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INDICE

THE EVOLUTION OF THE VERTICAL SPECIALIZATION IN THE WORLD ECONOMY. (1995 – 2011) [1]

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1. Introduction

It is widely recognized – see for example Krugman and Venables (1995) and Feenstra (1998) – that political factors such as tariff reduction and trade liberalization, technological changes such as reduction of transport costs, and income convergence among countries have delocalized production to countries where the costs are relatively low and have thus considerably increased international trades.

Consequently, the current world economy is characterized by a strong interdependence among countries' economies that connects them together, so that the production of a finished good involves the participation of many countries specializing in different stages of production.

On the other words, a country specialized in a particular stage of a good's production, imports a good from another country, uses that good as input in the production of its own good and then export its good to the another country. The sequence ends when the good reached its final destination.

This situation capture the idea that the countries link sequentially to produce a final good and that production processes are sliced into many stages, carried out in many countries, each specializing in different stages of the vertical production chain.

In literature this phenomena is known as "vertical specialization" (Hammer et al 2001, Yi 2003), "slicing the value chain" (Krugman and Venables 1995), "international production sharing" (Yeats 2001) or "Outsourcing" (Grossman and Helpman, 2005). Now, the vertical specialization is considered an important tool able to explain the organization of the world production, the degree of globalization of the world economy and a key issue for international policy economy.

[1] Relazione invitata alla LII Riunione Scientifica della Sieds – Ancona e Fermo 2015.

Using the Hummels et al (2001) measure, i.e. the amount of imported inputs embodied in goods that are exported, this paper investigates and analyse the degree of vertical specialization of the world countries' economies. The data used are taken from the World Input-Output database (www.wiod.org).

The database covers 27 European countries and 13 other major countries in the world for the period from 1995 to 2011. More and detailed technical information on the construction of the World Input-Output Table (WIOT) can be found in Dietzenbacher et al (2013) and Timmer (2012).

The WIOT (henceforth inter-country IOT) is like an interregional input-output table with countries acting as regions and provide, respect the national IOT, a more detailed description of the interdependence of industries (economic sectors) between countries. The WIOT used in this analysis is built at current price with a classification for 35 industries.

The main contents of this article are structured into two sections, one theoretical and the other empirical. The theoretical section (Section 2) carries out a descriptive analysis of the index used to measure the vertical specialization of a country. Sections 3 and reports the results of an empirical analysis considering the data from the WIOT for the period 1995-2011. Section 5 concludes.

2. Methodology

Following Hummels et al. (2001), there is vertical specialization of trade when:

1) Goods are produced in multiple, sequential stages;
2) Two or more countries provide value added in the good's production sequence;
3) At least one country must use imported inputs in its stage of the production process, and some of the resulting output must be exported.

Note that vertical specialization has an import side and an export side. On the import side, vertical specialization is just a subset of intermediate goods: it is those intermediates that are used to make goods for export.

On the export side, vertical specialization can include both final goods and intermediate goods. Hence, the concept is related to, but distinct from, intermediate goods.

There are three standard methods to measure vertical specialization (Feenstra, 1998). The first is to use firm surveys. The second is to use a fine industrial classification of trade, as in Athukorala and Yamashita (2006).

The third and most traditional method considers national input-output tables. See for example: Ishii and Yi (1997), Hummels, et al. (2001).

Restricting the attention to this last method, a quantitative measure of the vertical specialization of a country's economic system is the value of directly imported intermediates (inputs) embodied in goods that are exported. Formally:

$$DVS = \mathbf{i'A_M e(i'e)^{-1}} \quad (1)$$

where, **i** is a *k*x*1*vector of 1's, $\mathbf{A_M}$ is a *k*x*k* matrix of the direct imported coefficients whose generic element is $a_{Mij} = m_{ij}/x_j$ and m_{ij} the flow of goods from the i-th foreign sector imported to the j-th domestic sector for intermediate use. While, x_j is the total production (gross output) of the j-th domestic sector.
Thus, a_{Mij} is the total amount of the i-th product imported and used as input for the production of one monetary unit of industry j's output.
Finally, " **′** " is the transposition symbol and **e** is a *k*x*1* vector of exports whose elements are the exports of the domestic i-th sector. The DVS index can also be expressed as:

$$DVS=\sum_{j=1}^{k} a_{M.j}\, e_j(\mathbf{i'e})^{-1} \text{ and } a_{M.j}=\sum_{i=1}^{k} a_{Mij} \quad (2)$$

In other words, the DVS index is a weighted average of the direct import coefficients using the sectorial exports as weights.
Another and perhaps more detailed index of a country's vertical specialization is the following:

$$VS = \mathbf{i'A_M(I-A)^{-1}e(i'e)^{-1}} \quad (3)$$

where $(\mathbf{I-A})^{-1}$ is the Leontief inverse. This last index includes both the directly and indirectly imported input content in exports of a country. Indeed, the j-th entry of the vector $\mathbf{i'A_M(I-A)^{-1}}$ gives the total amount of imports that is directly and indirectly required to satisfy one unit (1 $) of the j-th product exported.

The main advantage of this indicator is that it takes into account industrial linkages across the economic sectors of a country and thus provides a more precise measure of vertical specialization. Like the DVS also the VS index is a weighted average. In particular, it is a weighted average of the import multipliers, using the sectorial exports as weights.

In general, a high value of the VS index indicates that imported intermediate goods make up a large proportion of the value of a country's exports and consequently indicate a country's greater degree of involvement in global production chains.

3. Evolution of vertical specialization in the world economy

In this section, by means of the VS index we examine the vertical specialization of the world economy and its evolution in the period 1995 to 2011.
Contrary to what has done until now, this inquiry uses the World Input Output Table. A simplified pattern of a WIOT is depicted in the following Figure 1, where:

- $\mathbf{Z}_{h;h}$ is a 35x35 matrix whose elements are the flow for intermediate use from the i-th sector of country h to the j-th sector of the same country;
- $\mathbf{Z}_{h;k}$ (for h≠k) is a 35x35 matrix whose elements are the exports for intermediate use from the i-th sector of country h to the j-th sector of country k;
- $\mathbf{E}_{hh}$ is a 35x5 matrix of the domestic final demand in country h;
- $\mathbf{E}_{h;k}$ (for h≠k) is a 35x5 matrix of the exports of country h for final demand purposes in country k;
- Finally, $\mathbf{x}_h$ and $\mathbf{v}_h$ are respectively the vectors of the gross output and added-value of country h.

Figure 1 – *Pattern of a WIOT.*

$\mathbf{Z}_{1;1}$	$\mathbf{Z}_{1;2}$	…	$\mathbf{Z}_{1;40}$	$\mathbf{Z}_{1;W}$	$\mathbf{E}_{1;1}$	…	$\mathbf{E}_{1;40}$	$\mathbf{E}_{1;W}$	$\mathbf{x}_1$
$\mathbf{Z}_{2;1}$	$\mathbf{Z}_{2;2}$	…	$\mathbf{Z}_{2;40}$	$\mathbf{Z}_{2;W}$	$\mathbf{E}_{2;1}$	…	$\mathbf{E}_{2;40}$	$\mathbf{E}_{2;W}$	$\mathbf{x}_2$
…	…	…	…	…	…	…	…	…	…
$\mathbf{Z}_{40;1}$	$\mathbf{Z}_{40;2}$	…	$\mathbf{Z}_{40;40}$	$\mathbf{Z}_{40;W}$	$\mathbf{E}_{40;1}$	…	$\mathbf{E}_{40;40}$	$\mathbf{E}_{40;W}$	$\mathbf{x}_{40}$
$\mathbf{Z}_{W;1}$	$\mathbf{Z}_{W;2}$	…	$\mathbf{Z}_{W;40}$	$\mathbf{Z}_{W;W}$	$\mathbf{E}_{W;1}$	…	$\mathbf{E}_{W;40}$	$\mathbf{E}_{W;W}$	$\mathbf{x}_W$
$\mathbf{v}'_1$	$\mathbf{v}'_2$	…	$\mathbf{v}'_{40}$	$\mathbf{v}'_W$					
$\mathbf{x}'_1$	$\mathbf{x}'_2$	…	$\mathbf{x}'_{40}$	$\mathbf{x}'_W$					

Legend: W=Rest of world

As will be seen, unlike in a national IOT, in a WIOT the exports of a country are more detailed and divided into two parts.

The first is given exogenously and corresponds, for the h-th country, to $\mathbf{E}_{hk}$ (for k=1,..,W) matrices. The other part, endogenously determined, is the $\mathbf{Z}_{hk}$ (for k≠h) matrices.

Consequently, in order to determine the import content of the exports of a country, it is possible to use different levels of exports. Limiting but not restricting the attention to the following two types, a most general level of analysis is to consider conjointly all the exports of a country (i.e. $\sum_{k\neq h}\mathbf{Z}_{hk}+\sum_{k\neq h}\mathbf{E}_{hk}$). This is the classic analysis when national IOT are used.

A second type of analysis considers only the exports of a country that are used as inputs into the production process of another country (i.e. $\sum_{k\neq h}\mathbf{Z}_{hk}$).

In the first case, the import content of the endogenous exports (exports for intermediate use in the other countries) will be determined. In the second case, the import content of the exogenous exports (exports for final use in the other countries) will be determined.

Because the goal of this inquiry is to analyze the degree of vertical specialization among the economic systems of the countries, we consider it appropriate to restrict the attention only the value of imported intermediates embodied in a country's endogenous exports.

Consequently, the measure of vertical specialization of the h-th country was obtained as:

$$VS_h = \mathbf{i'A}_{Mh}(\mathbf{I}-\mathbf{A}_h)^{-1}\mathbf{e}_h(\mathbf{i'e}_h)^{-1} \quad (4)$$

where:

- $\mathbf{A}_{Mh}=(\sum_{k\neq h}\mathbf{Z}_{kh})\langle\mathbf{x}_h\rangle^{-1}$;
- $\mathbf{A}_h=\mathbf{Z}_{hh}\langle\mathbf{x}_h\rangle^{-1}$;
- $\mathbf{e}_h = (\sum_{k\neq h}\mathbf{Z}_{hk})\mathbf{i}$;
- $\langle\mathbf{x}_h\rangle^{-1}$ is the diagonal matrix of gross output by sector.

Table 6 of the Appendix shows the values of the VS index for each year and country considered, while they are synthesized, by means of the mean and standard deviation, in the following Table 1.

Table 1 – *Temporal mean between 1995 and 2011 and standard deviation (in bracket) of the VS index.*

AUS	0.13	(0.011)	ESP	0.25	(0.031)	JPN	0.12	(0.040)	ROW	0.23	(0.026)
AUT	0.29	(0.032)	EST	0.39	(0.039)	KOR	0.33	(0.054)	RUS	0.08	(0.015)
BEL	0.40	(0.026)	FIN	0.27	(0.042)	LTU	0.35	(0.021)	SVK	0.41	(0.037)
BGR	0.38	(0.034)	FRA	0.23	(0.026)	LUX	0.58	(0.048)	SVN	0.36	(0.029)
BRA	0.11	(0.016)	GBR	0.17	(0.011)	LVA	0.27	(0.025)	SWE	0.28	(0.024)
CAN	0.21	(0.016)	GRC	0.27	(0.038)	MEX	0.24	(0.019)	TUR	0.24	(0.059)
CHN	0.20	(0.053)	HUN	0.41	(0.054)	MLT	0.46	(0.043)	TWN	0.40	(0.060)
CYP	0.29	(0.029)	IDN	0.15	(0.022)	NLD	0.33	(0.023)	USA	0.11	(0.018)
CZE	0.38	(0.057)	IND	0.15	(0.030)	POL	0.27	(0.057)			
DEU	0.23	(0.035)	IRL	0.40	(0.020)	PRT	0.28	(0.020)			
DNK	0.32	(0.043)	ITA	0.22	(0.034)	ROM	0.26	(0.025)			

Excluding the Rest of the World from the analysis, the mean value of the vertical specialization for the collective considered in the period analyzed is about 0.28.

The following Figure 2 highlights that the VS index has in mean a substantially positive trend increasing from 0.24 in 1995 to 0.30 in 2011. The slow growth

shows a turnaround in the years 2001 and 2002, and an even more substantial one in 2009.
Much more diversified are the values that the VS index assumes in the different countries.

Figure 2 – *Time series of the mean VS index value between 1995-2011.*

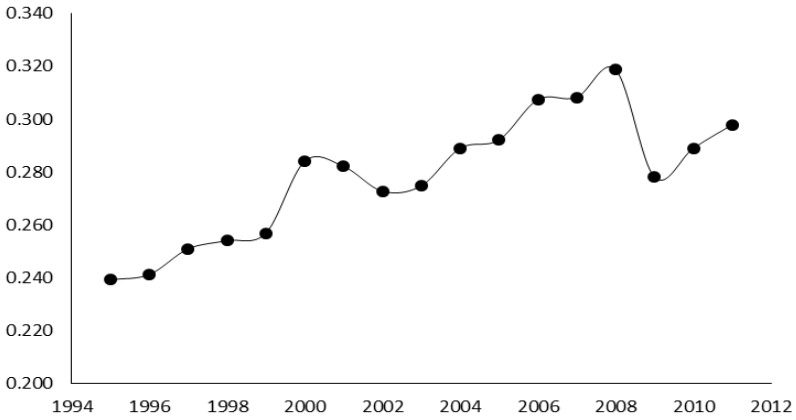
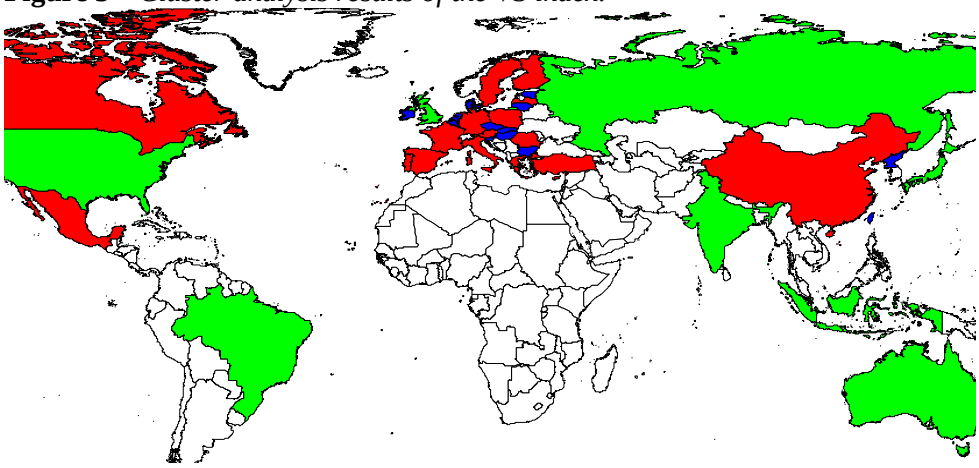


Figure 3 – *Cluster analysis results of the VS index.*



Legend: First group; Second group; Thirth group.

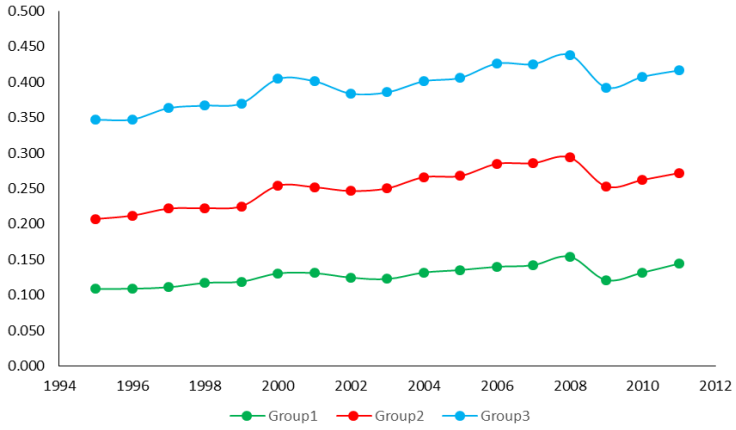
To this end, using the values of the index set out in Table 6 a cluster analysis was performed with Wald's method.

