are effectively using their resources / capitals in socio-economic life. This second score was subsequently imputed to individuals with the same characteristics in censuses. The first score calculation method has been chosen since it offers the widest ranges of scores, i.e. the greatest inequalities magnitude on the socio-economic scale.

3. Evolution of Social Inequalities on the Territory

In this final section, we present and discuss the results of scores from a territorial perspective. In connection with the objectives of DESTINY, this part of the research primarily aimed to establish a comparative map basis. In addition, this work stage has settled on harmonized legend maps the scores for the three dimensions previously discussed. The scores for the two countries were calculated and standardized in order to be compared: between countries and between variables. This standardization was carried out according to each country using their national means. The following sections expose maps for scores on a single Luxembourg / Belgium basis; the frequencies of scores are also presented in appendix for both countries.

3.1. Spatial perspective for education scores

In regard to education scores there was a strong spatial structure in Luxembourg and in Belgium, both for 1991 (figure 9) and 2001 (figure 10). In Luxembourg, a major polarization of the most favored scores is observed in the capital agglomeration and its periurban areas. According to that, there is a fairly consistent decline toward the

country's borders. The most urban and industrial areas located in the south of Luxembourg, caught up between 1991 and 2001 by desindustrialization processes, were among the lowest positioned jointly with rural areas in the north.

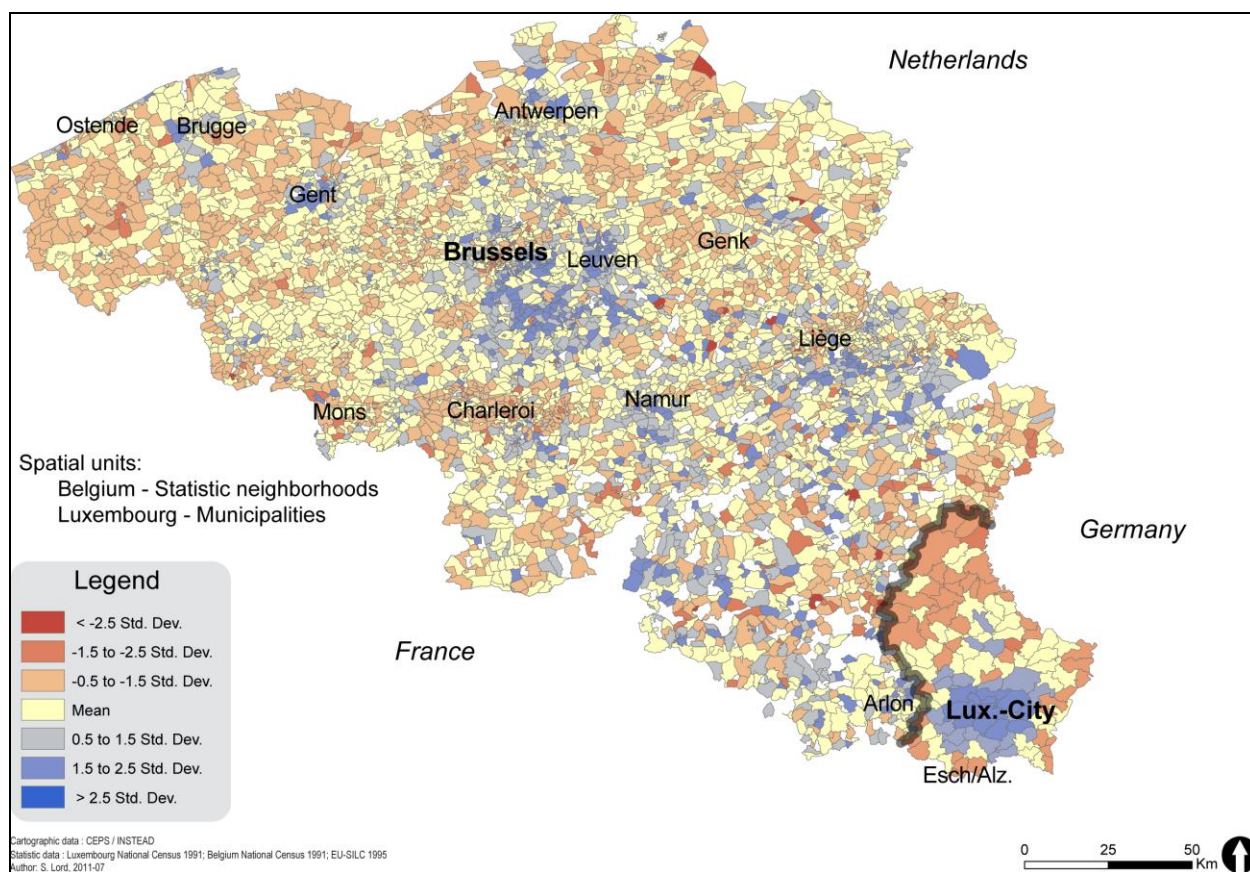


Figure 9 – Territorial inequalities in education for Luxembourg and Belgium in 1991

In 1991, with the exception of Flemish cities of Brugge, Gent, Antwerpen and Leuven, most of major Belgian urban centers, especially in Wallonia as “Old Walloon Industrial Area”, have most of the lowest values. On the contrary, all the country's suburban and periurban neighborhoods, especially in the case of Brussels and Leuven, were concentrating the country's highest scores for education.

The national mean scores for education have significantly improved in both countries between 1991 and 2001. Virtually no changes in the territorial structure are recognized. This being said, we observe a segregation strengthening as for Luxembourgish and Belgian territories. This is particularly the case for the industrial

regions in decline in both countries: south of Luxembourg and Old Walloon Industrial Area.

