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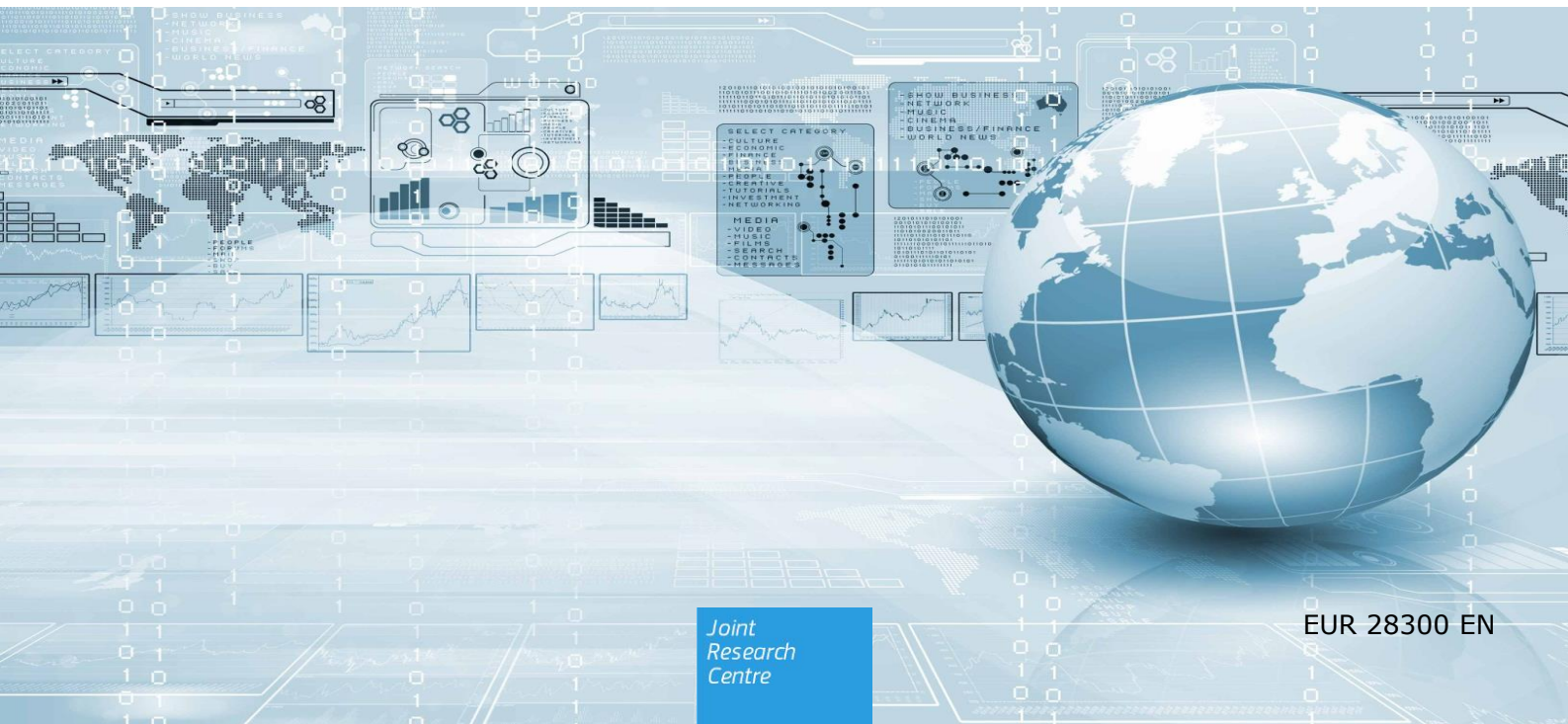
Conversion of regional data between NUTS classifications

Adapting the RHOMOLO database to different uses

López-Cobo M.

2016



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EUR 28300 EN

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JRC Science Hub
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JRC104030

EUR 28300 EN

PDF ISBN 978-92-79-64453-5 ISSN 1831-9424 doi:10.2791/039045

Luxembourg: Publications Office of the European Union, 2016

How to cite: López-Cobo M. (2016); Conversion of regional data between NUTS classifications. Adapting the RHOMOLO database to different uses; EUR 28300 EN; doi:10.2791/039045

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Acknowledgements

The author acknowledges the comments and suggestions from Francesco Di Comite and thanks all the members of the REMO team for their collaborative working.

Abstract

This technical report presents the methodology followed to transform regional data between different NUTS classifications in RHOMOLO, the spatial computable general equilibrium model developed by the European Commission to evaluate the impact of Cohesion Policy. This method has been designed for the conversion between NUTS 2006 and NUTS 2010 in both directions, but the same philosophy can be extended to transform data between any pair of NUTS classifications. It has been applied to the construction of two regional databases for RHOMOLO-v2 in 2010, one covering the EU-27 regions according to NUTS 2006, the other for the EU-28 regions according to NUTS 2010.

Keywords: NUTS, EU-28, regional database.

JEL Codes: D57, E16, R10.

1. Introduction

RHOMOLO-v2 is a spatial computable general equilibrium model developed by the Directorate General Joint Research Centre (DG JRC) and the Directorate General for Regional and Urban Policy (DG REGIO) of the European Commission. This model has been designed to evaluate the effects of Cohesion Policy on economic growth for all the regions of the European Union. In fact, RHOMOLO has already been used to assess the impact of Cohesion Policy for the 2007-2013 Programming period and will be used for the ex-ante impact assessment for the period 2014-2020. A full description of the model can be found in Mercenier et al. (2016).

In order to capture the characteristics of regions and interregional connections, the database has been built at the NUTS 2 level. The Nomenclature of Territorial Units for Statistics, abbreviated NUTS (from the French version *Nomenclature des unités territoriales statistiques*), is a hierarchical classification system to divide the EU territory for the purpose of collection, development and harmonisation of EU regional statistics, and socio-economic analyses of the regions and for the framing of EU regional policies. There are three levels -NUTS 1, 2 and 3 respectively, moving from larger to smaller territorial units-. NUTS 2 levels correspond to regions for the application of regional policies, Eurostat (2011). The first NUTS was adopted in May 2003 –NUTS 2003- and since then three major revisions have been implemented –NUTS 2006, NUTS 2010 and NUTS 2013-.