As will be seen from the dendrogram (Figure 9 of the Appendix) and the following Figure 3, three distinct groups of countries are identified:

1) A first group comprises Australia, Brazil, Great Britain, India, Indonesia, Japan, Russia and United States of America, with average values ranging between 0.11 in 1995 and 0.14 in 2011;
2) A second group consists of Austria, Canada, China, Cyprus, Germany, Spain, Finland, France, Greece, Italy, Latvia, Mexico, Poland, Portugal, Romania, Sweden and Turkey, with average values ranging between 0.21 1995 and 0.27 in 2011;
3) A third group includes Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Hungary, Ireland, Korea, Lithuania, Luxembourg, Malta, Netherlands, Slovakia, Slovenia and Taiwan, and with average values ranging between 0.34 in 1995 and 0.42 in 2011.

Furthermore, as can be seen in the following Figure 4, the temporal evolution of the average mean value of the index for the three groups is practically identical and completely analogous to that of the set (shown in Figure 2).

Figure 4 – *Time series of the mean VS index for the three groups of countries with similar VS evolution.*



Considering the statistics shown in Table 2, it is apparent that in 1995 the set considered had in mean an outsourcing degree equal to 0.24 and one half of the units considered had a value not exceeding 0.23. The lowest value is recorded by Japan (0.06) and the highest value by Malta (0.54).

However, as previously mentioned, the vertical specialization degree is constantly growing except for the years 2002 and 2009, and in 2011 its value is in

mean 0.30. In this last year, Luxembourg was the country with the highest value (0.62) while Russia was the country with the lowest one (0.06).

Table 2 – *Descriptive statistics of the VS index by year.*

Year	Mean	Std. Dev.	1° Quart.	Median	3° Quart.	Min	Max
1995	0.24	0.10	0.17	0.23	0.31	0.07	0.54
1996	0.24	0.10	0.18	0.24	0.31	0.07	0.48
1997	0.25	0.11	0.18	0.25	0.32	0.07	0.52
1998	0.25	0.11	0.19	0.24	0.33	0.08	0.55
1999	0.26	0.11	0.18	0.25	0.32	0.08	0.55
2000	0.28	0.12	0.21	0.26	0.36	0.09	0.59
2001	0.28	0.12	0.22	0.27	0.36	0.10	0.60
2002	0.27	0.11	0.21	0.26	0.34	0.09	0.58
2003	0.27	0.11	0.21	0.27	0.35	0.10	0.56
2004	0.29	0.11	0.23	0.29	0.37	0.08	0.60
2005	0.29	0.11	0.23	0.29	0.36	0.07	0.59
2006	0.31	0.12	0.25	0.31	0.38	0.07	0.61
2007	0.31	0.12	0.25	0.31	0.38	0.07	0.62
2008	0.32	0.12	0.26	0.32	0.40	0.07	0.62
2009	0.28	0.11	0.23	0.27	0.35	0.05	0.61
2010	0.29	0.12	0.22	0.27	0.37	0.05	0.62
2011	0.30	0.12	0.22	0.28	0.38	0.06	0.62

In general, from the beginning to the end of the period considered, the index increased by 6 points, rising in mean from 0.24 to 0.30. The same situation is recorded also for the values of the main quantiles. In particular, the first quartile grows from 0.17 to 0.22. The median changes from 0.23 to 0.28 and the third quartile from 0.31 to 0.38. By contrast, whilst the minimum value of the index remains unchanged (from 0.07 in 1995 to 0.06 in 2012), the maximum rises from 0.54 to 0.62.

To summarize, the analysis conducted highlights a clear situation. Throughout the period considered, the economic systems of all the countries considered recorded an increasing degree of vertical specialization.

Russia, the US, Japan, Australia, Brazil and Britain were the countries with the lowest values in the index. On the contrary, Malta, Luxembourg, Taiwan, Belgium Estonia and Ireland were those with the highest degree of outsourcing. Finally, the set considered is characterized by the presence of three groups with different levels of outsourcing.

4. Effect of the structure of imports and exports of intermediate goods

As previously noted, the VS index is an average of imports of intermediate inputs with weights represented by the relative distribution of exports.
Therefore, further to improve the study of the time evolution, an analysis was carried out to determine the influence of the two components (imports and exports) on the performance of the index.
In this regard, by means of the Mean Absolute Error (MAE) the current values of the VS index were compared to the theoretical ones. This last were determined taking fixed the structure of exports. Formally, for the h-th county:

$$MAE_{hk} = \frac{1}{17}\sum_{t=1995}^{2011} | VS_{h;t} - VS^{*}_{h;k} | \qquad k=1995,..,2011 \qquad (5)$$

where:

- $VS_{h;t} = [\mathbf{i'A}_{Mh}(\mathbf{I}-\mathbf{A}_h)^{-1}]_t \, [\mathbf{e}_h(\mathbf{i'e}_h)^{-1}]_t$ (VS current values)
- $VS^{*}_{h;k} = [\mathbf{i'A}_{Mh}(\mathbf{I}-\mathbf{A}_h)^{-1}]_t \, [\mathbf{e}_h(\mathbf{i'e}_h)^{-1}]_k$ (VS theoretical values)

Table 3 – *Current and Theoretical values of the VS index for the Italy.*

		$VS^{*}_{ITA;k}$																
k	t	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11
95		0.19	0.17	0.18	0.18	0.18	0.21	0.20	0.20	0.19	0.21	0.22	0.24	0.24	0.24	0.21	0.24	0.26
96		0.19	0.17	0.18	0.18	0.18	0.21	0.21	0.20	0.20	0.21	0.22	0.24	0.24	0.25	0.21	0.24	0.26
97		0.19	0.17	0.18	0.18	0.18	0.21	0.21	0.20	0.20	0.21	0.22	0.24	0.24	0.24	0.21	0.24	0.26
98		0.19	0.17	0.18	0.18	0.18	0.21	0.20	0.19	0.19	0.21	0.22	0.24	0.24	0.24	0.21	0.24	0.25
99		0.19	0.17	0.18	0.18	0.18	0.21	0.20	0.19	0.19	0.21	0.22	0.24	0.24	0.24	0.21	0.24	0.25
00		0.19	0.17	0.18	0.18	0.18	0.21	0.21	0.20	0.20	0.21	0.22	0.24	0.25	0.25	0.21	0.25	0.26
01		0.19	0.17	0.18	0.18	0.18	0.21	0.21	0.20	0.20	0.21	0.22	0.24	0.24	0.24	0.21	0.24	0.26
02		0.19	0.17	0.18	0.18	0.18	0.21	0.21	0.20	0.20	0.21	0.22	0.24	0.24	0.24	0.21	0.24	0.26
03		0.19	0.17	0.18	0.18	0.18	0.21	0.21	0.20	0.20	0.21	0.22	0.24	0.25	0.25	0.21	0.25	0.26
04		0.19	0.17	0.18	0.18	0.18	0.21	0.21	0.20	0.20	0.21	0.22	0.24	0.25	0.25	0.21	0.25	0.26
05		0.19	0.18	0.18	0.18	0.19	0.22	0.21	0.20	0.20	0.21	0.23	0.25	0.25	0.25	0.22	0.25	0.27
06		0.19	0.18	0.18	0.18	0.19	0.22	0.21	0.20	0.20	0.22	0.23	0.25	0.25	0.26	0.22	0.26	0.27
07		0.20	0.18	0.18	0.19	0.19	0.22	0.21	0.21	0.20	0.22	0.23	0.25	0.26	0.26	0.22	0.26	0.27
08		0.20	0.18	0.19	0.19	0.19	0.22	0.22	0.21	0.21	0.22	0.23	0.26	0.26	0.26	0.23	0.26	0.28
09		0.19	0.18	0.18	0.18	0.18	0.21	0.21	0.20	0.20	0.21	0.22	0.25	0.25	0.25	0.22	0.25	0.27
10		0.20	0.18	0.19	0.19	0.19	0.22	0.22	0.21	0.21	0.22	0.23	0.26	0.26	0.26	0.23	0.26	0.28
11		0.20	0.18	0.19	0.19	0.19	0.22	0.22	0.21	0.21	0.22	0.24	0.26	0.26	0.27	0.23	0.27	0.28
$VS_{ITA;t}$		0.19	0.17	0.18	0.18	0.18	0.21	0.21	0.20	0.20	0.21	0.23	0.25	0.26	0.26	0.22	0.26	0.28

By way of example the following Table 3 shows the current values and the theoretical ones of the VS index for the Italy while, Table 7 of the Appendix shows same descriptive statistics of the MAE index for the set analyzed.

As is evident (see Table 7), the theoretical values of the VS index differ very little from the actual values, highlighting that the temporal dynamic of the index is attributable more to the structure of imports than to that of exports.

In consideration of these results, the subsequent analysis focused on the structure of global imports of inputs, broken down by sectors and individual countries:

$$\mathbf{m}_h' = \mathbf{i}'\mathbf{A}_{Mh}(\mathbf{I} - \mathbf{A}_h)^{-1} \qquad h = 1, 2,...,41 \tag{6}$$

Some descriptive statistics of the index (6) values for each country at the beginning of the period, i.e. 1995, are shown in Table 8 of the Appendix. We note that the mean values contained therein have a clear economic significance because they represent the total amount of imports of intermediate inputs necessary to meet a requirement for final use evenly distributed among the 35 sectors (= $ 1/35).

The 35 coordinates of the vectors $\mathbf{m}_h'$ are highly correlated, so that the first two principal components capture 78% of the variability between the different countries considered. More particularly, the first principal component is positively correlated, often highly correlated (in 57% of cases the correlation coefficient exceeds the value 0.80), with all the sectors except sector 35 (Private Households with Employed Persons) having a coefficient of -0.14.

Table 4 – *Classification of the countries according to the index (5). Year 1995.*

Low (0.07)	BRA, IND, JPN, RUS USA
Mean-low (0.13)	AUS, CHN, DEU, ESP, FRA, GBR, IDN, ITA, MEX, POL, TUR
Mean (0.19)	AUT, CAN, DNK, FIN, GRC, KOR, PRT, ROM, SWE, TWN
Mean-high (0.27)	BEL, BGR, CYP, CZE, EST, HUN, IRL, LTU, LVA, MLT, NLD, SVK, SVN
High (0.29)	LUX

In parentheses, the index mean value of the group.

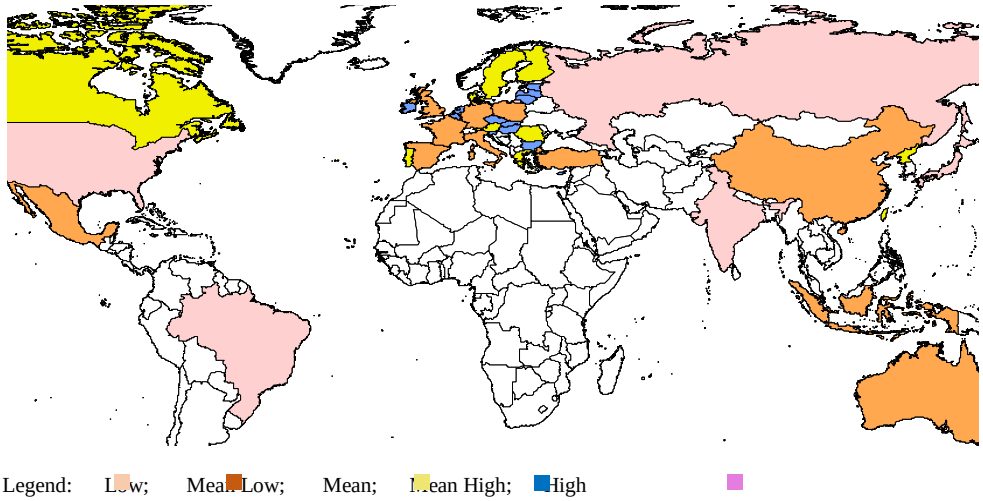
Therefore, the first principal component essentially reflects the index levels. The second principal component is strongly correlated (0.88) only with sector 8 (Coke, Refined Petroleum and Nuclear Fuel), highlighting the strategic role of this sector in vertical specialization.

To identify groups of countries homogeneous with respect to the structure and to the levels of the indexes (5), a cluster analysis was performed using Ward's method.

As can be noted from the dendrogram shown in Figure 10 of the Appendix, it is appropriate to consider the five groups of countries listed in the following Table 4 and Figure 5 mainly characterized by the mean level of the indexes.

The position of the different countries described by the first two principal components and their distribution among the five groups are shown in the following Figure 6.

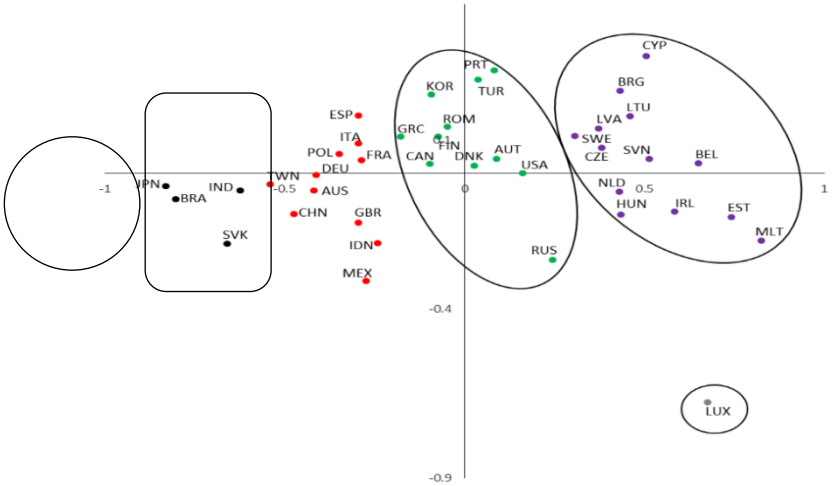
Figure 5 – *Results of the cluster analysis. Year 1995.*



In order to detect the changes that occurred in the period considered, the analysis was repeated for the year 2011. Table 8 of the Appendix shows the usual descriptive statistics indexes (5) for the year 2011.

The results of the principal component analysis carried out on the vectors $\mathbf{m}_h'$ of the 2011 are practically coincident with those of 1995. Indeed, the variability captured by the first two components is about 72%. The first principal component is strongly correlated (in 57% of cases the correlation coefficient exceeds the value 0.80) with all the economic sectors except sector 35 (Private Households with Employed Persons) for which the coefficient is -0.20. The second principal component, as previously, is strongly correlated (0.93) only with sector 8 (Coke, Refined Petroleum and Nuclear Fuel).

Figure 6 – *Countries by import content of the sectors. Year 1995.*



To identify groups of countries homogeneous with respect to the structure and the levels of the indexes (5), a cluster analysis was again performed using Ward's method.