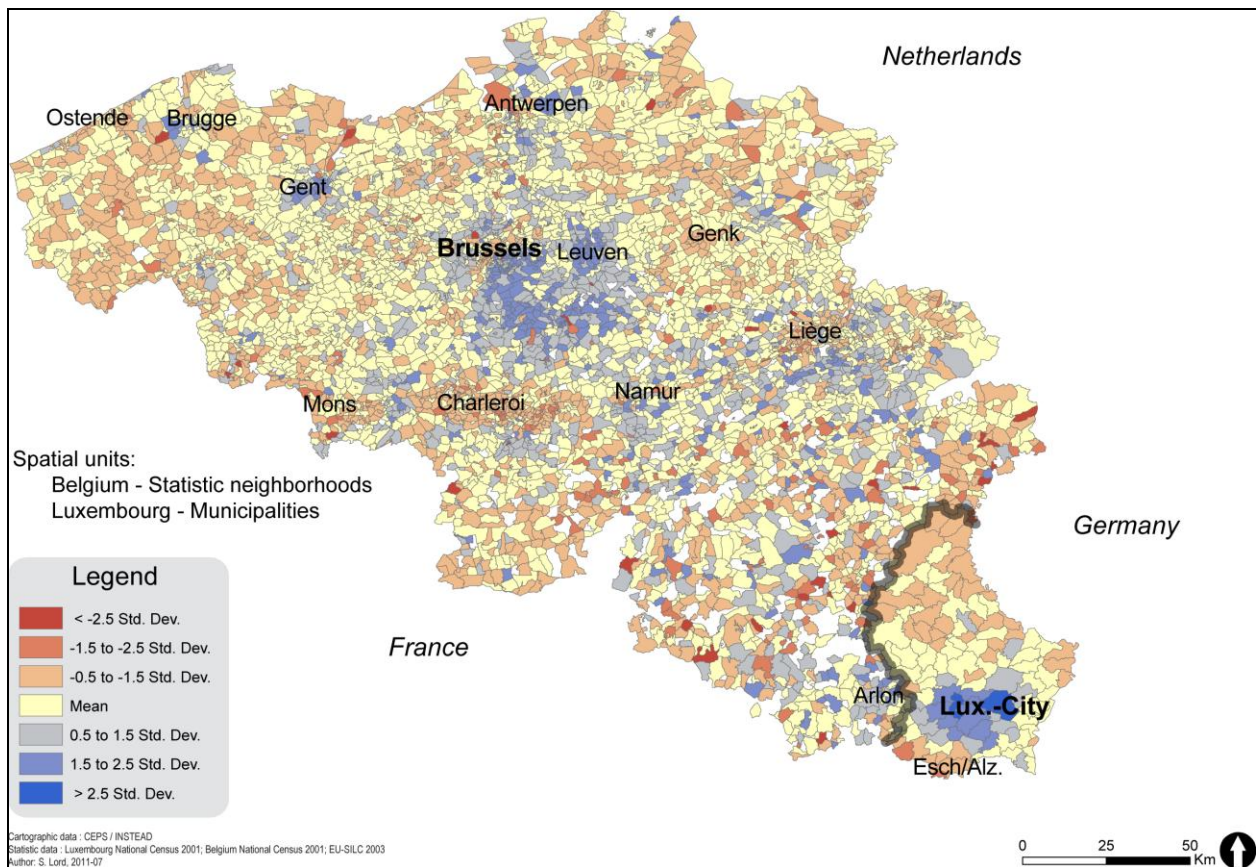


Figure 10 – Territorial inequalities in education for Luxembourg and Belgium in 2001

3.2. Spatial perspective for socio-professional status scores

If map for socio-professional status score is similar to education ones, few differences need to be underlined for both countries. In 1991, in addition to the Old Walloon Industrial Area and the south of Luxembourg, low values are also concentrated in the other old mining area, in the Kempen located in the North-East of Belgium. The suburban and periurban rings of the capitals (Luxembourg and Brussels), as well as some borders areas like Arlon, are found the most advantaged with scores very high for socio-professional status (figure 11).

In 2001, still about the scores of socio-professional status, as seen above there is a considerable improvement of scores for the two countries. This significant improvement nevertheless retains a strong spatial structure. The two capitals, Luxembourg and Brussels, strongly structure the top of the socio-economic scale where suburban and periurban rings are being heavily favored. We note that Luxembourg-City remained in the average (figure 12).