A number of data sources are used by RHOMOLO to apprehend the regional and sectoral characteristics and spatial connections in the base year 2010: a set of 28 national Social accounting matrices (SAMs) has been built for the EU-28, and further regionalised at NUTS 2 level, to capture the circular flow of income for the economy in the regions; an interregional transport cost matrix is used to estimate iceberg-type transport cost between regions; the interregional trade flows show the spatial connections; a set of elasticities model the choices made by the economic agents; the Herfindahl indices are used to estimate the number of firms at country-sector level.

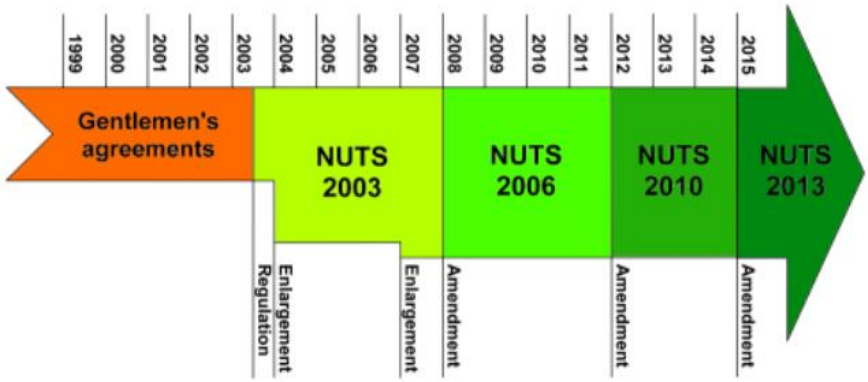
The main sources for the construction of the SAMs at national level are the Supply and use tables from the World Input Output Database and National Accounts from Eurostat (Álvarez-Martínez and López-Cobo, 2016). For the regionalisation process a non-survey method is applied, making extensive use of regional data available from Eurostat, as well as interregional trade flows data. A description of the methodology can be found in López-Cobo (2016). The data used to build the regional SAMs come from several sources, often developed under different sectoral (activity) or regional classifications. The available regional data from Eurostat for the year 2010 follows the NUTS 2010 classification; while the interregional trade flows have been built under the NUTS 2006 version, based on Thissen et al. (2015). Ultimately, the Cohesion Funds allocated during the 2007-2013 Programming period referred to NUTS 2006 regions, which explains the initial development of the database for RHOMOLO under the NUTS 2006 version. On the other hand, the funds programmed for the period 2014-2020 will be allocated to the NUTS 2010 regions, so both classifications must be used.

Therefore, a conversion procedure between different versions of the regional classification was needed. This report describes the procedure followed to convert data from NUTS 2010 to NUTS 2006 and backward, so that RHOMOLO-v2 can be used to assess the impact of the Cohesion policy irrespective of the programming period or regional classification. This is not a research paper but rather a technical note, intended for empirical economists dealing with data from different NUTS classifications. This paper's primary objective is to describe the decisions taken in the data conversion, as well as to stimulate and promote discussion rather than to provide a definitive solution.

2. History of NUTS, changes between classifications

The Commission Regulation (EC) 1059/2003 gave for the first time NUTS a legal status, after around thirty years of implementation and updating of the NUTS classification under a series of "gentlemen's agreements" between the Member States and Eurostat. The regulation also requires the stability of the classification for at least three years. Stability makes sure that data refers to the same regional unit for a certain period of time. This is crucial for statistics, in particular for time-series. However, sometimes national interests require changing the regional breakdown of a country. When this happens the country concerned informs the European Commission about the changes. The Commission in turn amends the classification at the end of period of stability according to the rules of the NUTS Regulation.

Figure 1. Evolution of NUTS classifications



Source: Eurostat

A first regular amendment to the annexes was adopted by Commission Regulation (EC) No 105/2007 and the NUTS version 2003 was replaced by version 2006 on 1 January 2008[1]. The second regular amendment to the annexes was adopted by Commission Regulation (EU) No 31/2011, NUTS 2010. The third regular amendment to the annexes was adopted by Commission Regulation (EU) No 1319/2013, NUTS 2013[2].

According to the regulations, in case of an amendment to the classification, the Member State concerned has to replace historical data by time series according to the new regional breakdown within two years. In such cases, the time series is substituted by one updated according to the newest classification, and the data following the previous classification are not available anymore from the Eurostat's website, not even under request. Due to this break in the series, if there is a need to use data according to and old version of the NUTS, a conversion procedure has to be applied. This conversion is sometimes straightforward, but in some cases more detailed information needs to be used.

There are mainly three types of changes that affect data: regions can merge, split or change boundaries. Changes in region names or codes do not affect data integrity and therefore are disregarded in this exercise. Table 1 summarises the changes between NUTS 2006 and NUTS 2010 that need to be addressed. Table A 1 in Annex provides the

[1] This was preceded by completions of the NUTS classification with the regional breakdowns of the countries that joined the EU in 2004 and 2007 (see Commission Regulation (EC) No 1888/2005 and Commission Regulation (EC) No 176/2008).

[2] The fourth, extraordinary amendment to the annexes was adopted by Commission Regulation (EU) No 868/2014, entered into force on 8 August 2014 and applicable, with regard to the transmission of data to the Commission (Eurostat), from 1 January 2016.