Figure 7 – *Results of the cluster analysis. Year 2011.*

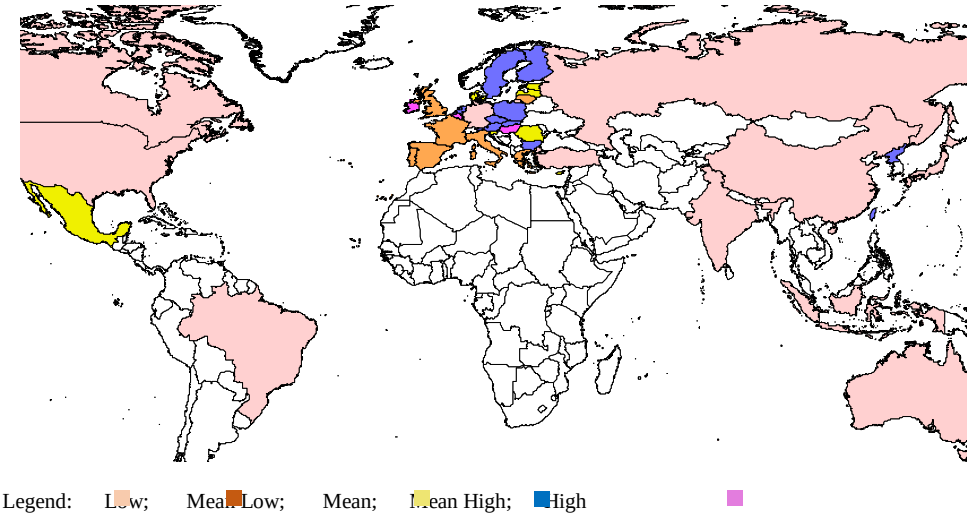
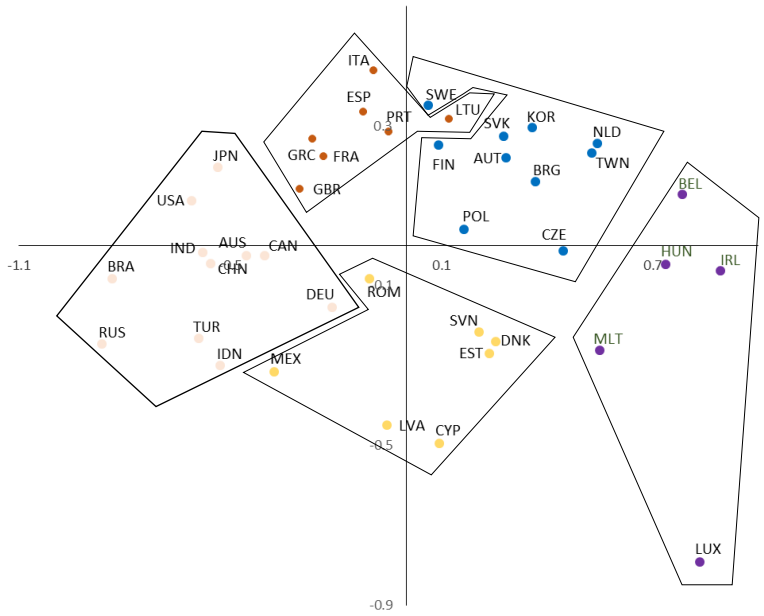


Table 5 – *Classification of the countries according to the index (5). Year 2011.*

Low (0.14)	Mean-low (0.20)	Mean (0.24)	Mean-high (0.28)	High (0.31)
AUS	ESP	CYP	AUT	BEL
BRA	FRA	DNK	BRG	HUN
CAN	GBR	EST	CZE	IRL
CHN	GRC	LVA	FIN	LUX
DEU	ITA	MEX	KOR	MLT
IND	LTU	ROM	NLD	
IDN	PRT	SVN	POL	
JPN			SVK	
RUS			SWE	
TUR			TWN	
USA				

In parentheses the index mean value of the group.

Figure 8 – *Countries by import content of the sectors. Year 2011.*



As can be noted from the dendrogram shown in Figure 10 of the Appendix, it is appropriate to consider the five groups of countries listed in the following Table 5 and represented in the Figure 7, while Figure 8 shows the positions of the different

countries described by the first two principal components and their distribution among the five groups.

Comparing the two classifications, the following characteristics are highlighted:

1) Belgium, Hungary, Ireland and Malta move from the cluster with Mean High values to the cluster with High values;
2) Austria, Finland, Korea, Sweden and Taiwan move from the cluster with Mean values to the cluster with Mean High values;
3) Mexico and Poland move from the cluster with Mean Low values respectively to the cluster with Mean High and High values.

On the contrary:

1) Australia, China, Germany, Indonesia and Turkey move from the group with Mean Low values to the group with Low values. Canada moves from the cluster with Mean values to that with Low values.
2) Greece and Portugal move from the cluster with Mean values to that with Mean Low values. Lithuania moves from the Mean high to Mean Low values clusters. Cyprus, Estonia, Latvia and Slovenia move from the cluster with Mean high values to that with Mean values.

Finally, the remaining 41% of the countries in 1995 are included in the same clusters type of the 2011 classification.

On analysing the descriptive statistics of vectors $\mathbf{m}_h'$ (Table 8), it is possible to highlight that, in 1995, 65% of the countries had the largest vertical specialization in sector 08 (Coke, Refined Petroleum and Nuclear Fuel) and 15% in sector 06 (Wood and Products of Wood and Cork). On the contrary, 45% and 30% of the countries have the lowest outsourcing respectively in sectors 18 (Construction) and 12 (Basic Metals and Fabricated Metal).

A similar situation occurs in 2011. In this case, the largest vertical specialization is for 80% of the countries, in the same sectors as in 1995, while the lowest levels are for 73% of the countries in sectors 29 (Real Estate Activities) and 32 (Education).

5. Conclusion

Using the measure proposed by Hummels et al. (2001), this paper has analysed the degree and evolution of the vertical specialisation (international production fragmentation) of the world economy in the period 1995-2011.

Vertical specialisation occurs when countries specialise in particular stages of a good's production sequence rather then in the entire good.Our main data source has been the World Input Output Table, which covers 40 countries with a classification for 35 industries.

Our main results indicate that in the period analysed the degree of vertical specialisation had a significantly positive trend, increasing, in mean, from 0.24 to 0.30.

More diversified is the evolution of the index for the various countries considered. In particular, the results of the cluster analysis identified three distinct groups of countries. The first group was characterised by low values in the index considered. Generally, this group included the countries of largest size.

The second group consisted of European countries, and the third group generally included the countries of smaller size, characterised by the highest values in the index.

Since the VS index is a mean of imports for intermediate use with weights represented by the relative distribution of exports, the next step of the inquiry was to analyse the influence of the two components (imports and exports) on the index's performance.

The analysis showed that the exports structure changed very little in the period considered, so that the temporal dynamics of the index are attributable to the increase in imports intensity.

Analysis of the imports structure evidenced a particular similarity of behaviour among countries. Indeed, the first two principal components captured over 72% of the imports variability.

Also in this case it was possible to identify five groups of countries with particular similarity in the structure of imports.

Appendix

Table 6 – *VS Index by countries and years.*

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
AUS	0.12	0.12	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.13	0.13	0.14	0.15	0.16	0.12	0.12	0.14
AUT	0.23	0.24	0.25	0.26	0.25	0.27	0.28	0.27	0.28	0.3	0.31	0.32	0.32	0.33	0.29	0.32	0.34
BEL	0.37	0.38	0.39	0.38	0.38	0.4	0.4	0.38	0.37	0.38	0.4	0.42	0.43	0.45	0.39	0.42	0.45
BGR	0.35	0.36	0.41	0.34	0.39	0.39	0.37	0.34	0.37	0.39	0.35	0.37	0.45	0.45	0.33	0.34	0.34
BRA	0.08	0.08	0.08	0.08	0.1	0.11	0.12	0.12	0.12	0.12	0.11	0.11	0.12	0.13	0.1	0.1	0.12
CAN	0.21	0.21	0.22	0.23	0.23	0.23	0.22	0.21	0.2	0.21	0.2	0.2	0.2	0.2	0.18	0.18	0.18
CHN	0.15	0.14	0.14	0.12	0.14	0.17	0.16	0.17	0.21	0.25	0.26	0.26	0.25	0.29	0.25	0.22	0.23
CYP	0.26	0.28	0.31	0.29	0.3	0.34	0.32	0.31	0.31	0.26	0.21	0.26	0.29	0.31	0.27	0.28	0.28
CZE	0.3	0.28	0.31	0.31	0.32	0.37	0.38	0.38	0.39	0.42	0.43	0.44	0.45	0.45	0.39	0.44	0.45
DEU	0.17	0.18	0.19	0.19	0.2	0.22	0.22	0.21	0.22	0.23	0.25	0.27	0.28	0.28	0.24	0.26	0.28
DNK	0.27	0.27	0.27	0.27	0.27	0.3	0.32	0.3	0.29	0.3	0.33	0.36	0.38	0.39	0.37	0.37	0.38
ESP	0.2	0.2	0.21	0.21	0.23	0.26	0.25	0.23	0.24	0.25	0.26	0.28	0.29	0.29	0.23	0.27	0.3
EST	0.37	0.36	0.39	0.4	0.39	0.44	0.47	0.43	0.41	0.4	0.39	0.43	0.38	0.37	0.32	0.33	0.33
FIN	0.22	0.23	0.24	0.22	0.22	0.26	0.24	0.24	0.24	0.27	0.3	0.32	0.32	0.33	0.29	0.32	0.34
FRA	0.19	0.2	0.21	0.21	0.21	0.24	0.23	0.23	0.22	0.23	0.24	0.26	0.26	0.27	0.24	0.26	0.28
GBR	0.18	0.19	0.18	0.16	0.16	0.18	0.17	0.16	0.16	0.16	0.16	0.17	0.17	0.18	0.16	0.18	0.2
GRC	0.2	0.2	0.24	0.24	0.26	0.32	0.35	0.31	0.27	0.29	0.27	0.29	0.28	0.29	0.25	0.25	0.25
HUN	0.29	0.3	0.34	0.39	0.4	0.45	0.44	0.42	0.42	0.44	0.45	0.47	0.47	0.46	0.41	0.44	0.45
IDN	0.14	0.13	0.15	0.19	0.15	0.17	0.19	0.17	0.16	0.18	0.17	0.15	0.15	0.15	0.12	0.12	0.13
IND	0.11	0.11	0.11	0.12	0.14	0.16	0.15	0.14	0.14	0.16	0.18	0.19	0.19	0.2	0.17	0.18	0.19
IRL	0.37	0.37	0.37	0.37	0.39	0.43	0.43	0.39	0.38	0.4	0.4	0.39	0.39	0.4	0.41	0.42	0.43
ITA	0.19	0.17	0.18	0.18	0.18	0.21	0.21	0.2	0.2	0.21	0.23	0.25	0.26	0.26	0.22	0.26	0.28
JPN	0.07	0.08	0.08	0.08	0.08	0.09	0.1	0.1	0.1	0.11	0.12	0.15	0.16	0.2	0.14	0.16	0.19
KOR	0.25	0.26	0.29	0.29	0.28	0.31	0.3	0.29	0.31	0.33	0.34	0.35	0.36	0.44	0.39	0.4	0.42
LTU	0.34	0.34	0.35	0.34	0.31	0.35	0.36	0.34	0.34	0.34	0.36	0.38	0.33	0.41	0.35	0.36	0.36
LUX	0.46	0.48	0.52	0.55	0.55	0.59	0.6	0.58	0.56	0.6	0.59	0.61	0.62	0.62	0.61	0.62	0.62
LVA	0.25	0.26	0.25	0.28	0.25	0.25	0.25	0.25	0.28	0.3	0.3	0.32	0.31	0.29	0.25	0.26	0.25
MEX	0.2	0.2	0.22	0.23	0.24	0.23	0.23	0.23	0.23	0.27	0.26	0.26	0.25	0.24	0.24	0.26	0.25
MLT	0.54	0.48	0.46	0.5	0.5	0.55	0.48	0.46	0.45	0.46	0.44	0.48	0.46	0.44	0.39	0.39	0.4
NLD	0.31	0.31	0.32	0.31	0.32	0.34	0.32	0.31	0.31	0.32	0.33	0.35	0.34	0.36	0.33	0.37	0.39
POL	0.17	0.18	0.18	0.2	0.21	0.26	0.25	0.26	0.29	0.31	0.3	0.33	0.33	0.33	0.28	0.32	0.35
PRT	0.26	0.25	0.26	0.26	0.26	0.29	0.28	0.27	0.28	0.29	0.3	0.31	0.31	0.32	0.27	0.27	0.27
ROM	0.24	0.26	0.25	0.22	0.22	0.26	0.27	0.26	0.27	0.3	0.29	0.29	0.28	0.28	0.23	0.23	0.23
ROW	0.21	0.21	0.18	0.2	0.21	0.22	0.22	0.24	0.25	0.26	0.26	0.25	0.26	0.26	0.24	0.23	0.19
RUS	0.07	0.07	0.07	0.09	0.1	0.1	0.1	0.09	0.1	0.08	0.07	0.07	0.07	0.07	0.05	0.05	0.06
SVK	0.32	0.37	0.37	0.38	0.37	0.42	0.43	0.43	0.44	0.43	0.44	0.46	0.45	0.44	0.39	0.4	0.4
SVN	0.33	0.32	0.32	0.33	0.32	0.36	0.36	0.35	0.35	0.37	0.39	0.41	0.41	0.4	0.34	0.35	0.35
SWE	0.24	0.24	0.25	0.26	0.26	0.28	0.28	0.27	0.27	0.28	0.29	0.3	0.31	0.32	0.3	0.3	0.3
TUR	0.14	0.16	0.18	0.18	0.18	0.21	0.23	0.25	0.26	0.28	0.28	0.31	0.32	0.34	0.28	0.18	0.22
TWN	0.34	0.33	0.34	0.33	0.33	0.37	0.35	0.35	0.39	0.43	0.45	0.47	0.47	0.48	0.44	0.48	0.48
USA	0.09	0.09	0.09	0.09	0.09	0.11	0.1	0.09	0.1	0.11	0.12	0.13	0.13	0.14	0.11	0.13	0.14

Table 7 – *Same descriptive statistics of the MAE index.*

k	Min val.	1° Quart.	Median	3° Quart.	Max val.	Mean
1995	0.003	0.007	0.012	0.024	0.076	0.017
1996	0.003	0.007	0.013	0.020	0.079	0.016
1997	0.003	0.007	0.010	0.019	0.043	0.014
1998	0.003	0.006	0.010	0.017	0.040	0.013
1999	0.003	0.006	0.010	0.017	0.040	0.013
2000	0.003	0.005	0.009	0.014	0.063	0.012
2001	0.003	0.006	0.009	0.014	0.034	0.011
2002	0.003	0.006	0.010	0.015	0.030	0.012
2003	0.003	0.007	0.009	0.013	0.030	0.011
2004	0.003	0.006	0.009	0.012	0.033	0.011
2005	0.003	0.006	0.008	0.012	0.059	0.012
2006	0.003	0.006	0.008	0.014	0.035	0.011
2007	0.003	0.005	0.008	0.014	0.044	0.011
2008	0.003	0.007	0.010	0.018	0.053	0.013
2009	0.003	0.006	0.010	0.016	0.065	0.013
2010	0.003	0.007	0.010	0.015	0.067	0.013
2011	0.003	0.008	0.011	0.015	0.064	0.014