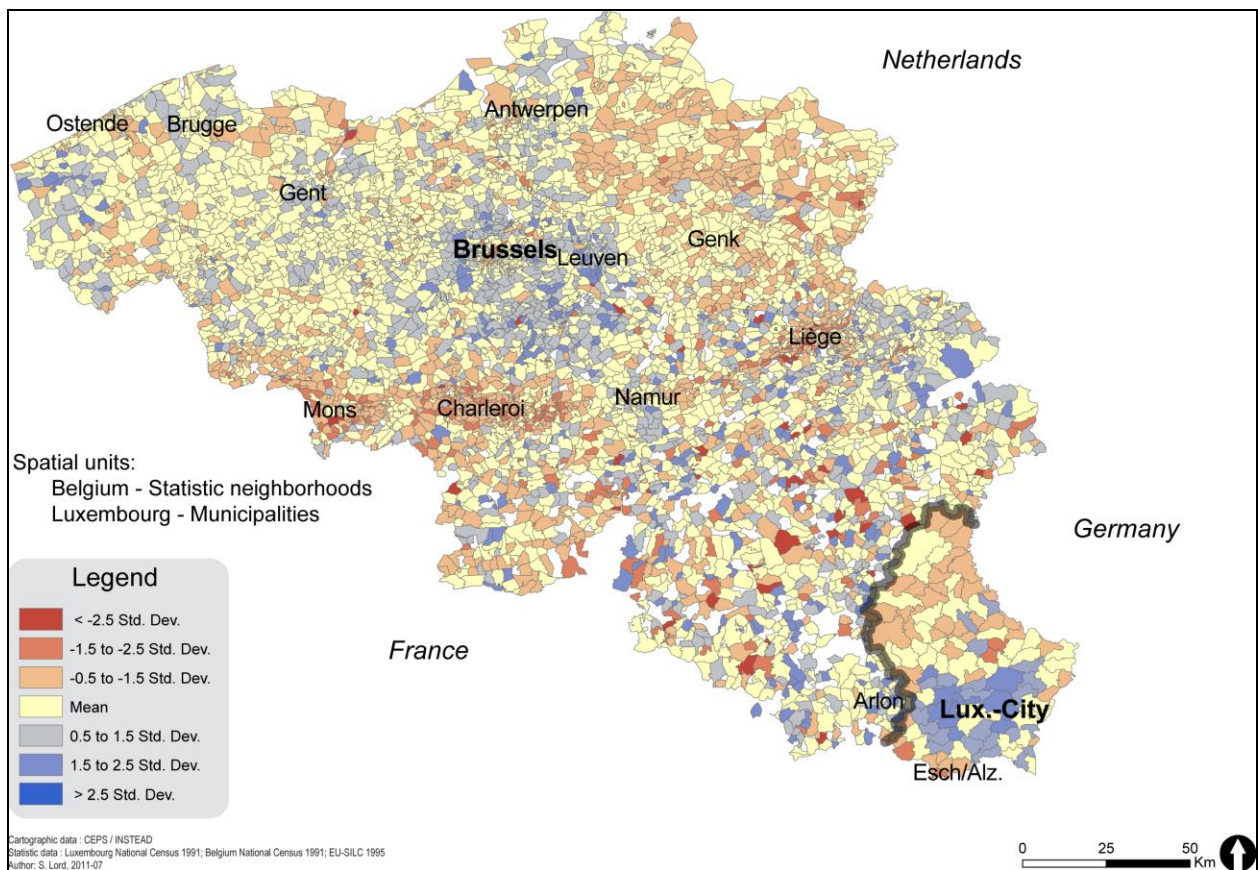


Figure 11 – Territorial inequalities in socio-professional status for Luxembourg and Belgium in 1991

The industrial parts in the south of Luxembourg, as well as Belgian cities from Old Walloon Industrial Area, already disadvantaged in 1991 are found even more disadvantaged for 2001. They seem to concentrate the lower scores for the two countries. For the Belgian side, the major changes are observed for the Kempen area where the region shows higher values, around the average, for 2001. Finally, we note that the lowest values observed in Brussels for 1991 tend to extend inside the agglomeration in 2001, while it is not the case for Luxembourg-City.

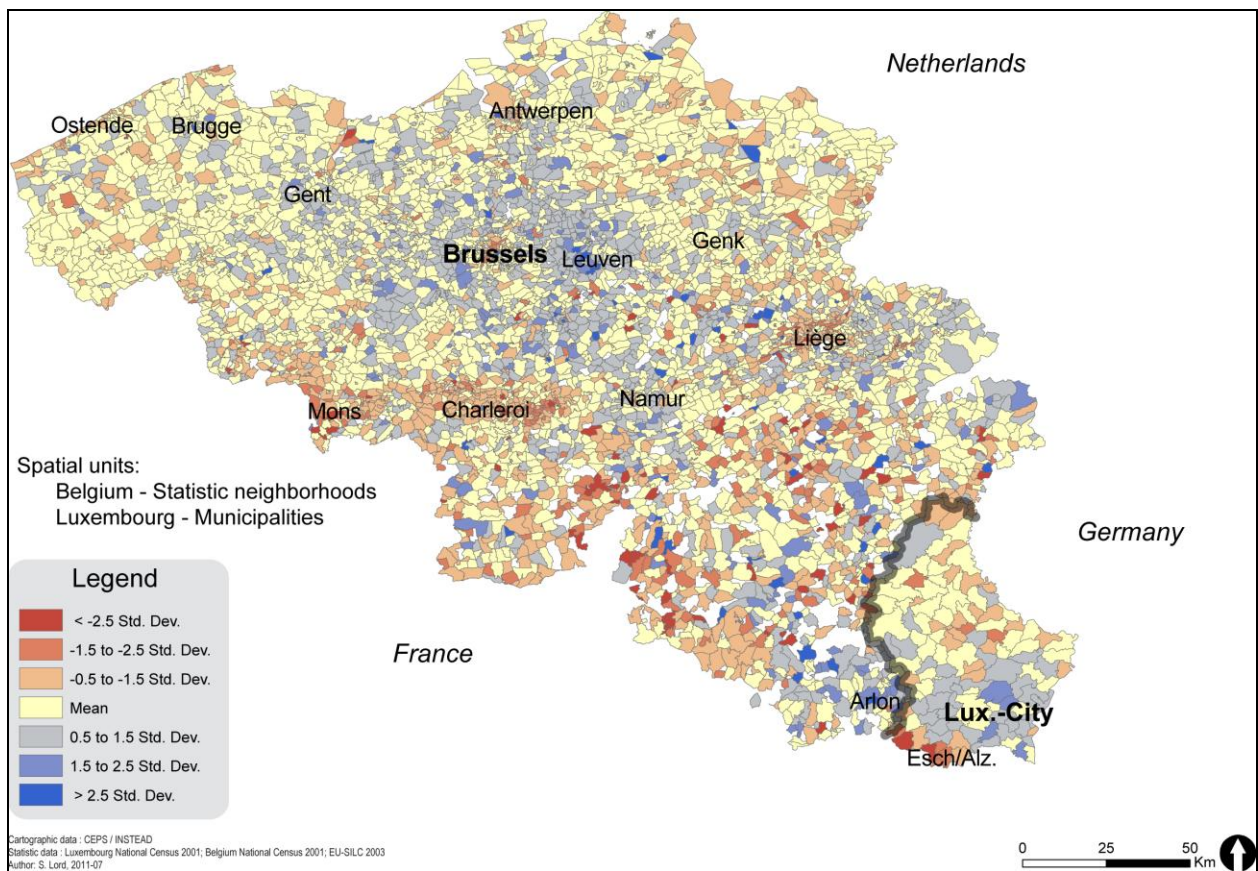


Figure 12 – Territorial inequalities in socio-professional status for Luxembourg and Belgium in 2001

3.3. Spatial perspective for housing scores

If the scores for the housing dimension in 1991 and 2001 also appear spatially structured in Luxembourg and Belgium, this structure is relatively different than dimensions of education and socio-professional status. Scores of worse and better housing seems much more structured according to the continuum urban-suburban-rural, where the better housing scores are observed in suburban milieus.