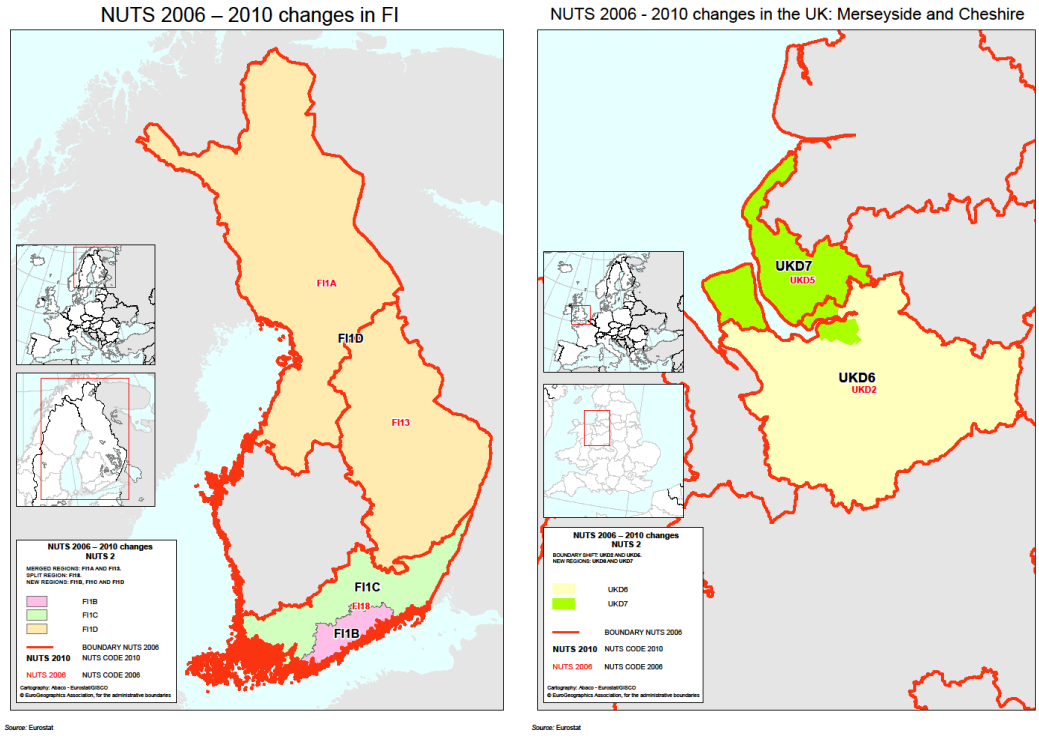
list of the 267 NUTS 2006 regions covered by RHOMOLO. Table A 2 in Annex shows the complete list of changes at NUTS 2 level from NUTS 2006 to NUTS 2010.

Table 1. Regions with changes between 2006 and 2010

Change from 2006 to 2010	NUTS 2006 code (old)	NUTS 2010 code (new)	Explanation (new = old)
1. Split	FI18	FI1B, FI1C	FI1B + FI1C = FI18, recalculation by NSI
2. Merge	DE41, DE42	DE40	DE40 = DE41 + DE42
	FI13, FI1A	FI1D	FI1D = FI13 + FI1A
3. Boundary shift	DED1, DED3	DED4, DED5	recalculation by NSI
	ITD5, ITE3	ITH5, ITI3	
	UKD2, UKD5	UKD6, UKD7	
Source: Own elaboration based on Eurostat.			

Figure 2 illustrates, on the left side, change type 1 –split- and type 2 -merge- with Finnish regions, and on the right side, type –boundary shift- of British regions.

Figure 2. Map showing the changes between NUTS 2006 and NUTS 2010 in NUTS 2 regions of Finland and United Kingdom



Source: Eurostat: http://ec.europa.eu/eurostat/web/nuts/history

3. Conversion from NUTS 2010 to NUTS 2006 and vice versa

3.1 Conversion from NUTS 2010 to NUTS 2006

A specific procedure is put in place to address each of the three types of changes described above. The procedure applied in each case differs, as does the accuracy of data obtained.

When a **region splits** into two regions, like is the case of FI18, Etelä-Suomi, which splits into FI1B, Helsinki-Uusimaa, and FI1C, Etelä-Suomi, the simple aggregation of data of these two NUTS 2010 regions provides the numbers corresponding to the original NUTS 2006 region. Whatever regional data we deal with, by aggregating we can reconstruct the original region data, not an estimation.

In the case of **merged regions** (for example the new FI1D, Pohjois- ja Itä-Suomi in 2010, is the aggregation of the old FI13, Itä-Suomi, and FI1A, Pohjois-Suomi in 2006), we need to use more detailed information to estimate data for the two old regions. By comparing the 2006 and 2010 versions of the classification, we can see that at the NUTS-3 level there is full correspondence between the two old regions and the new merged region (Table 2). In our example, we know that the four new NUTS 3 regions FI1D1 to FI1D4 match with the four old NUTS 3 regions composing FI13 (FI131 to FI134) and that the new FI1D5 to FI1D7 match with the old FI1A1 to FI1A3, with only code changes.

Table 2. Correspondence at NUTS 3 level in merged regions from 2006 to 2010. The case of Finnish regions

Code 2006	Code 2010	NUTS level 2	NUTS level 3	Change
FI13	***FI1D (part)***	*Itä-Suomi*		**Merged**
FI131	FI1D1		Etelä-Savo	Code change
FI132	FI1D2		Pohjois-Savo	Code change
FI133	FI1D3		Pohjois-Karjala	Code change
FI134	FI1D4		Kainuu	Code change
FI1A	***FI1D (part)***	*Pohjois-Suomi*		**Merged**
FI1A1	FI1D5		Keski-Pohjanmaa	Code change
FI1A2	FI1D6		Pohjois-Pohjanmaa	Code change
FI1A3	FI1D7		Lappi	Code change

Source: Eurostat.

Note: Labels correspond to version 2010, except if in italics (version 2006).

Note: NUTS 2010 codes in italics and with the note "(part)" are created from whole NUTS 2006 regions. Data can thus be aggregated from NUTS 2006 to NUTS 2010.

Hence, we are able to compute data for the NUTS 2 regions according to NUTS 2006 subject that we have it at NUTS 3 level according to NUTS 2010. We collect NUTS 2010 GVA data at NUTS 3 level broken down by sector[3] and reconstruct NUTS 2006 GVA data at NUTS 2 level for the same year by aggregation. To illustrate the procedure, we use total GVA not disaggregated by sector (Table 3). By doing this we have computed the exact GVA figure for the old regions FI13 and FI1A. However our aim is to obtain other regional data for these regions but, unfortunately, the availability of NUTS 3 level data in Eurostat is very scarce. As a consequence, we need to estimate data for the old regions

[3] Eurostat (2014). Regional economic accounts (ESA95). Gross value added at basic prices by NUTS 3 regions (NACE Rev. 2) (nama_r_e3vab95r2) [Data file]. Downloaded on 2014 July 29 from http://ec.europa.eu/eurostat/data/database. Not available anymore.

using their GVA data as a proxy. To this end, we compute the GVA shares of the NUTS-2 regions existing under version 2006 (the share of each individual region over the merged one), and multiply these shares by the regional data of the new aggregated region FI1D.