Table 8 – *Descriptive statistics of the global imports of inputs.*

	1995				2011			
	Mean	St. Dev.	Max Value	Min Value	Mean	St. Dev.	Max Value	Min Value
AUS	0.13	0.05	0.27 (08)	0.04 (29)	0.14	0.07	0.31 (08)	0.03 (28)
AUT	0.20	0.10	0.45 (08)	0.04 (32)	0.27	0.14	0.79 (08)	0.06 (32)
BEL	0.29	0.14	0.56 (15)	0.03 (32)	0.36	0.16	0.76 (08)	0.05 (32)
BGR	0.26	0.14	0.66 (08)	0.02 (32)	0.29	0.12	0.68 (08)	0.10 (29)
BRA	0.06	0.04	0.18 (08)	0.00 (29)	0.09	0.05	0.22 (14)	0.01 (29)
CAN	0.17	0.11	0.43 (08)	0.03 (29)	0.16	0.09	0.37 (08)	0.04 (32)
CHN	0.12	0.05	0.22 (14)	0.00 (19)	0.16	0.08	0.44 (08)	0.00 (19)
CYP	0.26	0.17	0.87 (08)	0.04 (29)	0.24	0.15	0.59 (24)	0.00 (08)
CZE	0.26	0.10	0.55 (08)	0.11 (32)	0.31	0.14	0.69 (14)	0.10 (31)
DEU	0.12	0.07	0.32 (08)	0.03 (29)	0.19	0.10	0.37 (15)	0.03 (29)
DNK	0.19	0.11	0.47 (24)	0.04 (29)	0.27	0.14	0.68 (25)	0.07 (29)
ESP	0.14	0.10	0.52 (08)	0.02 (32)	0.21	0.13	0.76 (08)	0.03 (29)
EST	0.31	0.12	0.59 (14)	0.07 (29)	0.27	0.11	0.46 (14)	0.08 (29)
FIN	0.18	0.09	0.52 (08)	0.07 (35)	0.25	0.12	0.75 (08)	0.08 (32)
FRA	0.14	0.08	0.39 (08)	0.02 (29)	0.19	0.13	0.63 (08)	0.02 (29)
GBR	0.15	0.07	0.29 (15)	0.04 (29)	0.18	0.10	0.55 (08)	0.06 (32)
GRC	0.16	0.10	0.47 (08)	0.01 (32)	0.18	0.13	0.70 (08)	0.02 (32)
HUN	0.26	0.10	0.45 (12)	0.07 (32)	0.35	0.14	0.66 (14)	0.10 (32)
IDN	0.15	0.10	0.45 (13)	0.00 (19)	0.15	0.09	0.43 (13)	0.00 (19)
IND	0.09	0.05	0.24 (08)	0.00 (29)	0.13	0.10	0.54 (16)	0.00 (31)
IRL	0.29	0.12	0.55 (14)	0.09 (32)	0.39	0.12	0.63 (08)	0.11 (32)
ITA	0.14	0.08	0.43 (08)	0.01 (29)	0.21	0.15	0.86 (08)	0.01 (29)
JPN	0.06	0.04	0.22 (08)	0.01 (29)	0.14	0.12	0.53 (08)	0.01 (29)
KOR	0.17	0.11	0.63 (08)	0.03 (29)	0.28	0.15	0.83 (08)	0.06 (29)
LTU	0.27	0.12	0.63 (08)	0.06 (29)	0.24	0.15	0.78 (08)	0.05 (32)
LUX	0.30	0.16	0.61 (12)	0.00 (05)	0.37	0.18	0.71 (28)	0.00 (05)
LVA	0.26	0.10	0.55 (08)	0.06 (27)	0.22	0.12	0.52 (12)	0.00 (08)
MEX	0.14	0.11	0.54 (14)	0.02 (29)	0.17	0.12	0.61 (14)	0.02 (29)
MLT	0.31	0.16	0.76 (14)	0.05 (29)	0.33	0.13	0.63 (14)	0.06 (32)
NLD	0.26	0.12	0.46 (15)	0.06 (32)	0.31	0.16	0.83 (08)	0.08 (32)
POL	0.14	0.07	0.41 (08)	0.03 (32)	0.26	0.12	0.54 (08)	0.06 (32)
PRT	0.20	0.14	0.76 (08)	0.03 (32)	0.22	0.14	0.74 (08)	0.03 (32)
ROM	0.19	0.09	0.49 (08)	0.05 (28)	0.22	0.09	0.36 (24)	0.05 (26)
RUS	0.09	0.05	0.24 (04)	0.03 (20)	0.09	0.06	0.33 (15)	0.03 (29)
SVK	0.28	0.12	0.58 (25)	0.08 (28)	0.28	0.15	0.72 (08)	0.08 (29)
SVN	0.24	0.12	0.57 (08)	0.03 (29)	0.27	0.12	0.51 (15)	0.07 (29)
SWE	0.20	0.12	0.71 (08)	0.06 (32)	0.24	0.15	0.88 (08)	0.00 (05)
TUR	0.10	0.06	0.26 (08)	0.00 (31)	0.14	0.08	0.36 (15)	0.03 (32)
TWN	0.21	0.12	0.44 (14)	0.03 (28)	0.31	0.19	0.79 (08)	0.03 (20)
USA	0.08	0.06	0.28 (08)	0.02 (29)	0.13	0.08	0.45 (08)	0.03 (29)

In parenthesis the economic sector

Figure 9 – *Dendrogram of the countries with respect to the VS evolution.*

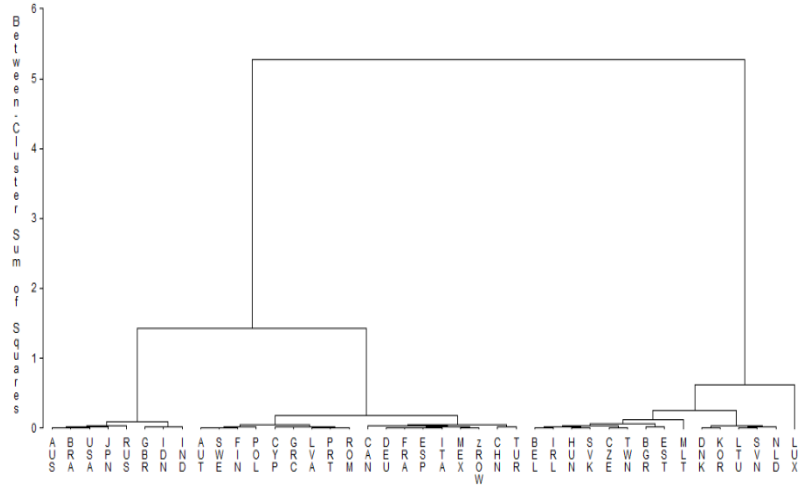


Figure 10 – *Dendrogram of the countries with respect to imports of inputs. Year 1995.*

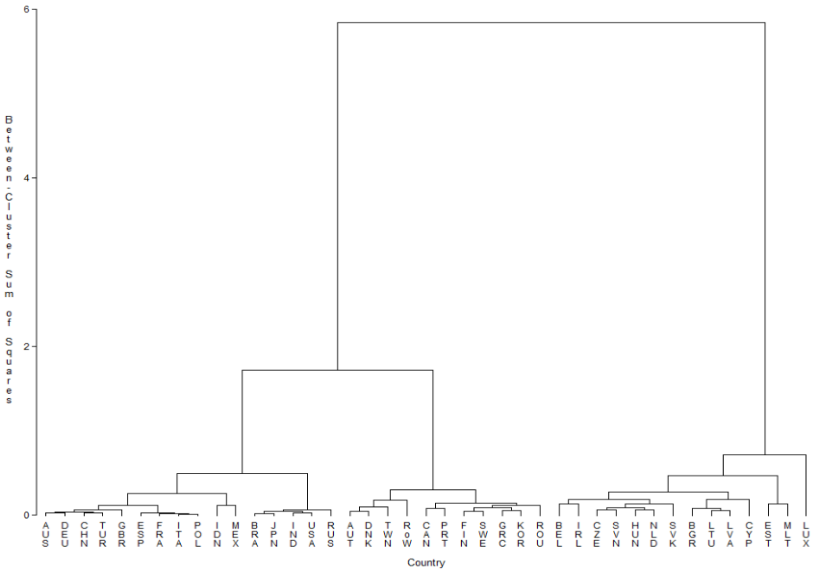
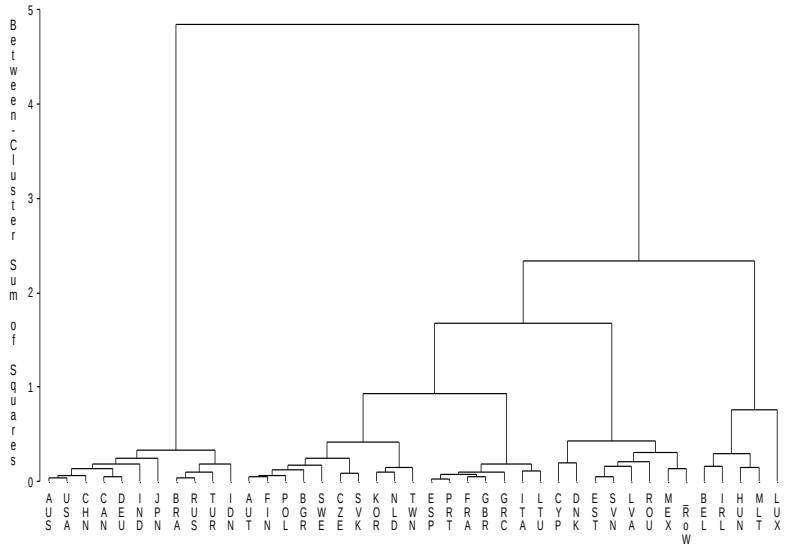


Figure 11 – *Dendrogram of the countries with respect to imports of inputs. Year 2011.*



Country abbreviations:

AUS	Australia	ESP	Spain	JPN	Japan	RoW	Rest of World
AUT	Austria	EST	Estonia	KOR	Korea	RUS	Russia
BEL	Belgium	FIN	Finland	LTU	Lithuania	SVK	Slovakia
BGR	Bulgaria	FRA	France	LUX	Luxembourg	SVN	Slovenia
BRA	Brazil	GBR	Great Britain	LVA	Latvia	SWE	Sweden
CAN	Canada	GRC	Greece	MEX	Mexico	TUR	Turkey
CHN	China	HUN	Hungary	MLT	Malta	TWN	Taiwan
CYP	Cyprus	IDN	Indonesia	NLD	Netherlands	USA	United States of America
CZE	Czech Rep.	IND	India	POL	Poland		
DEU	Germany	IRL	Ireland	PRT	Portugal		
DNK	Denmark	ITA	Italy	ROM	Romania		

Economic Sectors			
01	Agriculture, Hunting, Forestry and Fishing	19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel
02	Mining and Quarrying	20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles
03	Food, Beverages and Tobacco	21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods
04	Textiles and Textile Products	22	Hotels and Restaurants
05	Leather, Leather and Footwear	23	Inland Transport
06	Wood and Products of Wood and Cork	24	Water Transport
07	Pulp, Paper, Paper , Printing and Publishing	25	Air Transport
08	Coke, Refined Petroleum and Nuclear Fuel	26	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies
09	Chemicals and Chemical Products	27	Post and Telecommunications
10	Rubber and Plastics	28	Financial Intermediation
11	Other Non-Metallic Mineral	29	Real Estate Activities
12	Basic Metals and Fabricated Metal	30	Renting of M&Eq and Other Business Activities
13	Machinery, Nec	31	Public Admin and Defence; Compulsory Social Security
14	Electrical and Optical Equipment	32	Education
15	Transport Equipment	33	Health and Social Work
16	Manufacturing, Nec; Recycling	34	Other Community, Social and Personal Services
17	Electricity, Gas and Water Supply	35	Private Households with Employed Persons
18	Construction		

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SUMMARY

In recent years, the phenomenon of vertical specialization, i.e. linkage among the productive processes of countries, has grown dramatically. Using the import content in exports, this paper analyse the degree of vertical specialization of the world economy and its evolution for the period 1995-2011. The analysis uses the World Input Output Table. Our evidence supports a significant increase in the vertical specialization of the world economy during the period analyzed.

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EFFETTI DELLA RECESSIONE: UN'ANALISI DEI DIVARI TERRITORIALI DEL REDDITO PRO CAPITE IN GRECIA

Luca Salvati, Margherita Carlucci, Giuseppe Venanzoni

1. Introduzione

In Europa, il tema della convergenza del reddito regionale è stato al centro dell'interesse dall'inizio del processo di unificazione e la riduzione delle disparità regionali è stata posta come obiettivo fondamentale per la politica comune europea (ESPON, 2014). Le asimmetrie di crescita nelle economie regionali sono state oggetto di un gran numero di studi, stimolati anche dalle evidenze empiriche di ridotta – o assente - influenza dei processi di convergenza economica sulla riduzione delle disparità territoriali (Arbia e Paelinck, 2003; Christopoulos, 2004; Fratesi e Percoco, 2013). Forti disparità strutturali sono osservabili a scala continentale: un esempio è fornito dal Sud Europa, dove si osservano importanti divari economici anche tra regioni confinanti e gran parte delle aree marginali interne in Portogallo, Spagna, Italia, Grecia e Turchia mostrano una economia stagnante. Le cause sono state identificate di volta in volta in fenomeni a livello macro, come la gerarchia urbana, i sistemi abitativi, le interazioni stato-mercato, i regimi di welfare ed i cambiamenti istituzionali (Cracolici et al., 2007; Kyriakou e Roca Sagales, 2014). Tuttavia, l'insufficiente capacità di adattamento della base produttiva, i fenomeni di spopolamento e la bassa qualità del capitale umano rimangono fattori rilevanti che determinano il divario con le regioni ricche e più accessibili, situate lungo le zone costiere e intorno alle aree metropolitane (Prodromidis, 2014).

Particolare interesse riveste l'analisi delle dinamiche di breve periodo della convergenza regionale e della diversa capacità di resilienza dei contesti territoriali locali a fronte di shock esogeni (Frenken et al., 2007). Secondo Frenken et al. (2007), il grado di specializzazione produttiva di una regione migliora le opportunità di crescita dell'occupazione nel medio termine, ma espone ad una maggiore vulnerabilità agli shock esterni nel lungo periodo. Al contrario, regioni con una struttura economica più diversificata presentano livelli di crescita inferiori, ma sono più resistenti agli shock esterni (Kemeny e Storper, 2015). Rodriguez-Pose e Fratesi (2007) hanno identificato un’evoluzione pro-ciclica delle disparità

regionali in Italia, Portogallo e Spagna, ma non in Grecia e Francia, ed una relazione significativa tra questi andamenti pro-ciclici e l'emergere di economie meno dinamiche nelle regioni periferiche.

Grazie alla dimensione mondiale e alla sua gravità, la crisi finanziaria iniziata nel 2008 può essere considerata un punto di svolta nei sistemi economici regionali (Lee, 2014). Una serie di studi empirici ha analizzato l'impatto della recessione sui processi economici, cercando di individuare le regioni resilienti e quali siano le più importanti caratteristiche socio-economiche che le caratterizzano (Lee, 2014). Il gap nella capacità di resilienza dei sistemi regionali potrebbe infatti aggravare le disparità regionali in termini di disoccupazione (Christopoulos, 2004; Patacchini e Rice, 2007; Taulbut e Robinson, 2014).

Essendo uno dei paesi in cui l'impatto della recessione è stato più visibile, la Grecia rappresenta una economia svantaggiata in Europa, con evidenti disparità regionali. Nonostante la crescita economica stimolata dalle Olimpiadi e dall'aumento del debito pubblico, la successiva stagnazione ha congelato i cambiamenti nella struttura produttiva che rimane centrata, in gran parte, su costruzioni, commercio e turismo. La recessione ha colpito la società greca più che nel resto dell'Europa meridionale, con un tasso di disoccupazione che cresce fino al 26% ed un tasso di disoccupazione giovanile che raggiunge il 50% nel 2014.