For Luxembourg, the periphery of the agglomeration of Luxembourg-City in 1991 concentrated the highest scores of the country. The lowest values for housing are found in the industrial municipalities in the south, in the center of the capital and in different small towns all around the country, particularly in the North and the East. Specifically it is the age and the equipment of the housing stock that is expressed through these scores,

where the Capital periurban rings concentrate more recent buildings with better level of comfort (figure 13).

For housing scores in Belgium in 1991 we can observe the classic opposition East / West. Flanders and Hainaut (West) have older housing stocks than Kempen (East) or all the suburban / periurban areas (around Brussels, Antwerp...). As we observed for Luxembourg, we note that many of urban municipalities of the country, especially in Brussels and Wallonia regions, are characterized by the lowest values for housing scores.

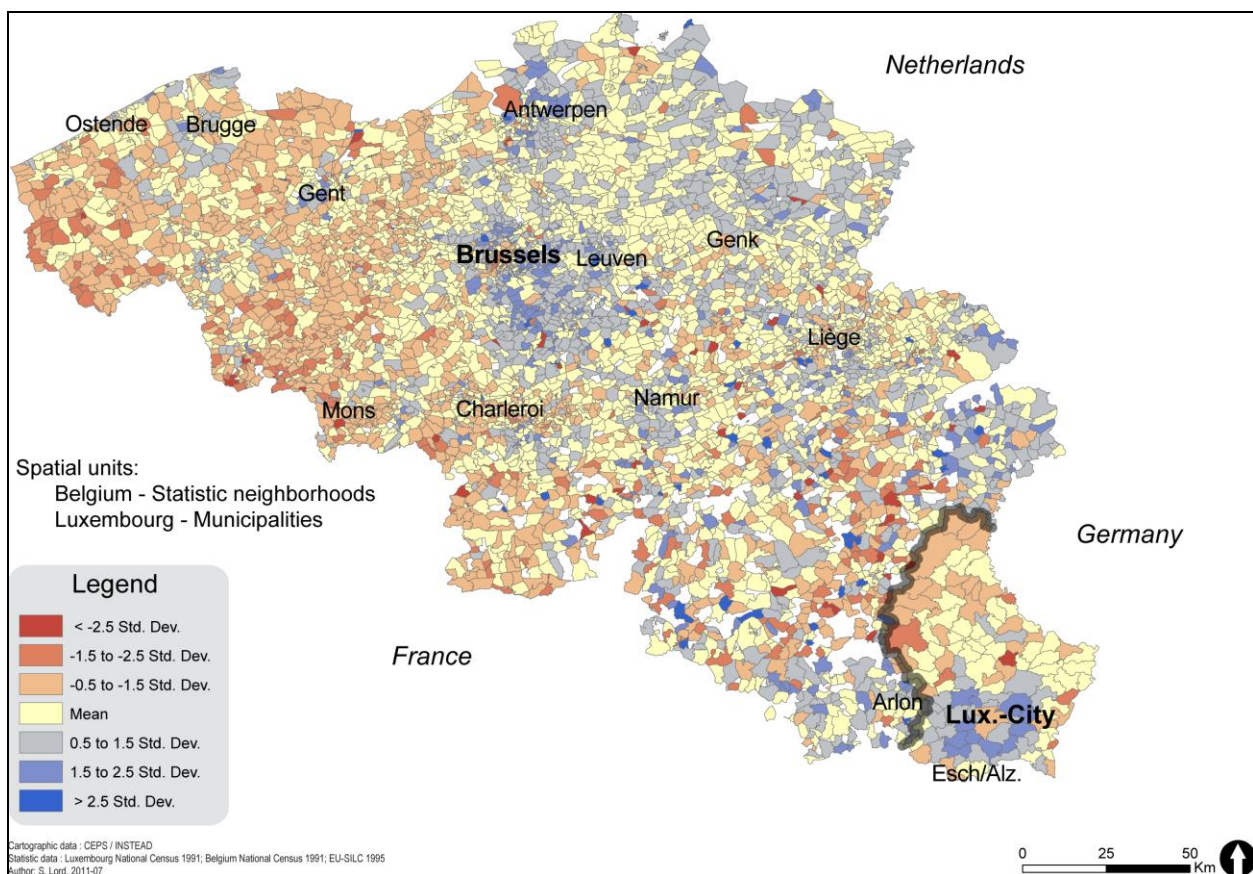


Figure 13 – Territorial inequalities in housing for Luxembourg and Belgium in 1991

The evolution of housing scores between 1991 and 2001 shows for Luxembourg a significant improvement. Several municipalities have moved closer to average. This being said, the same spatial structure remains in place. The periurban rings of Luxembourg-City further concentrate the best housing scores. The farer periphery around the capital has caught up the average. However, the urban cities in the North and

East of the country, the center of the capital and the industrial municipalities of Southern part of the country remained with lowest scores, and even lower than in 1991. These specific areas have not benefited from the national overall improvement.