In our example, the GVA share of FI13 over FI1D is 47.49%; hence, we estimate the regional indicators other than value added needed for the SAM of FI13, such as compensation of employees, gross fixed capital formation, household accounts, etc., by multiplying these indicators observed for FI1D by this share. Similarly, we get data for FI1A. Here, the source of error primarily lies on the different relation that may exist in the economic variable between two regions, say compensation of employees, with respect to their GVA. If, for example, region FI13 had a higher productivity level than FI1A (computed as GVA over employment), and assuming unity salary over the regions (employment equals compensation of employees), we would be overestimating the compensation of employees in FI13 by applying the GVA share. In this case, other regional proxies showing the different productivity levels might be used to improve this estimation, but again we face the problem of data availability when it comes to NUTS 3 or even NUTS 2 level data.

Table 3. Reconstruction of GVA at NUTS 2 level according to NUTS 2006. Merged regions. Year 2010

NUTS 2010				NUTS 2006			
NUTS 2	GVA 2010	NUTS 3	GVA 2010	NUTS 3	NUTS 2	GVA 2010	GVA share
DE40	49,002	DE403	1,768	DE411	**DE41**	19,813	0.404323
		DE405	2,583	DE412			
		DE409	2,796	DE413			
		DE40A	3,669	DE414			
		DE40C	3,119	DE415			
		DE40D	1,806	DE416			
		DE40F	1,443	DE417			
		DE40I	2,630	DE418			
		DE401	1,619	DE421	**DE42**	29,190	0.595677
		DE402	2,482	DE422			
		DE404	4,765	DE423			
		DE406	4,267	DE424			
		DE407	1,798	DE425			
		DE408	2,075	DE426			
		DE40B	2,049	DE427			
		DE40E	3,215	DE428			
		DE40G	3,607	DE429			
		DE40H	3,313	DE42A			
FI1D	30,439	FI1D1	3,359	FI131	**FI13**	14,456	0.474905
		FI1D2	5,872	FI132			
		FI1D3	3,527	FI133			
		FI1D4	1,698	FI134			
		FI1D5	1,795	FI1A1	**FI1A**	15,983	0.525095
		FI1D6	9,769	FI1A2			
		FI1D7	4,419	FI1A3			

Source: Own elaboration.

Following this procedure at the sector level we obtain the GVA of the old regions sector (Table 4. Estimation of GVA by sector (NACE Rev.2) at NUTS 2 level according to NUTS 2006. Merged regions). These are not the final figures for GVA in these regions, since there is still the need to transform data from NACE Rev. 2 (Eurostat data) to NACE Rev. 1 (WIOD data), as explained in López-Cobo (2016).

Table 4. Estimation of GVA by sector (NACE Rev.2) at NUTS 2 level according to NUTS 2006. Merged regions. Year 2010

NUTS 2006							
NUTS 2	Total GVA	A	B-E	F	G-J	K-N	O-U
DE41	19,812.7	499.6	4,061.1	1,403.1	3,362.4	4,586.6	5,899.9
DE42	29,189.5	418.9	6,049.4	1,732.5	5,337.1	7,431.0	8,220.4
FI13	14,455.6	1,126.5	2,708.9	1,121.2	2,328.1	2,919.1	4,251.6
FI1A	15,983.3	665.4	3,823.5	1,211.7	2,739.5	3,109.4	4,431.7
GVA shares							
DE41	0.4043	0.5439	0.4017	0.4475	0.3865	0.3817	0.4178
DE42	0.5957	0.4561	0.5983	0.5525	0.6135	0.6183	0.5822
FI13	0.4749	0.6287	0.4147	0.4806	0.4594	0.4842	0.4896
FI1A	0.5251	0.3713	0.5853	0.5194	0.5406	0.5158	0.5104

Source: Own elaboration.

In the case of **boundary shifts**, there are two different cases:

a) those where the reproducibility of NUTS 2006 regions from NUTS 2010 cannot be reached despite the availability of NUTS 3 level data. This happens when at least one NUTS 3 region changed its boundaries between both classifications, capturing now part of the territory of another NUTS 3 region belonging to a different old NUTS 2 region. Therefore, since there is not full correspondence between NUTS 3 level regions of 2006 and 2010 versions of the classification, the old NUTS 2 region cannot be fully reproduced.

b) those where the reproducibility relies on the availability of information at NUTS 3 level, depending also on the direction in which we want to make the transformation, that is, from NUTS 2006 to NUTS 2010 or backwards. This is the case where an entire NUTS 3 region switches between two NUTS 2 regions but keeps its boundaries unchanged, only the boundaries of the NUTS 2 regions change.

Case a) corresponds to the British and Italian regions that shifted boundaries from 2006 to 2010 (Table 1). Here we illustrate the case with the British regions. In Figure 2 (right) and Table 5 we can see how the new region UKD7 (Merseyside) includes old UKD5 (Merseyside) plus part of UKD2 (Cheshire). The figure shows the NUTS 2010 regions in black font and coloured areas, and the NUTS 2006 boundaries with red lines. The NUTS 3 regions UKD51 (East Merseyside) and UKD21 (Halton and Warrington) have shifted boundaries by increasing their size (the former) to become UKD71 or reducing it (the latter) to become UKD61. The green area inside UKD6 shows the part of UKD71 that had belonged to UKD21 before. Data for the new NUTS 3 and NUTS 2 regions have been recomputed by the National Statistics Institute, but no further information is available to allow us to reconstruct the old regions. Therefore, on top of the source of error explained in the case of the merged regions, here we face an extra issue due to the fact that old NUTS 2 regions cannot be fully reconstructed even when NUTS 3 level data are available. Here we would put in place a two-step procedure: we would first aggregate data corresponding to the two new regions (UKD6 and UKD7) and disaggregate them into the two old regions (UKD2 and UKD5) using the GVA shares. But since it is not

possible to have GVA data corresponding to the boundary shift, but only to the whole new NUTS 3 region, we have to assume that the GVA of the NUTS 3 regions before (UKD21) and after the boundary shift (UKD61) are the same. Therefore, by neglecting the boundary shift of the NUTS 3 region, what we are assuming in practical terms is that the NUTS 2 regions have not changed. Consequently, NUTS 2 regions where one or several NUTS 3 regions have seen a boundary shift are not recomputed in fact, they stay untouched and data for the new NUTS 2010 region UKD7 are assumed to be the same as for the old NUTS 2006 region UKD5. Nevertheless, this boundary shift affects only one NUTS3 region in each NUT2 region. Therefore we can neglect the boundary shift and assume that data of the older region are approximately equal to data of the newer region.