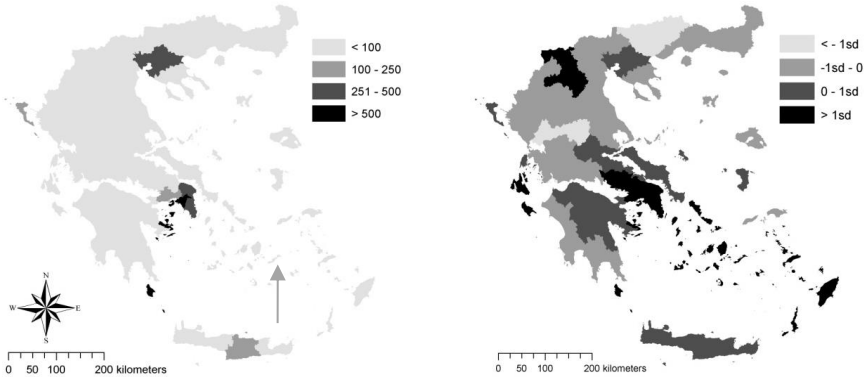
La Grecia offre un'opportunità unica per esaminare la sensibilità a breve termine dei sistemi regionali alle fasi di espansione e di recessione *(sensu* Cho et al., 2014), nonché di verificare l'impatto complessivo della crisi sulle disparità regionali in termini di reddito pro-capite. Partendo dall'ipotesi che il contesto territoriale locale eserciti un'influenza fondamentale sul potenziale di resilienza regionale e utilizzando un'analisi esplorativa dei dati, questo studio si propone di ricostruire un quadro completo della struttura spaziale del reddito nelle prefetture greche tra il 2000 e il 2012. Allo stesso tempo, il lavoro offre un contributo al dibattito sulla resilienza socio-economica collegata al tema delle disparità regionali. La variazione temporale del reddito pro-capite è qui interpretata come un *proxy* di resistenza agli shock economici (nel caso di una riduzione nella regione inferiore alla media nazionale) o di recupero post-shock (nel caso di un aumento superiore alla media). Collegando i divari regionali di reddito pro-capite con il gradiente urbano, lo studio permette una migliore conoscenza dei distinti fattori territoriali che modellano le disparità socioeconomiche durante le fasi di espansione e di recessione, contribuendo alla progettazione di politiche mirate di sviluppo locale.

2. Metodologia

2.1. L'area di studio

L'area indagata comprende tutta la Grecia (131.982 km^2). Le unità di osservazione sono le 51 prefetture ('Nomoi' in greco), corrispondenti al livello gerarchico NUTS-3 dell'Unione Europea. In Grecia le prefetture costituiscono un livello amministrativo intermedio tra regioni e comuni, ad una scala che permette di identificare il ruolo di gradienti geografici quali l'altitudine e la distanza dalla città capoluogo. Il centro del sistema urbano greco è situato nella regione dell'Attica (in cui si concentra oltre il 30% della popolazione del paese), comprendente l'area metropolitana di Atene (oltre 3 milioni di abitanti). A partire dalla fine degli anni Novanta lo sviluppo demografico ha interessato soprattutto città di medie dimensioni (tra cui Salonicco e Iraklion) e alcune città capoluogo (Patra, Larissa, Volos, Kalamata, Chania, tra gli altri). Le zone rurali interne hanno vissuto forti fenomeni di spopolamento, in contrasto con le regioni dinamiche costiere, specializzate nel turismo (Figura 1), ivi comprese le isole Ionie ed Egee.

Figura 1 – *Distribuzione spaziale della densità di popolazione (sinistra; la freccia indica Atene) e del reddito pro-capite (destra; sd=deviazione standard). Anno 2012*



2.2. Statistiche descrittive

L'ufficio statistico greco (ELSTAT) diffonde a livello di prefettura i dati di popolazione ed il reddito lordo pro-capite a prezzi correnti. Per tener conto delle specificità regionali della struttura dei prezzi, i valori di reddito sono stati corretti utilizzando le Parità di Potere d'Acquisto della regione corrispondente (livello NUTS-2) per gli anni 2000-2012 di fonte Eurostat. Sulla base dei dati territoriali ELSTAT sono state poi costruite per ogni prefettura le mappe per il calcolo delle

distanze dai centri principali: Atene, Salonicco e Iraklion. Per la descrizione della distribuzione spaziale dei redditi pro capite sono stati utilizzati i seguenti indicatori di tendenza centrale, variabilità, simmetria e curtosi: Med, rapporto tra mediana e media aritmetica; Cv, coefficiente di variazione (%); Nor, range tra il massimo e il minimo valore per prefettura normalizzato alla mediana; Ske, l'indice di simmetria; Kur, l'indice di curtosi. Come indicatori di disparità territoriale tra le aree del Paese, sono stati calcolati per ogni anno il rapporto tra reddito mediano delle prefetture più ricche (sopra la mediana nazionale) e di quelle più povere (Mra); il rapporto tra coefficiente di variazione dei redditi nelle prefetture più ricche e in quelle più povere (Cra); i valori, normalizzati alla mediana, delle differenze in valore assoluto tra il reddito pro-capite rispettivamente di Atene (Att), Salonicco (Sal) e Iraklion (Ira) e il minimo valore registrato nelle prefetture.

2.3. Analisi spaziali

Per meglio caratterizzare la struttura spaziale del reddito pro-capite in Grecia è stata condotta un'analisi esplorativa dei dati spaziali. Per ogni prefettura è stato identificato un set di unità vicine con le quali questa potrebbe interagire, attraverso la definizione di una matrice di pesi basati sulle distanze euclidee tra i centri gravitazionali delle prefetture. In particolare, le contiguità tra le unità sono state rappresentate dalla matrice W = { wij } ove wij = 1 se la distanza tra le prefetture *i* e *j* è inferiore a una soglia fissa, *d*, e 0 altrimenti. Sono stati presi in considerazione sei valori di *d* variabili tra 75 e 200 km con un passo di 25 km, al fine di valutare fino a che distanza si estendano i legami tra unità spaziali, e quindi il grado di correlazione spaziale. Utilizzare definizioni alternative di 'vicinanza' invece di una sola soglia definita a priori permette di ricavare informazioni sul modello di dipendenza spaziale che massimizza l'intensità delle relazioni tra regioni (Patacchini, 2008). Per tre anni individuati come punti di svolta attraverso l'analisi della dinamica degli indicatori (2000, 2008, 2012; dati disponibili a richiesta), l'autocorrelazione spaziale globale è stata studiata tramite l'indice I di Moran. Data la distribuzione dei valori assunti da una variabile su un insieme di unità spaziali, l'indice di Moran indica se il modello spaziale è in *cluster*, disperso, o casuale, restituendo un punteggio Z e la probabilità dell'errore di I specie per valutarne la significatività sotto l'ipotesi nulla di indipendenza spaziale. L'indice I riflette il modello di auto-correlazione spaziale dominante sul territorio: per mettere in luce eventuali differenze nei pattern di associazione spaziale a livello locale è possibile utilizzare l'indice di Moran locale, che misura la correlazione tra il valore per una data area e quelli delle aree vicine, e può essere utilizzato per identificare le posizioni atipiche nonché gruppi di valori alti o bassi. Un valore positivo e significativo dell'indice di Moran locale indica un *clustering* spaziale di valori

simili (alti, HH, o bassi, LL), mentre un valore negativo e significativo indica un *clustering* spaziale di valori dissimili (HL o LH) tra un territorio ed i suoi vicini.

I valori dell'indice di Moran locale calcolati per le 51 prefetture, infine, sono stati correlati, separatamente per i tre anni selezionati, con sei variabili rappresentative di importanti gradienti geografici in Grecia: (i) la densità di popolazione (che indica il gradiente urbano-rurale), (ii) l'ampiezza della popolazione (che illustra la gerarchia urbana greca), (iii) l'altitudine (come *proxy* di accessibilità), (iv) la distanza dalla capitale Atene, (v) le distanze da Salonicco e Iraklion, seconda e terza città della Grecia e (vi) il reddito lordo pro capite. Un test basato sulla bontà di adattamento (R^2) di un modello polinomiale del secondo ordine (test di Fisher-Snedecor con soglia di significatività $p < 0.05$), è stato effettuato per ogni correlazione secondo la procedura illustrata in Salvati e Carlucci (2014). Correlazioni significative indicano che l'indice di Moran locale aumenta con i valori più alti e più bassi dei predittori.

3. Risultati

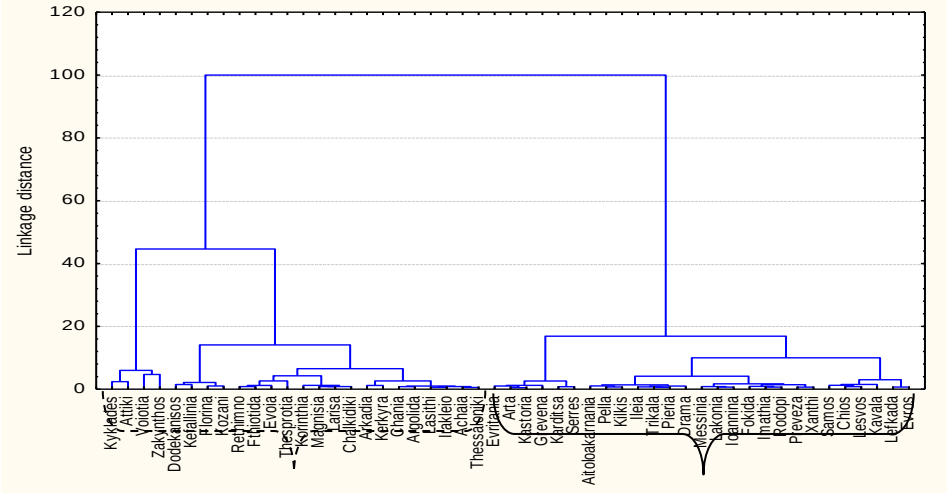
3.1. Statistiche descrittive

La distribuzione del reddito pro-capite mostra un netto gradiente da Atene e le zone centrali della Grecia ai distretti periferici settentrionali (Figura 1) con il consolidamento del divario tra zone rurali marginali, da un lato, e prefetture costiere, aree metropolitane e pianure interne più accessibili specializzate nella produzione agricola di qualità, dall'altro. Le prefetture intorno all'area metropolitana di Atene o a specializzazione turistica (Attica, Viotia, Evia, le Cicladi) sono le regioni con un reddito pro-capite superiore alla media di oltre una deviazione standard in tutto il periodo, mentre un reddito pro-capite persistentemente basso si osserva nelle prefetture meno accessibili della Grecia settentrionale e occidentale.

Ulteriori informazioni sulla struttura spaziale della distribuzione del reddito sono state ottenute applicando un *clustering* gerarchico (metodo di Ward). Usando una soglia pari al 50%, il dendrogramma in Figura 2 permette di individuare due gruppi di unità. Nel *cluster* di sinistra (dalle Cicladi a Salonicco) troviamo le aree urbane e peri-urbane, le coste e le pianure più fertili, caratterizzate da un contesto economico dinamico, una base produttiva diversificata e specializzazione turistica. Il *cluster* a destra (da Evritania a Evros) include le prefetture rurali meno dinamiche, marginali, meno accessibili e con una base produttiva poco diversificata.

Il rapporto tra mediana e media aritmetica (Med) del reddito nelle prefetture greche è stato relativamente stabile intorno a 1 nel periodo considerato (Tabella 1), indicando simmetria nella relativa distribuzione. Il coefficiente di variazione (Cv) dei redditi, stabile durante la fase di espansione economica (compreso tra 22,7% nel 2000 e 22,6% nel 2007), appariva in leggero calo al 21,4% nel 2012. Il range normalizzato (Nor) diminuiva da 1,25 (2000) a 0,98 (2007), risalendo poi fino a stabilizzarsi a 1,03 nel 2012. Una riduzione moderata del divario tra regioni più ricche e quelle più povere si è verificata durante la fase di espansione, con un rallentamento nel periodo successivo. Asimmetria (Ske) e curtosi (Kur) si riducono alla fine dell'espansione arrivando ad assumere i valori più bassi osservati nella serie storica esaminata, aumentando invece durante la recessione. Questo suggerisce che la crescita economica si è associata ad una distribuzione più omogenea dei redditi sul territorio.

Figura 2 – *Clustering geografico delle prefetture rispetto al reddito pro-capite Anni 2000-2012.*



Per tutti gli anni esaminati, la distribuzione del reddito pro-capite in Grecia mostra differenze significative (test *U* di Mann-Whitney, $p < 0{,}001$) tra prefetture con un reddito superiore alla mediana e quelle con reddito pro capite inferiore. Tuttavia, i valori più bassi del test *U* - che indicano differenze meno significative tra le due partizioni analizzate - sono stati registrati alla fine del periodo di espansione, tra il 2006 e il 2010 (dati disponibili su richiesta). Questi risultati confermano che l'impatto della crescita economica in termini di modelli spaziali di reddito era abbastanza simile nelle zone più e meno dinamiche del paese, mentre le differenze più evidenti si sono osservate durante la recessione post-2008. Il

rapporto tra i valori nelle prefetture più affluenti e quelli nelle prefetture più svantaggiate sia del reddito mediano sia del coefficiente di variazione mostra importanti variazioni nel tempo.

La distanza tra prefetture abbienti e svantaggiate in termini di reddito pro-capite (Mra) è rimasta stabile fino al 2009 per poi diminuire negli anni successivi. Le disparità di variabilità dei redditi locali tra prefetture abbienti e svantaggiate (Cra) sono diminuite notevolmente durante il periodo di crescita economica, aumentando con la stessa intensità durante la recessione. Infine, le disparità di reddito tra le aree urbane selezionate e la prefettura più svantaggiata in Grecia sono aumentate continuamente nel caso di Atene (Att) mentre sono stabili o in leggero calo per Salonicco (Sal) e Iraklio (Ira).

Tabella 1 – *Indicatori della distribuzione spaziale dei redditi. Anni 2000-2012*

Anno	Med	Cv	Nor	Ske	Kur	Att	Mra	Cra	Sal	Ira
2000	0.969	22.7	1.25	1.42	3.73	0.57	1.34	1.71	0.43	0.38
2001	0.983	21.9	1.24	1.59	5.09	0.59	1.33	1.54	0.39	0.38
2002	0.945	21.6	1.16	1.15	2.21	0.68	1.38	1.53	0.42	0.47
2003	1.011	21.5	1.06	1.01	1.77	0.66	1.34	1.28	0.43	0.42
2004	0.984	21.0	1.04	0.87	1.30	0.70	1.35	1.19	0.48	0.42
2005	0.988	22.9	1.00	1.00	0.89	0.86	1.32	1.50	0.39	0.41
2006	0.968	23.1	0.98	0.82	0.32	0.95	1.35	1.30	0.47	0.48
2007	0.975	22.6	0.98	0.92	0.65	0.93	1.33	1.38	0.44	0.43
2008	0.989	22.4	1.01	0.99	0.89	0.97	1.31	1.40	0.46	0.45
2009	0.957	22.7	1.08	1.16	1.41	1.03	1.34	1.55	0.46	0.45
2010	0.974	21.5	1.01	1.30	1.93	1.00	1.30	1.71	0.41	0.42
2011	0.958	21.7	1.02	1.34	1.98	1.02	1.26	1.78	0.40	0.39
2012	0.976	21.4	1.03	1.32	1.95	1.03	1.25	1.75	0.38	0.37

3.2. Analisi spaziali

I valori dell'indice globale di Moran per il reddito pro-capite mostrano una autocorrelazione spaziale positiva tra le diverse prefetture: le aree a (relativamente) maggior reddito si collocano vicine tra loro in maniera non casuale (dati disponibili su richiesta). Ciò vale per tutte le soglie di distanza considerate, con il massimo valore dell'indice a d = 150 km in tutti gli anni considerati. Inoltre, a tutte le soglie i valori crescono nel tempo, ad indicare che l'alternarsi di espansione e recessione ha consolidato il pattern dominante di autocorrelazione spaziale del reddito. Per tutti gli anni esaminati, i valori degli indici di Moran locali osservati nelle diverse prefetture confermano i risultati dell'analisi descrittiva, identificando un gradiente dall'area metropolitana di Atene (valori significativi di tipo HH) alle regioni più periferiche della Grecia nordoccidentale (valori significativi di tipo LL). Rispetto al

2000, nel 2008 si osserva un modello spaziale più complesso, con la nascita di un gruppo significativo nel regime HL nel nord della Grecia e la diffusione del *cluster* LL verso la Grecia settentrionale. Questi risultati suggeriscono come l'espansione economica abbia guidato la struttura spaziale del reddito verso un modello più equilibrato, evidenziando le prestazioni di alcune prefetture periferiche. La distribuzione nel 2012 è simile a quanto osservato nel 2008, ma con un leggero aumento del divario tra regioni centrali e periferiche.