Such as Luxembourg, Belgium also saw the scores improve significantly for housing dimension. A number of municipalities overtook the national average, and even spent the highest values of 1991. This applies to the suburban periphery of Brussels and to the Northeast of the country, much of Flanders with among others the areas of Kempen. If the West of the country was at the level of the national average, there are several municipalities that concentrate the lowest housing scores. This is particularly the case for Old Walloon Industrial Area (Mons, Charleroi and Liège). Finally several municipalities or border areas in the West of the country have relatively high housing scores. This is the case for Arlon where the positive influence of the Luxembourg-City seems to sprawl across the border.

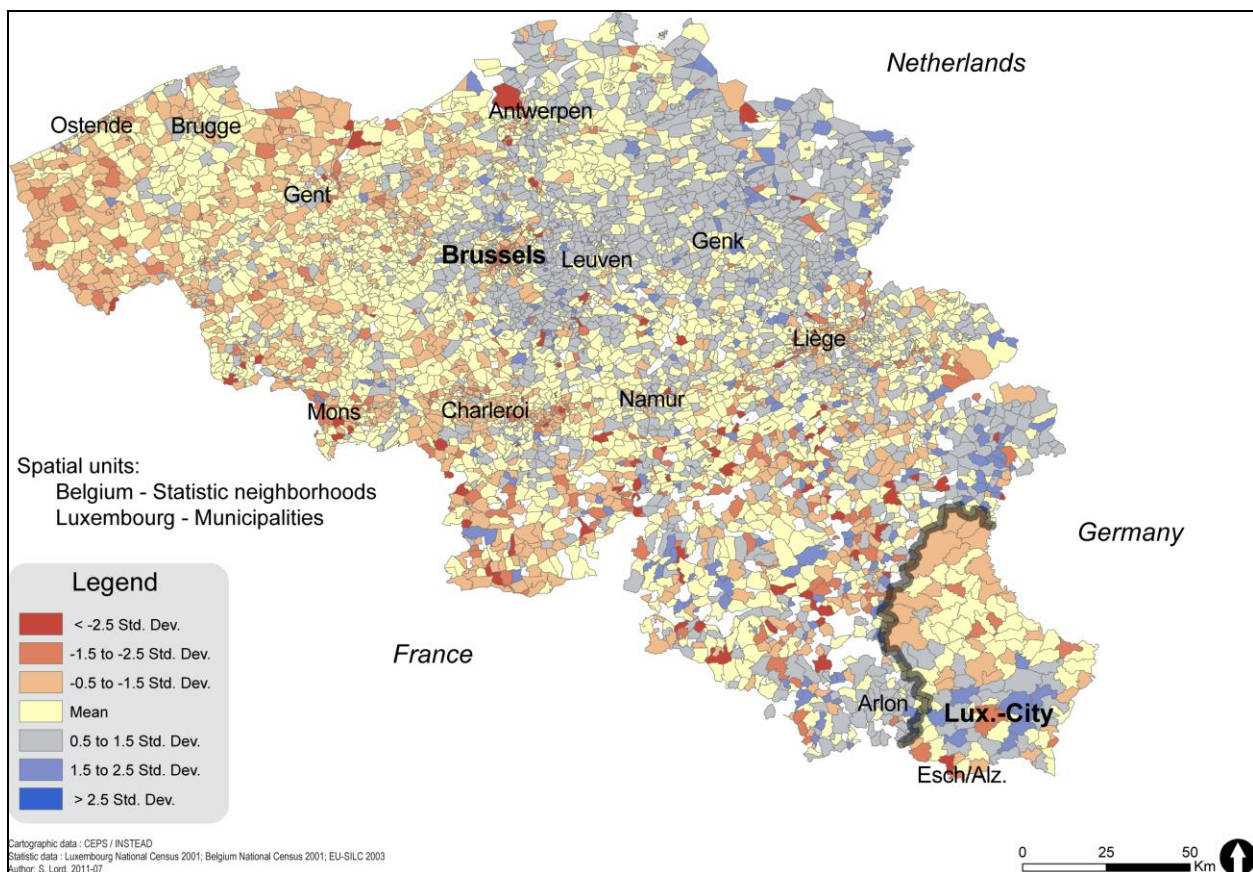


Figure 14 – Territorial inequalities in housing for Luxembourg and Belgium in 2001

Conclusion and Research Perspectives for DESTINY

The main objective of the DESTINY project is to analyze both longitudinally and spatially social inequalities in Belgium and Luxembourg. This research is mainly based on the possibility of coupling at the individual level survey data and censuses data in Luxembourg and Belgium. In order to operate a multidisciplinary analysis of social inequalities, the populations of both countries have been ranked along a socio-economic continuum that reveals social inequalities. This ranking has been done using three dimensions: education, socio-professional status and housing. Then this paper has reported the first phase of the project and presented in details the scoring method used to classify the individuals of the two countries.

An empirical framework that integrates both individual and household resources / capitals has been jointly developed in both countries. Panel data were used to measure the standard of living conditions (all sources of incomes) at the individual / household levels. In Luxembourg and Belgium, two waves of PSELL/EU-SILC surveys were linked to census data (panel of 1995 for 1991 census; panel 2003 for 2001). To position each individual into national exhaustive censuses, the disposable income per consumption units has been used, which weight the number of individuals constituting the household. The average income was calculated for each values of the variables common to both databases (panels and censuses) and standardized. This gives a score (positive or negative) for explored dimensions in 1991 and in 2001.

The calculated scores are consistent with the social and economic development of both countries. In addition they accurately reflect the evolution of territories and populations. For the three explored dimensions (education, socio-professional status and housing) significant overall improvements have been observed between 1991 and 2001. The mapping of these evolutions, however, shows that they are unequal in the territories. A strong polarization of the top of the social ladder is observed for the two National Capitals and major cities, more specifically their suburban peripheries including cross-borders areas such as Arlon close to the agglomeration of Luxembourg-City. The former mining and industrial areas in both countries (e.g. South of Luxembourg and Old

Walloon Industrial Area) remained at the bottom of the socio-economic continuum, or even slightly dropped to a lower position in 2001 compared to 1991. This first step of analysis allows pointing polarization and segregation dynamics that seem to have strengthened and expanded unequally on the two territories in between 1991 and 2001.