Table 5. Correspondence at NUTS 3 level in the case of regions that shift boundaries from 2006 to 2010. Case a) British regions

Code 2006	Code 2010	NUTS level 2	NUTS level 3	Change
UKD2		*Cheshire*		**Boundary shift**
	UKD6	Cheshire		New region
UKD21			*Halton and Warrington*	**Boundary shift**
	UKD61		Warrington	New region
UKD22			*Cheshire CC*	Split
UKD22 (part)	UKD62		Cheshire East	New region
UKD22 (part)	UKD63		Cheshire West and Chester	New region
UKD5		*Merseyside*		**Boundary shift**
	UKD7	Merseyside		New region
UKD51			*East Merseyside*	**Boundary shift**
	UKD71		*East Merseyside*	New region
UKD52	UKD72		Liverpool	Code change
UKD53	UKD73		Sefton	Code change
UKD54	UKD74		Wirral	Code change

Source: Eurostat.
Note: Labels correspond to version 2010, except if in italics (version 2006).
Note: NUTS 2006 codes in italics and with the note "(part)" are split in a number of whole NUTS 2010 regions.

Similarly, the old ITD5 region (Emilia-Romagna) has a correspondence with the new ITH5 region with the same name. The only difference between ITD5 and ITH5 lies in that its ninth NUTS 3 region, ITD59 (Rimini), experienced a boundary shift, being transformed into the bigger ITH59 (Rimini). This boundary shift is in turn compensated by the complementary reduction in the old ITE31 (Pessaro e Urbino), which was part of the old NUTS 2 ITE3 (Marche), which are converted into the new ITI31 (Pessaro e Urbino) and ITI3 (Marche) respectively.

Case b) is represented by the German regions DED1 (Chemnitz) and DED3 (Leipzig) being transformed into the new DED4 and DED5 with same names. As shown by Table 6, at NUTS 3 level there are a few old regions merging into new ones, but at NUTS 2 level the only significant difference lies in the NUTS 3 region DED33 leaving the old NUTS 2 region DED3 to become part of the new DED4 (old DED1). Since DED33 does not become an entire new NUTS 3 region, but only a part of the new DED43, there is not full correspondence at NUTS 3 level between classifications. Consequently, even if we had NUTS 3 level data for the new regions, we would not be able to reconstruct the old NUTS 2 regions. However, if we were interested in the conversion in the other direction, from NUTS 2006 to NUTS 2010, we would be able to reconstruct entirely data for the NUTS 2 new regions using NUTS 3 level data of NUTS 2006 regions.

Table 6. Correspondence at NUTS 3 level in the case of regions that shift boundaries from 2006 to 2010. Case b) German regions

Code 2006	Code 2010	NUTS level 2	NUTS level 3	Change
DED1		*Chemnitz*		Boundary shift
	DED4	Chemnitz		New region
DED11	DED41		Chemnitz, Kreisfreie Stadt	Code change
DED12	*DED44 (part)*		*Plauen, Kreisfreie Stadt*	Merged
DED13	*DED45 (part)*		*Zwickau, Kreisfreie Stadt*	Merged
DED14	*DED42 (part)*		*Annaberg*	Merged
DED15	*DED45 (part)*		*Chemnitzer Land*	Merged
DED16	*DED43 (part)*		*Freiberg*	Merged
DED17	*DED44 (part)*		*Vogtlandkreis*	Merged
DED18	*DED42 (part)*		*Mittlerer Erzgebirgskreis*	Merged
DED19	*DED43 (part)*		*Mittweida*	Merged
DED1A	*DED42 (part)*		*Stollberg*	Merged
DED1B	*DED42 (part)*		*Aue-Schwarzenberg*	Merged
DED1C	*DED45 (part)*		*Zwickauer Land*	Merged
	DED42		Erzgebirgskreis	New region
	DED43		Mittelsachsen	New region
	DED44		Vogtlandkreis	New region
	DED45		Zwickau	New region
DED3		*Leipzig*		Boundary shift
	DED5	Leipzig		New region
DED31	DED51		Leipzig, Kreisfreie Stadt	Code change
DED32	*DED53 (part)*		*Delitzsch*	Merged
DED33	*DED43 (part)*		*Döbeln*	Merged
DED34	*DED52 (part)*		*Leipziger Land*	Merged
DED35	*DED52 (part)*		*Muldentalkreis*	Merged
DED36	*DED53 (part)*		*Torgau-Oschatz*	Merged
	DED52		Leipzig	New region
	DED53		Nordsachsen	New region

Source: Eurostat.
Note: NUTS 2010 codes in italics and with the note "(part)" are created from whole NUTS 2006 regions. Data can thus be aggregated from NUTS 2006 to NUTS 2010.

To estimate data for the old regions, DED1 and DED3, we can choose whether to assume that the contribution of the NUTS 3 region DED33 that switches between NUTS 2 regions is negligible, in which case we assume that data for the old DED1 region are the same as those for the new DED4 region, and DED3 equals DED5; or we can estimate the amount of DED4 figures due to DED33 and add it to DED5 data to approximate the old region DED3. Table 7 shows the composition of the 2010 NUTS 2 and NUTS 3 regions in terms

of 2006 NUTS 3 regions and the estimation of their GVA. Due to the lack of data at NUTS 3 level according to the 2006 classification, we can only assume that the three NUTS 3 regions constituting DED43 contribute equally to the GVA of the latter. This way, the estimated GVA of DED33 is one third of DED43 GVA. Now we can deduct the figure for DED33 (2,201.5) from DED4 (29,377) to estimate DED1 GVA (27,175), and similarly, add it to DED5 GVA to get an approximation to DED3 GVA. For indicators different than GVA, we can use the GVA ratios (old region's GVA over new region's GVA) to obtain a multiplier (0.925060) applicable to other economic indicators of the NUTS 2010 regions to get an estimation of their NUTS 2006 counter parts. As explained before, we are relying on the assumption that all economic variables are proportional to GVA or, in other words, the relationship between one economic variable in two regions is proportional to their GVA.