Figura 3 – *Valori degli indici locali di Moran di associazione spaziale nelle prefetture greche. Anni 2000-2008-2012.*

2000 2008 2012

I risultati delle regressioni quadratiche degli indici (Z-score) di Moran locali calcolate nelle 51 prefetture mostrano valori significativi del coefficiente di determinazione ($p < 0{,}001$) per il reddito pro-capite (rispettivamente, 0,60 nel 2008 e 0,62 nel 2012) e la distanza da Atene (0,62 e 0,70), confermando la crescente importanza del gradiente urbano centrato sulla capitale nel determinare la forma della distribuzione spaziale del reddito nel Paese.

4. Discussione

Negli ultimi decenni, le disparità socioeconomiche plasmate da una crescita regionale asimmetrica sembrano essere esaltate da fattori esterni collegati alla struttura economica locale, al contesto socio-demografico ed a condizioni territoriali *place-specific* (D'Uva e De Siano 2011, Lee, 2014). In molti casi, i divari tradizionali si sono consolidati come risultato di uno sviluppo polarizzato, determinato da una distribuzione spaziale squilibrata del capitale a tutti i livelli: economico, umano e naturale. Questo lavoro fornisce alcuni spunti per l'analisi dello sviluppo locale in un Paese europeo diviso e più di altri esposto alla crisi

globale, esplorando la distribuzione spaziale del reddito pro-capite in 51 prefetture greche durante l'alternarsi di fasi di espansione economica e di recessione. Le prefetture si sono dimostrate un dominio spaziale abbastanza dettagliato per rappresentare l'impatto che i gradienti geografici hanno sui divari socio-economici in Grecia, mostrando allo stesso tempo di possedere i requisiti necessari di affidabilità e coerenza delle fonti e di rilevanza per le questioni regionali (Zuindeau, 2006). Le maggiori variazioni spaziali del reddito pro-capite si osservano lungo i due gradienti costiero-interno e urbano-rurale, riflettendo i diversi percorsi di sviluppo seguiti dalle regioni della Grecia. Ridurre le disparità socioeconomiche lungo questi gradienti è considerato in molti contesti europei un obiettivo primario per le politiche di sviluppo regionale.

Con l'introduzione di un approccio esplorativo dei dati spaziali nell'analisi delle disparità di reddito, questo lavoro si incentra sulle dinamiche spazio-temporali del reddito pro-capite, come indicatore di sensibilità agli shock esterni (D'Agostino e Scarlato, 2013). Le dinamiche spaziali della variabile *target* sono state interpretate come una possibile misura di resilienza regionale, per individuare le caratteristiche delle prefetture con una *performance* migliore (Taulbut e Robinson, 2014) e allo stesso tempo il ruolo dei cicli di espansione e recessione nel plasmare le disparità regionali. L'evidenza suggerisce che il 2008 è stato il punto di svolta tra un modello caratterizzato da una lenta convergenza tra aree ad alto e a basso reddito ed un regime più eterogeneo, in cui anche distretti economicamente più ricchi in partenza si sono trovati ad essere più esposti alla recessione. I risultati confermano l'effetto positivo delle fasi di espansione economica sui processi di convergenza reale osservati in Europa meridionale (Rodriguez-Pose e Fratesi, 2007; ma si veda anche Arbia e Paelinck, 2003; Patacchini e Rice, 2007; D' Uva e De Siano, 2011). L'effetto più evidente della recessione in Grecia è invece l'ampliamento della dicotomia tra l'area metropolitana di Atene ed il resto del Paese. I distretti urbani, industriali, del turismo ed i principali distretti agricoli – che avevano realizzato le massime prestazioni durante il periodo 2000-2007 – si sono mostrati poco resistenti agli shock esterni, come la dinamica del reddito osservata per Salonicco e Iraklion indica chiaramente. La vulnerabilità economica delle aree medie urbane in Grecia è probabilmente dovuta ad una combinazione di fattori tra cui la frammentazione della produzione industriale, la scarsa presenza di funzioni urbane avanzate, l'incidenza di attività informali nel settore turistico, una forte dipendenza dell'agricoltura dalle sovvenzioni comunitari, nonché le cosiddette 'eterogeneità multiple' che caratterizzano il sistema economico greco (Monastiriotis, 2011), con una conseguente differenziazione nelle forme e nell'intensità di regolazione del mercato del lavoro tra le regioni della Grecia. La moderata riduzione delle disparità regionali di reddito nel periodo di studio è stata accompagnata da un netto aumento del divario tra l'area metropolitana di Atene e il resto della Grecia. Da un lato,

questo è il risultato del primato di lunga data di Atene nella gerarchia urbana greca (Tsakloglou, 1990), che si è approfondito nel tempo: negli ultimi anni la regione della capitale è diventata l'area più avanzata in Grecia per i settori economici ad alto rendimento, come quello immobiliare, le telecomunicazioni, i servizi bancari e finanziari (Koutsampelas e Tsakloglou, 2013). Dall'altro, la crisi globale può rivelare modelli più sottili di disparità regionali, ampliando il divario tra le aree (o l'area) più avanzate e un numero sempre maggiore di regioni in ritardo, anche in un contesto di ridotta dispersione 'media' dei redditi regionali. Le evidenze negative del 'modello greco' per i centri urbani medi suggeriscono un'interpretazione diversa dell'impatto della recessione sulle disparità regionali di reddito, rispetto ai sistemi urbani 'maturi' dell'Europa nord-occidentale. Allo stesso tempo, i nostri risultati hanno evidenziato l'importanza dei fattori territoriali specifici, suggerendo una maggiore attenzione al ruolo dei gradienti geografici di base (Zuindeau, 2006) sulla resistenza agli shock a breve termine dei sistemi economici locali. Ulteriori indagini sono necessarie per verificare se i cambiamenti nella base produttiva regionale o politiche redistributive spaziali avranno un impatto positivo sulla competitività senza deprimere le performance economiche delle regioni più ricche e dinamiche.

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SUMMARY

Recession in action: exploring regional disparities in per-capita income (2000-2012) in Greece

The present study assesses recent changes (2000-2012) in the spatial distribution of per-capita income in the Greek prefectures with the objective to test the role of the economic crisis in shaping regional disparities in the country. An exploratory approach incorporating descriptive statistics, multivariate techniques and spatial analysis was used to investigate specific development paths for homogeneous groups of regions. To discuss the impact of recession on the increasingly complex geography of economic development in Greece, this approach has been preferred to more traditional procedures based on convergence analysis in income level and changes over time. Our results outline a period with generalized economic growth between 2000 and 2008 reflected in the consolidated territorial disparities between more accessible urban regions and economically-disadvantaged rural regions. With economic stagnation (2009-2012) an asymmetric distribution of regional income has been observed, although with moderate disparities among prefectures. Spatial dynamics in per-capita income indicate that lower-income regions are less sensitive to short-term shocks and seem to respond better to the current recession (i.e. with a moderate decrease or even with a slight increase of per-capita income). These evidence partly contrast with recent literature indicating how dynamic and affluent regions (metropolitan zones, manufacture districts and tourism-specialized areas) resulted to be less exposed to external shocks than disadvantaged regions.

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ITALIAN FAMILIES ON VACATION: A QUANTITATIVE ANALYSIS OF HOLIDAY EXPERIENCES

Livia Celardo, Domenica Fioredistella Iezzi

1. Introduction

Since the beginning of the twentieth century, low-cost travel, new associations that organize spare time, and mass tourism have played an important role in the growth of family holidays. Several studies into families and holidays showed that tourist activities and leisure time shared with family members help to maintain and consolidate family systems and improve communication between family members (Shaw and Dawson, 2001; Orthner and Mancini, 1990). Some scholars have probed the relationship between the level of participation in leisure activities of family members and indicators of "functioning" of the family, such as cohesion, communication, and satisfaction. Orthner and Mancini (1990) argue that the sharing of leisure and activities during holiday periods and detachment from everyday life help to keep family relationships firm. Nevertheless, this relationship between families and tourism reflects the changes in the family framework of Western countries, because these transformations in demographics have implied important changes in tourists' behaviour (Schänzel, Smith, and Weaver, 2005).

In this paper, we analyze travel choices of Italian families and their profiles. Information provided by market segmentation allows marketers to improve specific marketing efforts to more profitable customer segments (D'Urso, De Giovanni, Disegna, Massari, 2013). The literature shows us two typologies of market segmentation (Chandra and Menezes, 2001):

1) A-priori or common-sense segmentation: this approach leads to the examination of groups derived from dividing the population on the basis of prior information (Dolnicar, 2002, 2004);

2) Post hoc or data-driven segmentation: In this case, subjects are classified into groups according to their similarities. Consequently, with this approach, the researcher doesn't recognize in advance the number and composition of segments produced analytically.

So, in both approaches, market segmentation is realized through the support of different statistical methods. A lot of techniques can be applied (Boone, Roehm,

2002), but it is impossible to define the best method or algorithm for dividing the market (Dolnicar and Grün, 2008), because it depends both on the nature of the data and on the objectives of the research.

2. Data

From the quarterly multipurpose survey "Trips and Holidays" produced by the National Institute of Statistics (ISTAT) since 1997, we analyze a sample of 14,024 Italian families. Our analysis focused on the four quarters of 2013: January-March, April-June, July-September, and October-December. In each quarter, information about family members and travels done in the referring period is collected.

"Trips and Holidays" is a CATI (Computer Assisted Telephone Interview) survey collected on a sample of around 3,500 households and 8,000 individuals per quarter; the main objective pf this survey is to allow the Institute to investigate tourism activities of Italian residents, both tourists and non-tourists. Specifically, the collection of the data makes it possible to quantify the flow of Italian tourists not only within the country but also abroad; furthermore, it examines the characteristics and the patterns of Italians' journeys. According to the purpose of the survey, its target population consist of Italian families, defined as sets of people who live together, connected through marriage, family relationship, affinity, adoption, or protection (ISTAT, 2014).

From this survey, we obtained a final sample of 2,279 households, selecting the families who have at least holiday in one of the quarter of 2013. To describe Italians' holidays, we chose fifteen variables (Table 1; to illustrate the socio-demographic characteristics of households, we selected five indicators (Table 2).

In 2013, 78.54 percent of families made at least one trip to Italy, while 24.31 percent of families went to Europe and 5.44 percent went to the rest of the world, commonly by means of car or bus.

Over half of the travelers made a trip for pleasure (64.24 percent) or to visit relatives (29.88 percent). Only a small part of the sample travelled for religious tourism (3.12 percent) or health reasons (2.76 percent).

The four-quarter format shows a significant difference between the third quarter and the others: in fact, the summer season is predominantly characterized by long-standing and local holidays, staying in privately owned structures (second homes or relative's houses) and travelling by car or similar (Table 3).

Table 1 − *Travel habits variables*

Variables	Meaning	Levels
Trim	Quarter	January-March/ April-June/ July-September/ October-December
Dest_Ita	At least one holiday in Italy	No/Yes
Dest_Eu	At least one holiday in Europe* (not Italy)	No/Yes
Dest_Rest	At least one holiday in extra-European countries	No/Yes
Mezzo	Principal mean of transport	Plane/Train/Ship/Road
Motvac	Principal motivation of the holiday	Leisure/Visit to relative/ Religion/ Wellness
Mean_Dur	Average night of holidays	From 1
Orgall	Reserved accommodation	No/Yes
Iorgall	Internet reserved accommodation	No/Yes
Orgtra	Reserved transport	No/Yes
Iorgtra	Internet reserved transport	No/Yes
All_Hot	Percentage of vacations spent in payment structures	From 0 to 1
Fbreve	At least one short holiday	No/Yes
Flunga	At least one long holiday	No/Yes
Fnvac	Number of holidays	From 1

Note: (*) European countries are selected by UNWTO classification

Table 2 − *Demographic variables*

Variables	Meaning	Levels
Ncomp	Number of family's components	From 1
Rip	Geographical division (area of residence)	North-East/North-West/ Middle/South/Islands
Istr	Highest qualification in family	PhD/4-years degree/ Master's degree/ Bachelor's degree/ Associate degree/ Academy/5-years High School/3-years High School/Middle School/ Elementary/ No title
Eta_Mean	Average family's profile	From 15
Cond_	Percentage of workers in family	From 0 to 1

Table 3 − *Holidays of Italian families in 2013*

Quarter	Sample*	Short holidays**	Long holidays**	Holidays in Italy**	Holidays in Europe**	Holidays in rest of the world**	Nights average
1	411	62.04%	45.26%	76.16%	21.90%	12.17%	5.09
2	522	58.05%	49.81%	77.20%	23.75%	5.17%	5.04
3	974	23.92%	84.39%	82.34%	24.13%	3.39%	10.79
4	372	65.05%	41.67%	73.12%	28.23%	3.76%	4.38

**Families that have at least one holiday in one of the four quarter of 2013*
*** One at least in 2013*

The chi-square tests (X2) show an association between the quarter variable and short-holidays variable (X2=318.916, p-value<0.001), long-holidays variable (X2=355.888, p-value=0.000), Italian destination variable (X2=16.778, p-value<0.001), and extra-European destination variable (X2=46.209, p-value<0.001), while there is no association between the quarter and the European destination variable (X2=4.505, p-value=0.212).

4. Methods

We applied Multiple Correspondence Analysis (MCA – Greenacre & Blasius, 2006) to detect and represent underlying structures in the data set. We used twelve active variables: Dest_Ita, Dest_Eu, Dest_Rest, Mezzo, Motvac, Orgall, Iorgall, Orgtra, Iorgtra, Fbreve, Flunga, Fnvac (see Table 1), and three supplementary variables: Rip, Istr, and Ncomp (see Table 2). We employed FactoMineR an R package dedicated to multivariate data analysis (Husson, Josse, Le Mazet, 2015).

To study how close the categories are to one another, on the first factors of MCA we applied several clustering algorithms: complete, *k*-means, and PAM (Partitioning Around Medoids). To select the optimal partition and the best algorithm, we applied the Calinski-Harabasz, Dunn, and Silhouette indexes to validate the results, using the R package clusterCrit (Desgraupes, 2014).

5. Main results and discussion

MCA detects two latent dimensions for each quarter, explaining from 80 to 90 percent of the inertia. The first dimension represents the vacation destination and mode of travel and the in every quarter: mean of transport, transportation reservation, online or offline booking, Italian destination or not. By contrast, the second dimension describes different variables: in the first two quarters, it defines the motivation and the accommodation type for the holiday, while in the third quarter, it circumscribes the duration of the vacation. By contrast, in the fourth quarter, the second latent dimension describes the motivation, the type of accommodations, and the duration of the holiday combined (Figure 1).

The results on the Calinski-Harabasz, Dunn and Silhouette indexes for *k*-means, PAM, and complete hierarchical methods show that the optimal algorithm is *k*-means for three classes in the third quarter — the first three — and four classes in the others (Table 4).

Figure 3 shows that, in the third quarter, the clusters are well defined, while in other periods the groups have a clear degree of overlap, especially in the second quarter.