Social inequalities are then observable and may also reveal, on the one hand, the more or less privileged social groups and, on the other hand, some social sub-categories and subgroups in the population of both countries. On the basis of the scores presented in this paper, the next steps of the DESTINY project will thus enhance these inequalities for both social and territorial perspectives. The main idea is to follow – longitudinally for Belgium and transversally for Luxembourg – the evolution of inequalities for individual and their probabilities to escape / fall into deprivation situation. Besides the aggregation of individuals with socio-economic proximity (scores) along the social continuum will allow constructing social groups (in 1991 and in 2001) as well as developing territorial typologies. Descriptive, multivariate and probabilistic analysis will then be conducted with some illustrative variables (type and size of household, health, age, gender and nationality, etc.) from censuses in order to understand the structures of inequalities and the trajectories associated with them.

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Appendix

Values	1995	2003
	<i>Standardized score</i>	<i>Standardized score</i>
0. No diploma	-0,68	-0.67
1. Primary	-0,56	-0.46
2. Technical and professional	-0,14	-0.23
3. Secondary general	-0,01	0.09
4. Secondary superior / university	0,66	0.46

A.1. Luxemburgish scores values for education dimension

Values	1995	2003
	<i>Standardized score</i>	<i>Standardized score</i>
0. No diploma	-0.52	-0.49
1. Primary	-0.40	-0.40
2. Technical and professional	-0.08	-0.10
3. Secondary general	0.31	0.13
4. Secondary superior / university	0.61	0.54

A.2. Belgian scores values for education dimension

Values	1995	2003
	<i>Standardized score</i>	<i>Standardized score</i>
1. Unemployed	-0,89	-0,62
2. Worker	-0,61	-0,35
3. At home	-0,33	-0,35
4. Retired	-0,31	-0,24
5. Unspecified active	-0,01	-0,12
6. Other inactive	0,07	-0,43
7. Independent / professional	0,21	0,40
8. Public employee	0,22	0,09
9. Private employee	0,30	0,40

A.3. Luxemburgish scores values for socio-professional status dimension

Values	1995	2003
	<i>Standardized score</i>	<i>Standardized score</i>
1. Unemployed	-0.47	-0.50
2. Other inactive	-0.48	-0.45
3. At home	-0.37	-0.44
4. Retired	-0.22	-0.26
5. Worker	-0.09	0.05
6. Independent / Professional	0.17	0.07
7. Public employee	0.35	0.43
8. Private employee	0.44	0.63
9. Unspecified active	0.22	0.30

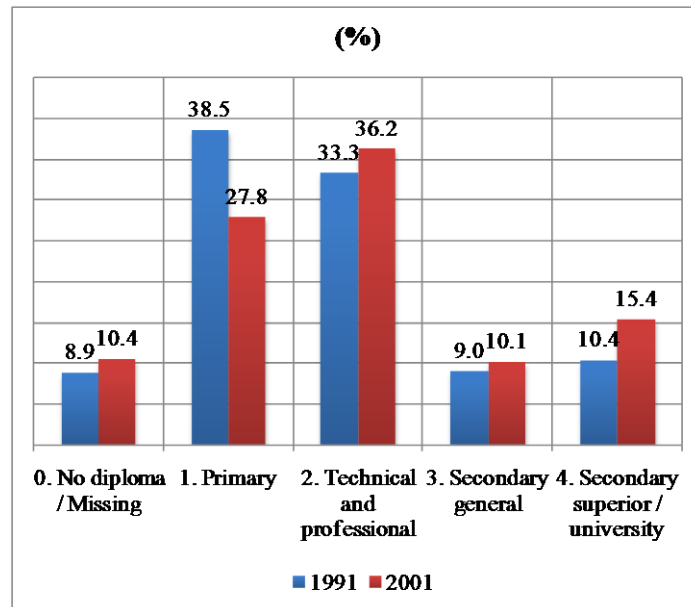
A.4. Belgian scores values for socio-professional status dimension

Values (Cumulative according to renter or owner status)	1995	2003
	<i>Standardized score</i>	<i>Standardized score</i>
1. Insalubrious dwelling – Renter	-1.01	-0.67
2. Insalubrious dwelling – Owner	-1.01	-0.54
3. Salubrious dwelling – Renter	-0.83	-0.71
4. Salubrious dwelling – Owner	-0.63	-0.52
5. With phone and >1 room per person – Renter	-0.67	-0.63
6. With phone and >1 room per person – Owner	-0.51	-0.40
7. With central heating – Renter	-0.26	-0.33
8. With central heating – Owner	-0.12	-0.17
9. With >2 room per person – Renter	-0.26	-0.34
10. With >2 room per person – Owner	-0.12	-0.27
11. With computer – Renter	0.64	0.01
12. With computer – Owner	0.48	0.21

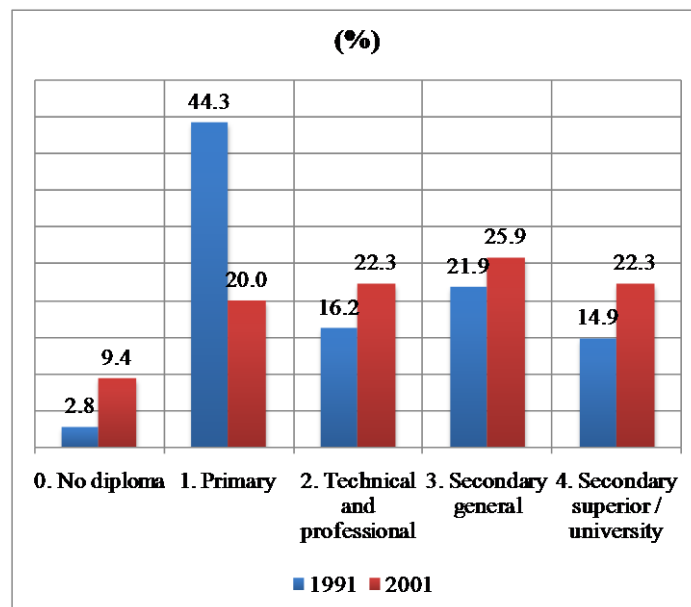
A.5. Luxemburgish scores values for housing dimension