Table 7. Estimation of GVA at NUTS 2 level according to NUTS 2006. Regions with boundaries shift. Case b) German regions. Year 2010

NUTS 2010				NUTS 2006				
NUTS 2	GVA 2010	NUTS 3	GVA 2010	NUTS 3	Estimated GVA 2010	NUTS 2	Estimated GVA 2010	GVA ratio (NUTS 2006/ NUTS 2010)
DED4	29,377	DED41	5,904	DED11	5,903.8	DED1= DED4 - DED33	27,175	0.925060
		DED42	5,837	DED14	1,459.1			
				DED18	1,459.1			
				DED1A	1,459.1			
				DED1B	1,459.1			
		DED43	6,604	DED16	2,201.5			
				DED19	2,201.5			
				DED33	2,201.5			
		DED44	4,251	DED12	2,125.6			
				DED17	2,125.6			
		DED45	6,781	DED13	2,260.3			
				DED15	2,260.3			
				DED1C	2,260.3			
DED5	20,887	DED51	12,357	DED31	12,357.0	DED3 = DED5 + DED33	23,088	1.105399
		DED52	4,690	DED34	2,345.2			
				DED35	2,345.2			
		DED53	3,840	DED32	1,919.8			
				DED36	1,919.8			

Source: Own elaboration.

Following this procedure at the sector level we estimate the GVA of the old regions DED1 and DED3 by sector (Table 8). These are not the final figures for GVA in these regions, since there is still the need to transform data from NACE Rev. 2 (Eurostat data) to NACE Rev. 1 (WIOD data), as explained in López-Cobo, 2016.

Table 8. Estimation of GVA by sector (NACE Rev.2) at NUTS 2 level according to NUTS 2006. Regions with boundary shift. Case b) German regions. Year 2010

NUTS 2006							
NUTS 2 and NUTS 3	Total GVA	A	B-E	F	G-J	K-N	O-U
DED1	**27,175.1**	**253.6**	**7,273.9**	**1,954.2**	**4,630.8**	**5,861.9**	**7,200.9**
DED11	5,903.8	6.0	1,087.2	364.4	1,079.8	1,517.0	1,849.3
DED14	1,459.1	17.1	400.6	123.6	236.6	290.9	390.3
DED18	1,459.1	17.1	400.6	123.6	236.6	290.9	390.3
DED1A	1,459.1	17.1	400.6	123.6	236.6	290.9	390.3
DED1B	1,459.1	17.1	400.6	123.6	236.6	290.9	390.3
DED16	2,201.5	39.3	684.4	154.9	382.9	447.8	492.2
DED19	2,201.5	39.3	684.4	154.9	382.9	447.8	492.2
DED12	2,125.6	23.7	581.0	166.3	348.4	431.7	574.6
DED17	2,125.6	23.7	581.0	166.3	348.4	431.7	574.6
DED13	2,260.3	17.7	684.5	150.9	380.7	474.2	552.3
DED15	2,260.3	17.7	684.5	150.9	380.7	474.2	552.3
DED1C	2,260.3	17.7	684.5	150.9	380.7	474.2	552.3
DED3	**23,088.4**	**259.9**	**4,679.5**	**1,567.5**	**4,746.7**	**5,413.4**	**6,421.3**
DED31	12,357.0	7.5	1,687.2	657.7	2,656.0	3,404.7	3,943.9
DED34	2,345.2	40.2	753.5	215.6	380.2	428.9	527.0
DED35	2,345.2	40.2	753.5	215.6	380.2	428.9	527.0
DED32	1,919.8	66.4	400.5	161.9	473.7	351.6	465.7
DED36	1,919.8	66.4	400.5	161.9	473.7	351.6	465.7
DED33	2,201.5	39.3	684.4	154.9	382.9	447.8	492.2
Ratio New region / Old region							
DED1 / DED4	0.9251	0.8659	0.9140	0.9266	0.9236	0.9290	0.9360
DED3 / DED5	1.1054	1.1775	1.1713	1.1097	1.0877	1.0902	1.0830
Source: Own elaboration.							

3.2 Conversion from NUTS 2006 to NUTS 2010

In order to use RHOMOLO for the ex-ante impact assessment of Cohesion Policy 2014-2020, the database needs to be built under (or converted to) the 2010 version of the NUTS classification. In this case, we can use the regional data from Eurostat as it is but we need to convert the inter-regional trade flows and the inter-regional transport cost matrix.

For the trade flows it makes sense to apply the same underlying strategy explained in the previous section. We rely on the GVA shares of regions to disaggregate trade data for regions that split or shifted boundaries between 2006 and 2010. When a **region splits** into two regions, like is the case of FI18, Etelä-Suomi (Table 1), splitting into FI1B and FI1C, we break down the trade data according to the GVA shares of the new regions.

For **merged regions**, like FI1D becoming the union of FI13 and FI1A, the simple aggregation of trade data of these two NUTS 2006 regions provides the trade corresponding to the new NUTS 2010 region.

4. Conclusion

This report describes the methodology designed to convert regional data between different NUTS classifications, as applied in RHOMOLO. It fills a gap in the definition of an applied approach to use regional data, when there is a need for data from an outdated NUTS classification. The importance to define a methodology lies in the fact that statistics following the previous classifications are not available from the Eurostat's website. The availability of data at NUTS 2 and NUTS 3 level is a key factor for the development of the method. Consequently, the results are more robust for GVA than for other economic variables such as employment or gross fix capital formation, for which NUTS 3 level data are not available. Possible improvements of the proposed methodology proposed include the identification of proxies to adjust the relationship between GVA and other variables at the maximum level of disaggregation.