Figure 1 − *Latent dimensions for each quarter of 2013*

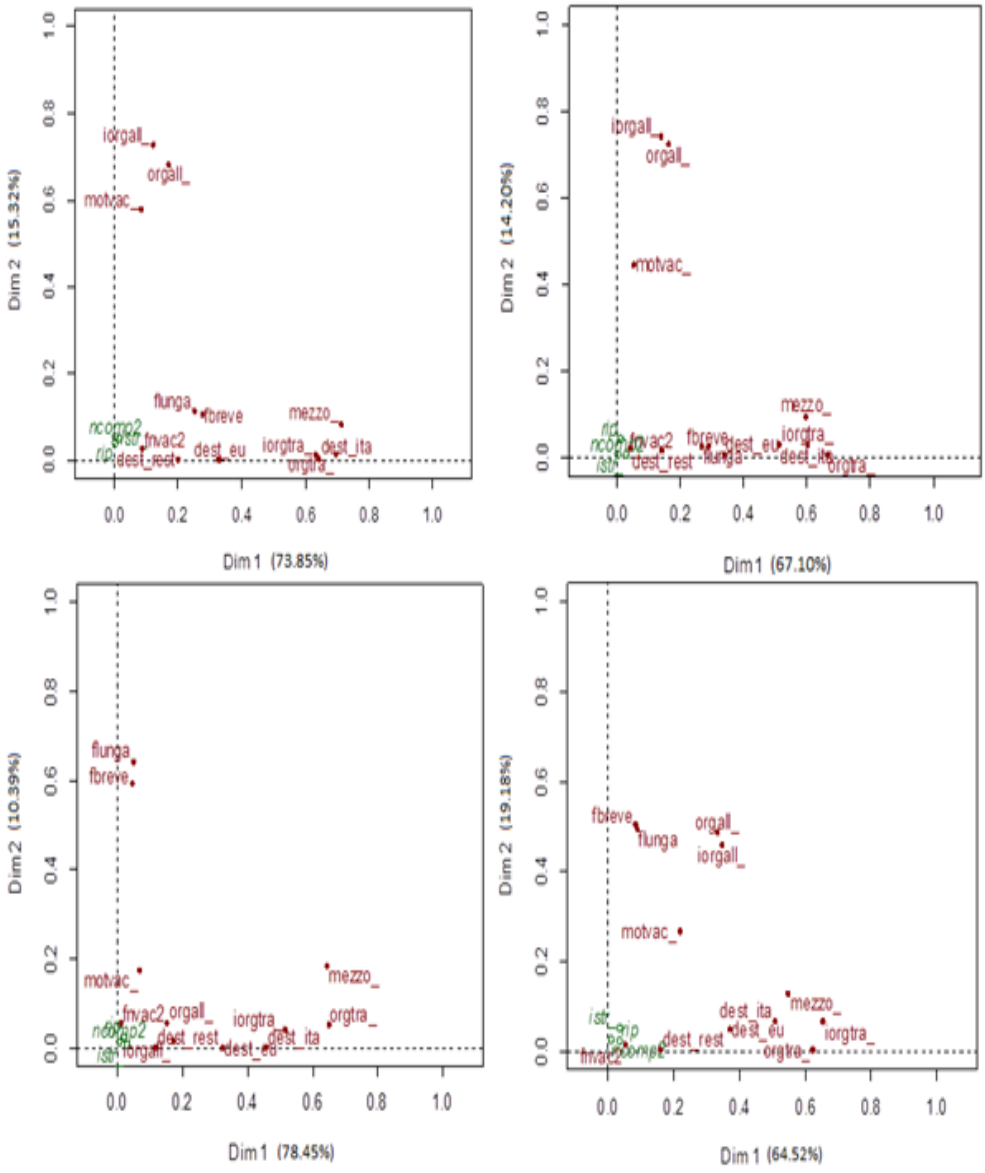
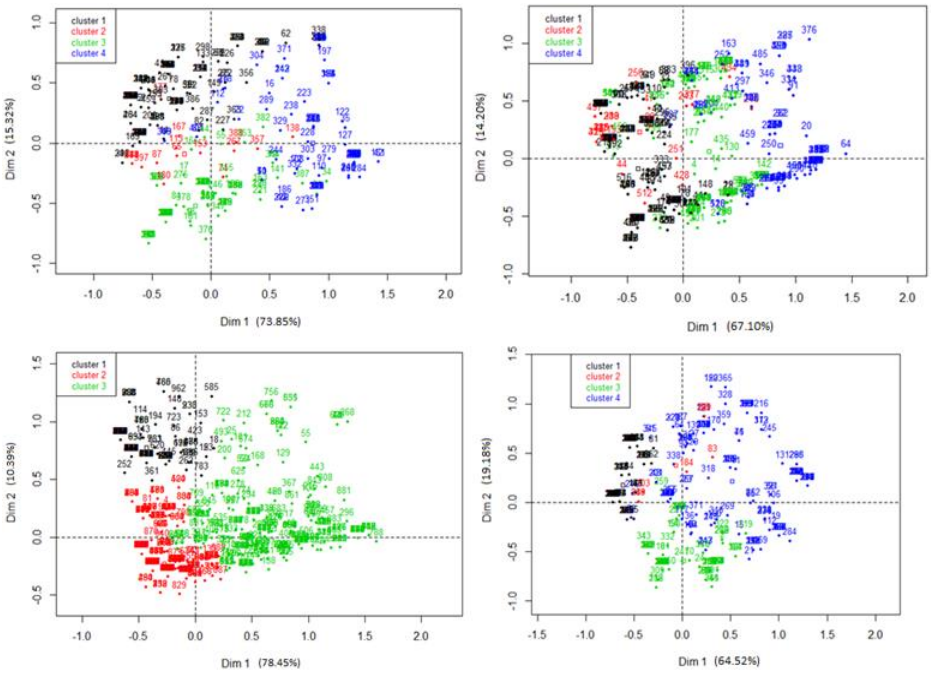


Table 4 – *Validation indexes (Calinski-Harabasz, Dunn, and Silhouette) for k-means method from 2 to 6 clusters*

	N. cluster	***Calinski-Harabasz Index***	***Dunn Index***	***Silhouette Index***
	2	235.0861	0.0524	0.4064
	3	339.3986	0.0412	0.5149
1st quarter	***4***	***644.3808***	***0.0601***	***0.5207***
	5	627.5495	0.0405	0.4864
	6	576.2869	0.0566	0.4654
	2	484.2257	0.0130	0.4431
	3	439.8450	0.0271	0.5075
2nd quarter	***4***	***891.6496***	***0.0307***	***0.5531***
	5	803.9428	0.0273	0.5257
	6	855.7503	0.0367	0.4812
	2	982.1707	0.0143	0.5180
	3	***1542.5701***	***0.0350***	***0.5756***
3rd quarter	4	1373.1012	0.0296	0.4661
	5	1216.9989	0.0226	0.4220
	6	1527.2886	0.0167	0.4789
	2	307.5190	0.0292	0.4163
	3	302.6841	0.0344	0.4705
4th quarter	***4***	***509.7991***	***0.0690***	***0.5133***
	5	507.6316	0.0591	0.5093
	6	500.8173	0.0269	**0.5166**

Figure 2 - *Plane of the first two axes from the MCA and clustering of families*



We detected the following four family tourism profiles:

1) CONVENTIONAL HOLIDAY-MAKERS: they often spent their holidays in private owners' or relatives' houses for a long time period, they mainly travel to visit relatives, they haven't a specific destination, they use different means of travel, and they are chiefly older and/or people who may be unemployed and belong to small families.
2) ONLINE USERS: they travel for long periods, their holidays have leisure as the motivation, they plan their holiday entirely through the Internet, they travel principally by air and go abroad, and they choose the highest level of accommodations. Their families are made up three or four young people, comprised by members who have jobs.
3) QUICK HOLIDAY-MAKERS: they plan short vacations in Italy, they travel by car or train, and they choose an intermediate level of accommodations. Their families are composed of fewer and older people, with an intermediate percentage of employed workers.
4) DELUXE VACATION CUSTOMERS: they move to short holidays in Italy, they have a higher level of Internet use, they travel largely by train or car, and they choose a higher level of accommodations. Their families are younger and more numerous, with a high number of employed workers.

6. Conclusions

The parallel study of the four quarters shows a clear definition of patterns of Italian tourists. In 2013, Italian family profiles on holidays are well-defined: the clusters are strongly linked to family composition, ages of the members, and financial resources. On the other hand, vacations inside the segments are distinctly in duration — long or short — and by the use of the Internet for accommodation and transportation booking.

In the third quarter, Italian families' holidays coincide with the summer holidays, which are longer than other times of the year; the motivation that drives them to leave is linked basically to pleasure and visiting relatives. In other quarters, families decide to travel for various reasons, e.g., to visit shrines or places of worship or for work. In fact, four profiles are present in the first, second, and fourth quarters, while the cluster "deluxe vacation-customers" is not present in the third quarter.

The results demonstrate the rationale of a market segmentation of Italian tourists; in addition to a sociological interest, this group definition can help

marketing strategies of companies that want to optimize the personalization of tourism products, also with a maximization of revenues.

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SUMMARY

Italian families on vacation: a quantitative analysis of holiday experiences

In last decades, the rapid expansion of the tourism sector and the major differentiation of the tourism products have stimulated several studies in segmentation of tourism markets, but the applications of those techniques frequently focus on single consumers, while often the real "buyer" is the family. In this paper, we detect the profiles of Italian families compared to their travel choices; for the analysis, a sample of around 14,000 Italian families, from the National Institute of Statistics survey "Trips and Holidays," is used. The main goal of this paper is to investigate holiday strategies of Italian families in connection with recent changes in family structure, in order to individuate different profiles and different customs in travel patterns.

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NATIONAL ACCOUNTS AND EUROPEAN STANDARS. ANALYSIS OF THE 2015 ECONOMIC AND FINANCIAL DOCUMENT ACCORDING TO INNOVATIONS INTRODUCED BY ESA 2010[1]

Vincenzo Marinello, Mariano Cavataio

1. Introduction

In the absence of a supranational fiscal jurisdiction, fiscal policies in the Member States are coordinated by the European Union (EU) through the implementation of common rules. These rules establish several boundaries for the budget balance and the public debt dynamics. Therefore, the Euro Area Member States are free to decide their fiscal policies within this rules framework.

Because of the Greek sovereign debt crisis that led to the European debt crisis, European policy-makers have decided to guarantee a greater coordination of fiscal policies among the Members States of Economic and Monetary Union (EMU) over the last few years, strengthening surveillance policies on deficit and public debt. Thus, almost all the Member States (except for the United Kingdom and the Czech Republic) implemented the "Treaty on stability, coordination and governance", the so-called *Fiscal Compact*. It establishes the balanced structural budget and a greater decrease of the debt-to-GDP (Gross domestic product) ratio in the medium term.

Nevertheless, because of enduring financial and economic crisis in several EU Member States in the 2007-2013 period, the obligations of the Stability and Growth Pact (SGP) and the later regulations (such as the Fiscal Compact) have been more and more under discussion among policy-makers, especially with reference to austerity measures. As a result, the economic and financial crisis has led the Member States more in trouble (especially, Southern European countries, including Italy) to ask greater flexibility margins in the implementation of the European standards (ISTAT 2014a).

It should be noted that the European standards have been recently implemented according to the new system of national and regional account ESA 2010. As a

[1] Vincenzo Marinello wrote the Introduction, the Paragraph 3 and the Conclusions; Mariano Cavataio wrote the Paragraph 1 and the Paragraph 2. In any case, this essay is the result of a common commitment by the two Authors.

consequence, the EFD 2015 is the first economic and financial document that makes reference to the estimates in ESA 2010.

After describing the main differences between the previous system of national and regional accounts (ESA 95) and the new system of national and regional accounts (ESA 2010) implemented by the EU countries members and after analyzing the main documents of public finance, the objective of this essay is to examine the last Economic and Financial Document (EFD 2015) in terms of the policy scenario (*programmatic framework*) and the scenario based on unchanged legislation (*tendency framework*), also highlighting the changes introduced by ESA 2010.

2. 1. Differences and peculiarities between ESA 95 and ESA 2010

National accounts are the main tool for measuring the overall economic situation of a country. Thus, they are an essential tool for evaluating, analyzing and forecasting economic phenomena. They are used by public authorities, economic and social operators to find in them important information for their decisions. Moreover, some crucial measurements for the governance of the EU and each Member State (such as the deficit-to-GDP ratio and the debt-to-GDP ratio) are estimated making reference to national accounts.

Within this framework, ESA is the European tool for the measurement of the economic and financial activities of an economic system, its components and the relations between them in a given period of time.

It should be noted that global changes have impacted economies over the last twenty years. As a result, the macro-economic statistics have needed an adaptation to new situation. The most important adaptation has been the updating of the United Nations System of National Accounts (SNA) which sets guidelines national accounts worldwide. Therefore, all the countries have passed from the SNA 1993 version to the current SNA 2008 throughout the last few years. Likewise, the same has been happened for the new ESA 2010 which is consistent with the SNA 2008 guidelines, although with several adaptations concerning the data presentation and with a higher level of precision in defining several concepts, especially those used for specific purposes by the EU.

In September 2014, ISTAT published the results of the revision of national accounts in accordance with the new ESA. Therefore, the switch to a new version of accounting standards (from ESA 95 to ESA 2010) led to a large revision of methodologies and information sources in order to better estimate the main aggregates of National Accounting (see Eurostat 2013). Within this revision process, the fiscal year 2011 was defined as *benchmark* year. Thus, the values of

all items included in the accounts were redefined for 2011. Starting from the new levels of the aggregates, a diachronic reconstruction of the time series revised back to 1995 onwards was carried out.

In the main, several innovations have been introduced by the new ESA, starting from the improvement of the timeliness of data transmission to the Statistical Office of the European Commission (Eurostat) and the timeliness of national dissemination (see Eurostat 2014).

Moreover, ESA 2010 changes the way in which research and development (R&D) expenditure and weapon systems expenditure are recorded. They are no longer considered as intermediate consumption expenditure, but as expenditure for investments (in terms of gross fixed capital formation).

In addition, the new ESA changes significantly the estimate of flows of goods and services in international trade, albeit with an almost null net effect on the trade balance (and consequently on GDP).

Contrary to ESA 95, the new ESA establishes the inclusion of illegal activities estimates in national accounts (and therefore in GDP). The illegal activities considered by ESA 2010 are trade in narcotic drugs, prostitution and smuggling (alcohol and tobacco). This methodological innovation is consistent with Eurostat guidelines.

Furthermore, the list of corporations belonging to General Government is revised in order to improve the their recording in national accounts. This innovation has an impact, although limited, on public consumption expenditure and on General Government net borrowing.

Finally, it should be also noted that the treatment of super dividends paid by public corporations is clarified better in order to improve the measurement of the elements that affect public debt. Moreover, the treatment of public-private partnerships is defined for the first time and this innovation has several implications on government account with reference to deficit and debt.

On the whole, ESA 2010 has introduced several innovations and improvements in national accounts. These changes have implied an impact on the estimate on macroeconomic variables.

As regards the new national accounts estimates for the benchmark year 2011, GDP has been revaluated for a value of EUR 58.9 billion (with a corresponding revaluation to 3.7%) compared to the ESA 95 estimates (Tab. 1).

In other words, the revision of economic aggregates for 2011 can be decomposed in three main components.

First, a contribute to the revaluation of the nominal GDP for 1.5 percentage points (equal to EUR 24.3 billion) has been due to the defining modifications introduced by ESA 2010 at the methodological level. Within this revaluation, the main share is attributable to the capitalization of R&D expenditure.

Second, another part of revision is due, for further 0.8 percentage points (equal to EUR 12.6 billion) to the changes related to the overcoming of European reservations on the implementation of ESA 95. These changes also include some illegal activities (narcotics, prostitution and smuggling).