Values (Cumulative according to renter or owner status)	1995	2003
	<i>Standardized score</i>	<i>Standardized score</i>
1. Insalubrious dwelling – Renter	-0.43	-0.60
2. Insalubrious dwelling – Owner	-0.41	-0.59
3. Salubrious dwelling – Renter	-0.21	-0.48
4. Salubrious dwelling – Owner	-0.01	-0.18
5. With phone and >1 room per person – Renter	0.29	-0.13
6. With phone and >1 room per person – Owner	-0.45	-0.38
7. With central heating – Renter	-0.31	-0.36
8. With central heating – Owner	-0.19	-0.27
9. With >2 room per person – Renter	0.10	0.26
10. With >2 room per person – Owner	0.35	0.14

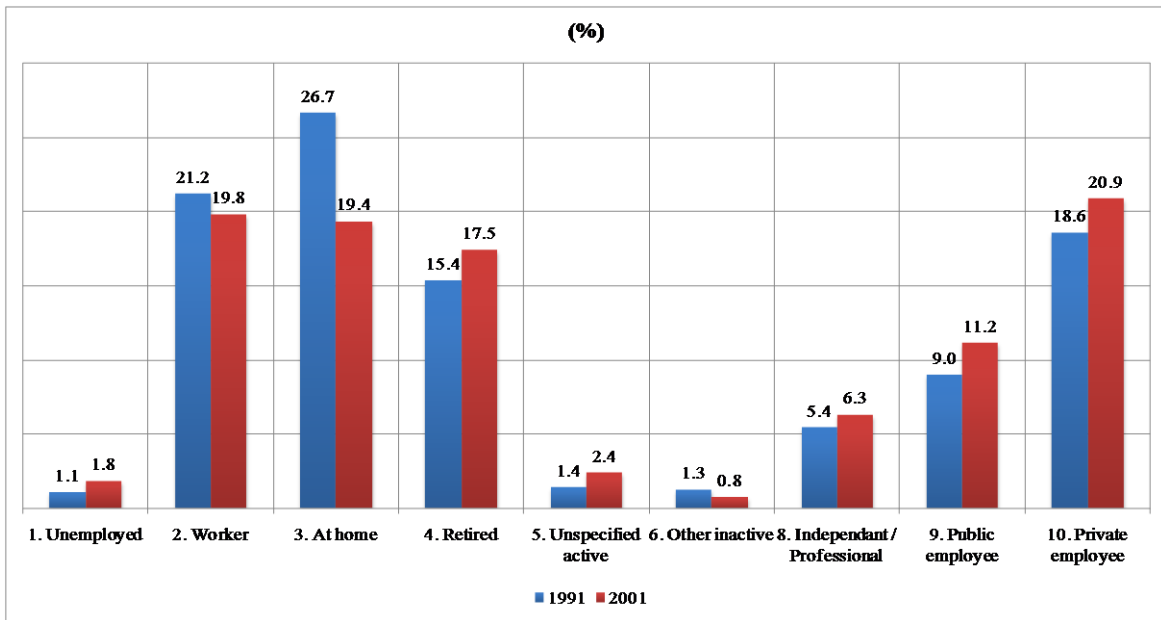
A.6. Belgian scores values for housing dimension



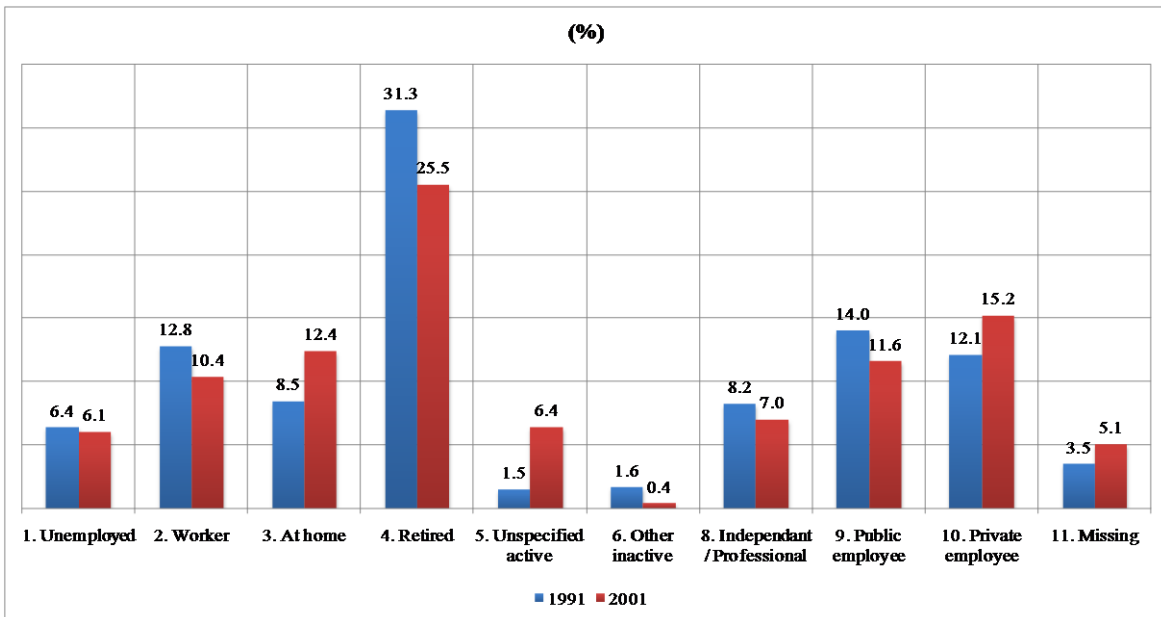
A.7. Census frequencies for education dimension in Luxembourg for 1991 (N=280 432) and 2001 (N=300 331)