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Annex

Table A 1 NUTS-2 Regions in RHOMOLO according to NUTS 2006 classification

Code	Name
BE10	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest
BE21	Prov. Antwerpen
BE22	Prov. Limburg (BE)
BE23	Prov. Oost-Vlaanderen
BE24	Prov. Vlaams-Brabant
BE25	Prov. West-Vlaanderen
BE31	Prov. Brabant Wallon
BE32	Prov. Hainaut
BE33	Prov. Liège
BE34	Prov. Luxembourg (BE)
BE35	Prov. Namur
BG31	Северозападен
BG32	Северен централен
BG33	Североизточен
BG34	Югоизточен
BG41	Югозападен
BG42	Южен централен
CZ01	Praha
CZ02	Střední Čechy
CZ03	Jihozápad
CZ04	Severozápad
CZ05	Severovýchod
CZ06	Jihovýchod
CZ07	Střední Morava
CZ08	Moravskoslezsko
DK01	Hovedstaden
DK02	Sjælland
DK03	Syddanmark
DK04	Midtjylland
DK05	Nordjylland
DE11	Stuttgart
DE12	Karlsruhe
DE13	Freiburg
DE14	Tübingen
DE21	Oberbayern
DE22	Niederbayern
DE23	Oberpfalz
DE24	Oberfranken
DE25	Mittelfranken
DE26	Unterfranken
DE27	Schwaben
DE30	Berlin
DE41	Brandenburg - Nordost
DE42	Brandenburg - Südwest
DE50	Bremen
DE60	Hamburg
DE71	Darmstadt
DE72	Gießen
DE73	Kassel
DE80	Mecklenburg-Vorpommern
DE91	Braunschweig
DE92	Hannover
DE93	Lüneburg
DE94	Weser-Ems
DEA1	Düsseldorf
DEA2	Köln
DEA3	Münster
DEA4	Detmold
DEA5	Arnsberg
DEB1	Koblenz
DEB2	Trier
DEB3	Rheinhessen-Pfalz
DEC0	Saarland
DED1	Chemnitz
DED2	Dresden
DED3	Leipzig
DEE0	Sachsen-Anhalt
DEF0	Schleswig-Holstein
DEG0	Thüringen
EE00	Eesti
IE01	Border, Midland and Western
IE02	Southern and Eastern
GR11	Ανατολική Μακεδονία, Θράκη
GR12	Κεντρική Μακεδονία
GR13	Δυτική Μακεδονία
GR14	Θεσσαλία
GR21	Ήπειρος
GR22	Ιόνια Νησιά
GR23	Δυτική Ελλάδα
GR24	Στερεά Ελλάδα

Code	Name
GR25	Πελοπόννησος
GR30	Αττική
GR41	Βόρειο Αιγαίο
GR42	Νότιο Αιγαίο
GR43	Κρήτη
ES11	Galicia
ES12	Principado de Asturias
ES13	Cantabria
ES21	País Vasco
ES22	Comunidad Foral de Navarra
ES23	La Rioja
ES24	Aragón
ES30	Comunidad de Madrid
ES41	Castilla y León
ES42	Castilla-La Mancha
ES43	Extremadura
ES51	Cataluña
ES52	Comunidad Valenciana
ES53	Illes Balears
ES61	Andalucía
ES62	Región de Murcia
ES63	Ciudad Autónoma de Ceuta
ES64	Ciudad Autónoma de Melilla
ES70	Canarias
FR10	Île de France
FR21	Champagne-Ardenne
FR22	Picardie
FR23	Haute-Normandie
FR24	Centre
FR25	Basse-Normandie
FR26	Bourgogne
FR30	Nord - Pas-de-Calais
FR41	Lorraine
FR42	Alsace
FR43	Franche-Comté
FR51	Pays de la Loire
FR52	Bretagne
FR53	Poitou-Charentes
FR61	Aquitaine
FR62	Midi-Pyrénées
FR63	Limousin
FR71	Rhône-Alpes
FR72	Auvergne
FR81	Languedoc-Roussillon

Code	Name
FR82	Provence-Alpes-Côte d'Azur
FR83	Corse
ITC1	Piemonte
ITC2	Valle d'Aosta/Vallée d'Aoste
ITC3	Liguria
ITC4	Lombardia
ITD1	Provincia Autonoma di Bolzano/Bozen
ITD2	Provincia Autonoma di Trento
ITD3	Veneto
ITD4	Friuli-Venezia Giulia
ITD5	Emilia-Romagna
ITE1	Toscana
ITE2	Umbria
ITE3	Marche
ITE4	Lazio
ITF1	Abruzzo
ITF2	Molise
ITF3	Campania
ITF4	Puglia
ITF5	Basilicata
ITF6	Calabria
ITG1	Sicilia
ITG2	Sardegna
CY00	Κύπρος
LV00	Latvija
LT00	Lietuva
LU00	Luxembourg
HU10	Közép-Magyarország
HU21	Közép-Dunántúl
HU22	Nyugat-Dunántúl
HU23	Dél-Dunántúl
HU31	Észak-Magyarország
HU32	Észak-Alföld
HU33	Dél-Alföld
MT00	Malta
NL11	Groningen
NL12	Friesland (NL)
NL13	Drenthe
NL21	Overijssel
NL22	Gelderland
NL23	Flevoland
NL31	Utrecht
NL32	Noord-Holland

Code	Name
NL33	Zuid-Holland
NL34	Zeeland
NL41	Noord-Brabant
NL42	Limburg (NL)
AT11	Burgenland (AT)
AT12	Niederösterreich
AT13	Wien
AT21	Kärnten
AT22	Steiermark
AT31	Oberösterreich
AT32	Salzburg
AT33	Tirol
AT34	Vorarlberg
PL11	Łódzkie
PL12	Mazowieckie
PL21	Małopolskie
PL22	Śląskie
PL31	Lubelskie
PL32	Podkarpackie
PL33	Świętokrzyskie
PL34	Podlaskie
PL41	Wielkopolskie
PL42	Zachodniopomorskie
PL43	Lubuskie
PL51	Dolnośląskie
PL52	Opolskie
PL61	Kujawsko-Pomorskie
PL62	Warmińsko-Mazurskie
PL63	Pomorskie
PT11	Norte
PT15	Algarve
PT16	Centro (PT)
PT17	Lisboa
PT18	Alentejo
PT20	Região Autónoma dos Açores
PT30	Região Autónoma da Madeira
RO11	Nord-Vest
RO12	Centru
RO21	Nord-Est
RO22	Sud-Est
RO31	Sud - Muntenia
RO32	Bucureşti - Ilfov
RO41	Sud-Vest Oltenia
RO42	Vest
SI01	Vzhodna Slovenija
SI02	Zahodna Slovenija
SK01	Bratislavský kraj
SK02	Západné Slovensko
SK03	Stredné Slovensko
SK04	Východné Slovensko
FI13	Itä-Suomi
FI18	Etelä-Suomi
FI19	Länsi-Suomi
FI1A	Pohjois-Suomi
FI20	Åland
SE11	Stockholm
SE12	Östra Mellansverige
SE21	Småland med öarna
SE22	Sydsverige
SE23	Västsverige
SE31	Norra Mellansverige
SE32	Mellersta Norrland
SE33	Övre Norrland
UKC1	Tees Valley and Durham
UKC2	Northumberland and Tyne and Wear
UKD1	Cumbria
UKD2	Cheshire
UKD3	Greater Manchester
UKD4	Lancashire
UKD5	Merseyside
UKE1	East Yorkshire and Northern Lincolnshire
UKE2	North Yorkshire
UKE3	South Yorkshire
UKE4	West Yorkshire
UKF1	Derbyshire and Nottinghamshire
UKF2	Leicestershire, Rutland and Northamptonshire
UKF3	Lincolnshire
UKG1	Herefordshire, Worcestershire and Warwickshire
UKG2	Shropshire and Staffordshire
UKG3	West Midlands
UKH1	East Anglia
UKH2	Bedfordshire and Hertfordshire
UKH3	Essex

Code	Name
UKI1	Inner London
UKI2	Outer London
UKJ1	Berkshire, Buckinghamshire and Oxfordshire
UKJ2	Surrey, East and West Sussex
UKJ3	Hampshire and Isle of Wight
UKJ4	Kent
UKK1	Gloucestershire, Wiltshire and Bristol/Bath area
UKK2	Dorset and Somerset
UKK3	Cornwall and Isles of Scilly

Code	Name
UKK4	Devon
UKL1	West Wales and The Valleys
UKL2	East Wales
UKM2	Eastern Scotland
UKM3	South Western Scotland
UKM5	North Eastern Scotland
UKM6	Highlands and Islands
UKN0	Northern Ireland
Source: Mercenier et al., 2016	

Table A 2 Changes from NUTS 2006 to NUTS 2010 at NUTS-2 level

Code 2006	Code 2010	Label	Change	Explanation (new = old)
DE41	DE40 (part)	Brandenburg - Nordost	Merged	
DE42	DE40 (part)	Brandenburg - Südwest	Merged	
	DE40	Brandenburg	New region	DE40 = DE41 + DE42
DED1		Chemnitz	Boundary shift	
	DED4	Chemnitz	New region	recalculation by NSI
DED3		Leipzig	Boundary shift	
	DED5	Leipzig	New region	recalculation by NSI
GR11	EL11	Ανατολική Μακεδονία, Θράκη	Code change	EL11 = GR11
GR12	EL12	Κεντρική Μακεδονία	Code change	EL12 = GR12
GR13	EL13	Δυτική Μακεδονία	Code change	EL13 = GR13
GR14	EL14	Θεσσαλία	Code change	EL14 = GR14
GR21	EL21	Ήπειρος	Code change	EL21 = GR21
GR22	EL22	Ιόνια Νησιά	Code change	EL22 = GR22
GR23	EL23	Δυτική Ελλάδα	Code change	EL23 = GR23
GR24	EL24	Στερεά Ελλάδα	Code change	EL24 = GR24
GR25	EL25	Πελοπόννησος	Code change	EL25 = GR25
GR30	EL30	Αττική	Code change	EL30 = GR30
GR41	EL41	Βόρειο Αιγαίο	Code change	EL41 = GR41
GR42	EL42	Νότιο Αιγαίο	Code change	EL42 = GR42
GR43	EL43	Κρήτη	Code change	EL43 = GR43
GRZZ	ELZZ	Extra-Regio NUTS 2	Code change, label change	ELZZ = GRZZ
ITD1	ITH1	Provincia Autonoma di Bolzano/Bozen	Code change, label change	ITH1 = ITD1
ITD2	ITH2	Provincia Autonoma di Trento	Code change, label change	ITH2 = ITD2
ITD3	ITH3	Veneto	Code change	ITH3 = ITD3

Code 2006	Code 2010	Label	Change	Explanation (new = old)
ITD4	ITH4	Friuli-Venezia Giulia	Code change	ITH4 = ITD4
ITE4	ITI4	Lazio	Code change	ITI4 = ITE4
ITE1	ITI1	Toscana	Code change	ITI1 = ITE1
ITE2	ITI2	Umbria	Code change	ITI2 = ITE2
ITD5		Emilia-Romagna	Boundary shift	
	ITH5	Emilia-Romagna	New region	recalculation by NSI
ITE3		Marche	Boundary shift	
	ITI3	Marche	New region	recalculation by NSI
FI13	FI1D (part)	Itä-Suomi	Merged	
FI1A	FI1D (part)	Pohjois-Suomi	Merged	
	FI1D	Pohjois- ja Itä-Suomi	New region	FI1D = FI13 + FI1A
FI18		Etelä-Suomi	Split	
FI18 (part)	FI1B	Helsinki-Uusimaa	New region	FI1B + FI1C = FI18, recalculation by NSI
FI18 (part)	FI1C	Etelä-Suomi	New region	FI1B + FI1C = FI18, recalculation by NSI
UKD2		Cheshire	Boundary shift	
UKD5		Merseyside	Boundary shift	
	UKD6	Cheshire	New region	recalculation by NSI
	UKD7	Merseyside	New region	recalculation by NSI

List of abbreviations and definitions

EU	European Union
GVA	Gross value added
NACE	Statistical classification of economic activities in the European Community
NUTS	Nomenclature of Territorial Units for Statistics
SAM	Social accounting matrix
WIOD	World input-output database

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LF-NA-28300-EN-N

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Publications Office

doi:10.2791/039045
ISBN 978-92-79-64453-5