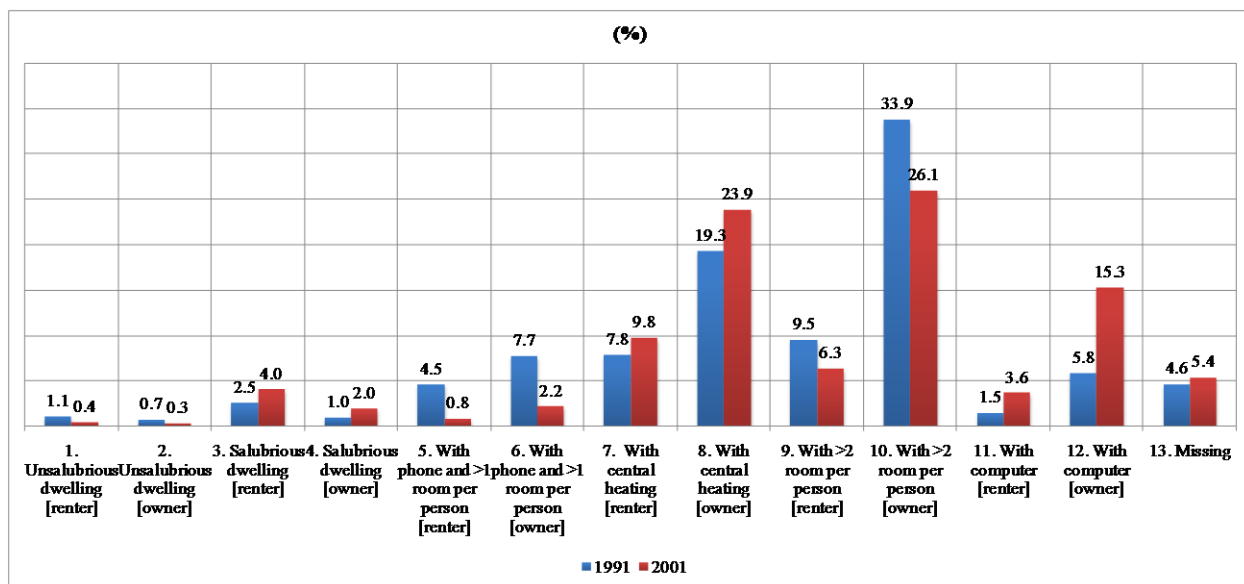
A.8. Census frequencies for education dimension in Belgium for 1991 (N=7 318 206) and 2001 (N=7 783 968)



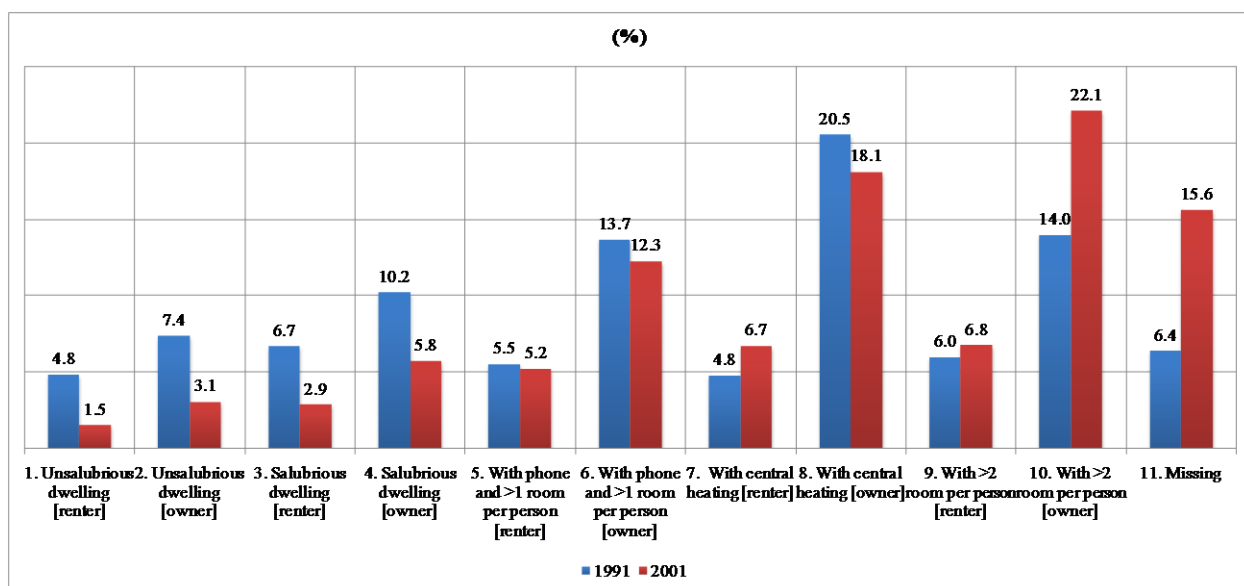
A.9. Census frequencies for socio-professional dimension in Luxembourg for 1991 (N=280 432) and 2001 (N=300 331)



A.10. Census frequencies for socio-professional dimension in Belgium for 1991 (N=7 318 206) and 2001 (N=7 783 968)



A.11. Census frequencies for dwelling dimension in Luxembourg for 1991 (n=280 432) and 2001 (n=300 331)



A.12. Census frequencies for dwelling dimension in Belgium for 1991 (N=7 318 206) and 2001 (N=7 783 968)



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