Table 1 – *GDP and expenditure components for fiscal year 2011: revisions by typology between ESA 2010 estimates and ESA 95 ones (data in percentage of GDP)*

Typology	Revaluation compared to ESA 95 estimates	*Of which* Defining modifications	Overcoming of European reservations	Other (sources/ methods)
Imports of goods and services	-2.0	-2.5	0.2	0.3
Final national consumptions expenditure	3.1	-0.1	1.2	2.0
Gross capital formation	7.2	8.5	-0.6	-0.7
Exports of goods and services	-2.9	-2.8	0.0	-0.1
GDP at market prices	3.7	1.5	0.8	1.4

Source: Our elaboration of data from ISTAT (2014b)

Third, the remaining share of the revaluation, corresponding to 1.4 percentage points (equal to EUR 22 billion), comes from the combination of several effects related to innovations in information sources and methodologies. Within this revaluation, there is the inclusion of the new estimate of the underground economy which in 2011 accounts for 11.5% of GDP (corresponding to EUR 187 billion). The overall amount of this component and of the illegal activities one leads to the wider definition of non-observed economy (NOE) that is equal to 12.4% of GDP in 2011 (ISTAT 2014b).

However, the inclusion of illegal economy in national accounts estimates has involved a strong debate among economists with reference to ESA 2010.

According to its supporters, the new ESA has the merit of providing macroeconomic statistics that are more updated and more consistent with the new economic and financial context. On the contrary, its detractors claim that ESA 2010 improves significantly the deficit-to-GDP ratio and the debt-to-GDP ratio, being successful where economy fails (Centorrino, David and Gangemi 2014).

Ultimately, the new ESA leads to a revaluation of GDP. Nevertheless, ISTAT (2014b) highlighted that over the period between 1995-2013 the annual rates of change concerning GDP at market prices have deviated only 3 tenth of a point compared to the previous series. Thus, the annual average rate of change remains unchanged compared to the previous estimates (+2.8%). Furthermore, over the period between 1995 and 2013 the annual average growth of GDP expressed in volume values has resulted unchanged compared to previous estimates (+0.5%).

Likewise, the annual rates of change have undergone revisions much more limited than those related to GDP, with a restricted deviation of 0.2 percentage points.

Table 2 – *Revision of estimates concerning the main aggregates of the General Government for fiscal year 2011: ESA 2010 vs. ESA 95 (data in billion Euro at current prices and in percentage of GDP)*

Aggregates	ESA 2010 estimates (September 2014)*	ESA 95 estimates (March 2014)	Revisions
Current balance	-5.8	-21.1	15.3
Capital account balance	-51.0	-38.0	-13.0
Primary balance	19.6	19.3	0.3
Primary balance/GDP (%)	1.2	1.2	0.0
Fiscal burden (%)	41.6	42.5	-0.9
Net borrowing	-56.8	-59.1	2.3
Net borrowing/GDP (%)	-3.5	-3.7	0.2

Note: * Preliminary data
Source: Our elaboration of data from ISTAT (2014c)

On the whole, the reconstruction of the time series revised back to 1995 onwards does not show strong differences concerning GDP and its components. After all, considering the *benchmark* of ESA 2010, that is year 2011, the revision of the deficit-to-GDP ratio has been limited, with a restricted impact of EUR 2.3 billion (Tab. 2).

3. EFD and other public finance documents

The EFD is the first economic and financial document based on the estimates in ESA 2010 instead of ESA 95. It contains the objectives of economic policy for the subsequent triennium.

According to Law No. 39/2011, the EFD is submitted by the Cabinet to Parliament by 10 April of every year. It is composed of three sections and some attachments. Two of the sections– the Stability Program and the National Reform Program (NRP) – are transmitted to the Council of the European Union and the European Commission by the end of April of every year.

Another planning document is the "Updated Note of the EFD". It is submitted to Parliament by 20 September of every year in order to update the economic and public finance forecasts on the basis of more stable information available on the performance of the macroeconomic situation (for which data are available on the first two quarters of the year) and public finance compared to estimates used in the EFD. Furthermore, the Updated Note contains the revision of economic policy targets and economic and public finance forecasts according to recommendations

adopted by the Council of the European Union concerning to the Stability Program and the NRP. In turn, the "Report to revise the Updated Note of the EFD" updates the programmatic objectives of public finance detailed in the Updated Note.

An additional tool of public finance is the "Draft Budgetary Plan" (DBP) in accordance with the EU Regulation No. 473/2013. It is submitted by the Member States to the European Commission and the Eurogroup by 15 October of every year. The DBP contains an update of the estimates indicated in the previous Stability Program. It illustrates to European Institutions a summarized and standardized version of draft budget for the following year.

On the whole, the EFD, the Update Note of the EFD, the Report to revise the Updated Note of the EFD and the DBP are the main public finance documents.

In the main, the public finance documents contain the economic and financial policies defined by the Cabinet. The elaboration of these policies and forecasts implies a long process which involves all the departments of the Ministry of the Economy and Finance. After all, over the last ten years planning documents have played more and more a key role in providing detailed information on the economic policy action taken by the Cabinet and in ensuring its transparency. They set out the Cabinet's objectives and the tools used to achieve them. Moreover, as a result of the ongoing European integration process and the serious financial crisis that has hit Europe in the last few years, national economic and fiscal policies are now more coordinated. This has significantly changed the structure of the public finance documents as well as the deadlines for submitting them. Nevertheless, these programmatic documents have been criticized in recent years. According to several experts, they would tend to point out excessively optimistic estimates (e.g. those concerning GDP growth forecasts and unemployment rate forecasts), risking to generate later disillusions as happened in the fiscal year 2014.

4. Characteristics and peculiarities of the EFD 2015

Despite the enduring financial crisis in Greece, the EFD 2015 takes account of the favorable trend of the macroeconomic scenario (thanks to the ECB's Quantitative Easing, the steep Euro depreciation and the strong decrease in oil prices), making upward revisions to growth estimates for Italy compared to the previous public finance documents (starting from the Updated Note of the EFD 2014).

The policy scenario contemplated by the EFD 2015 indicates the return to growth after a long period of recession, starting from the current year. It provides for an increase of GDP equal to 0.7% in 2015, followed by increases which may reach over 1% in the subsequent years, although the programmatic growth

forecasts remain below the European average considering the period between 2015 and 2019. However, Renzi's Cabinet evaluates that this gap should reduce in the next years, moving from 0.9 percentage points in 2015 to 0.4 percentage points in 2019 (Tab. 3).

Table 3 – *Differences on the growth forecasts based on policy scenario, 2014-2019. Italy compared to the EU average*

Fiscal year (FY)	*GDP EU 28*	*GDP Italy*	*Difference*
2014	1.3	-0.4	0.9
2015	1.6	0.7	0.9
2016	2.0	1.4	0.6
2017	1.9	1.5	0.4
2018	1.8	1.4	0.4
2019	1.7	1.3	0.4

Source: Our elaboration of data from EFD 2015 (MEF 2015a)

The net borrowing targets indicated in the DBP 2015 for the 2015-2018 period are confirmed, respectively equal to 2.6% of GDP in 2015, 1.8% in 2016 and 0.8% in 2017, reaching zero balance in 2018. A nominal surplus of 0.4% of GDP is expected in 2019. These trends are possible because the Cabinet estimates a progressive increase of the primary surplus in nominal terms which should reach 4% in 2019 (Tab. 4). These forecasts are in line with the trends in the last few years. Indeed, Italy recorded in the 2008-2012 period an accumulated primary surplus equal to around 5.4% of the GDP 2012, against an average deficit of 7.4% in the Euro Area (ISTAT 2014a).

The estimates on the public debt (compared to the GDP) foresee a growth in 2015 (from 132.1% to 132.5%), decreasing significantly in the two years thereafter (130.9% and 127.4%), also thanks to the contribution of the privatizations provided for the Cabinet. On the whole, the debt-to-GDP ratio should decrease from 2016, ensuring in 2018 the full respect of the debt rule provided by national and European regulations.

It should be noted that, according to the programmatic estimates of the Cabinet (that have been criticized by the opposing parties), a decreasing profile of fiscal burden would be envisaged in the next years, net of the accounting classification of the personal income-tax bonus of EUR 80. Nevertheless, according to the General Government account at unchanged legislation, the fiscal burden trend at current legislation is considerably different compared to the programmatic estimates defined by the Cabinet. Therefore, tax burden is projected to remain unchanged at 43.5% in 2015 compared to 2014, and then to rise to 44.1% in 2016 and 2017, before falling back to 43.7% in 2019 (Tab. 4). On the whole, a significant discrepancy is recognized among the programmatic estimates shown in the policy

scenario and the tendency estimates shown in the scenario at unchanged legislation. Compared to the scenario at unchanged legislation, Renzi's Cabinet foresees a higher reduction of fiscal burden, especially in the 2016-2019 period. This divergence of estimates is a typical characteristic that is also observable in the EFD of the previous years, mainly concerning tax burden that is a salient topic for the public opinion.

Table 4 – *Macroeconomic framework based on policy scenario and scenario concerning unchanged legislation, 2014-2019 (data in percentage of GDP)*

Public finance indicators	*FY*	*Policy scenario*	*Scenario based on unchanged legislation*	*Difference**
GDP	2014	-0.4	-0.4	0.0
	2015	0.7	0.7	0.0
	2016	1.4	1.3	-0.1
	2017	1.5	1.2	-0.3
	2018	1.4	1.1	-0.3
	2019	1.3	1.1	-0.2
Net borrowing	2014	-3.0	-3.0	0.0
	2015	-2.6	-2.5	-0.1
	2016	-1.8	-1.4	-0.4
	2017	-0.8	-0.2	-0.6
	2018	0.0	0.5	-0.5
	2019	0.4	0.9	-0.5
Primary balance	2014	1.6	1.6	0.0
	2015	1.6	1.7	0.1
	2016	2.4	2.8	0.4
	2017	3.2	3.8	0.6
	2018	3.8	4.3	0.5
	2019	4.0	4.6	0.6
Fiscal burden	2014	43.1	43.5	0.4
	2015	42.9	43.5	0.6
	2016	42.6	44.1	1.5
	2017	42.1	44.1	2.0
	2018	41.9	44.0	2.1
	2019	41.6	43.7	2.1
Public debt	2014	132.1	132.1	0.0
	2015	132.5	132.4	-0.1
	2016	130.9	130.3	-0.6
	2017	127.4	127.2	-0.2
	2018	123.4	123.7	0.3
	2019	120.0	120.2	0.2

Note: * Estimates based on scenario concerning unchanged legislation – Estimates based on policy scenario
Source: Our elaboration of data from EFD 2015 (MEF 2015a)

On the whole, the changeover to the new methods of ESA 2010 has represented an important change in the estimates of the EFD 2015 compared to the EFD 2014,

and has entailed a significant revision in the final figures for economic and public finance aggregates and a carryover effect with respect to later years. Thus, the EFD 2015 implements these changes.

For instance, public investment amounted to 2.2% of GDP in 2014, decreasing by 0.2 percentage points compared with 2013. Nonetheless, according to the EFD 2015, the new estimates point out an increase of 0.6 percentage points over the 2014 EFD forecast, mostly attributable to the reclassification of R&D and armaments expenditure from intermediate consumption to gross fixed investment, as provided by ESA 2010. The trend of the next few years indicates a significant recovery of public investment, with growth of 1.9% in 2015 and 4.5% in 2016. In turn, following the introduction of the new national accounting criteria concerning net lending/borrowing of the General Government, the accounting treatment of interest linked to transactions in financial derivatives instruments – as defined by Excessive Deficit Procedure (EDP) – has been aligned with that of ESA 2010. In addition, after decreasing in 2013, interest expenditure fell further in 2014 (and in 2015), due in part to gradually declining interest rates. However, this decline also reflects the exclusion of the flows originating from transactions in financial instruments for the purpose of the EDP, as provided by the new accounting criteria of ESA 2010. Finally, the national accounting data for GDP, pension expenditure, expenditure on social safety nets and healthcare expenditure have been developed on a basis consistent with ESA 2010. Therefore, for the 2015-2019 period, the values are in line with those underlying the forecast of the public finance framework regarding the EDF 2015 (MEF 2015a).

5. Discussion and conclusions

The EFD 2015 is the first economic and financial document based on the estimates in ESA 2010 instead of ESA 95. As a result, for the EFD 2015, the main reference framework is the revised time series by ISTAT according to new ESA.

This series changes the forecasts for interest expenditure, intermediate consumption expenditure, expenditure for investments and other types of expenditure (MEF 2015a).

Regardless of these methodological innovations, the last EFD revises the growth forecasts of the GDP and the other variables of the Italian macroeconomic framework compared to the Updated Note of the EFD 2014, envisaging a clear direction of change in the economic and financial situation of the country with a positive change for the GDP (+0.7%) after three years of recession, implementing – in turn – an economic policy supporting a more decisive growth in the subsequent three-year period.

According to Renzi's Cabinet, responsible fiscal policy – that is favorable to growth – will ensure the confidence of the markets. In addition, keeping favorable expectations will reinforce growth, and therefore, the long-term sustainability of the public finances.

With a view toward facilitating the process of economic recovery, in 2016 the Cabinet intends to make use of Europe's clause for structural reforms to allow for flexibility with respect to public finances. As a result, the path toward improvement of the structural balance would be more gradual, with the achievement of a balanced budget in structural terms in 2017.

On balance, the EFD 2015 provides two series of forecasts: one series based on unchanged legislation (tendency framework) and another series based on the policy scenario (programmatic framework). The latter incorporates the impact of the economic policies outlined in the Stability Program and in the RNP. Fiscal policies are considered as a whole in the forecasts.

Comparing the scenario based on unchanged legislation with the policy scenario, there are not any considerable percentage gaps referring to the main public finance indicators, although the scenario based on unchanged legislation foresees a lesser growth of GDP, a greater reduction of public debt[2], a higher primary balance and a lower net borrowing in the 2015-2019 period. However, the percentage differences referred to the fiscal burden trend are significant (Tab. 4). As a result, these gaps have caused a strong debate among political parties.

After all, the presentation of the EFD is followed by animated controversies every year. The Cabinet and the governing parties affirm to propose prudent and realistic estimates. On the contrary, the opposing parties charge the Cabinet with presenting excessively optimistic estimates which do not take account of the macroeconomic situation.

Moreover, the problem of forecast mistakes appears important, given that the estimates contained in the EFD have been revealed erroneous in the last few years. Nevertheless, Renzi's Cabinet has been prudent in pointing out the estimates defined in the EFD 2015. Indeed, the targets for 2015 (and the years thereafter) have been revised in the Updated Note of the EFD in September 2015 to reflect a more positive scenario, indicating an increase of GDP equal to 0.9% (instead of 0.7%) in 2015 in terms of both scenario policy and scenario based on unchanged legislation (MEF 2015b). The Cabinet does not exclude that it may be possible to indicate a higher growth rate in the next few months, and that would offer greater margins for the reduction of the tax burden (MEF 2015a).

In the main, during the recessive phases every government – presenting more optimistic estimates – does not intend to affect negatively the economic agents'

[2] Except for the fiscal years 2018 and 2019.

sentiment. In contrast, during the expansionary phases the cost to be too optimistic becomes higher than the cost to be prudent and conservatives. Therefore, if Renzi's Cabinet expectations will reveal to be exact, it will be possible to assist to several revisions about the forecasts for economic growth in the next few months. Generally, these revisions do not necessarily depend on insufficient economic analyses, but rather on the choices of economic policy authorities which are worried about the public opinion reactions in relation to the incongruity between forecast and realization. An explanation for forecast mistakes may be given by other reasons which have anything to do with economy but rather with searching of consensus (Favero 2015).

Regardless of political controversies and forecast mistakes, the EFD establishes the macroeconomic settings of the Stability Law. These settings give coherence to the public finance decisions.

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SUMMARY

National Accounts and European Standards. An analysis of the 2015 Economic and Financial Document according to innovations introduced by ESA 2010

After describing the main differences between the previous system of national and regional accounts (ESA 95) and the new system of national and regional accounts (ESA 2010) implemented by the EU countries members and after analyzing the main documents of public finance, the aim of this essay is to examine the innovations introduced by the last Economic and Financial Document (EFD 2015) in terms of the policy scenario (*programmatic framework*) and the scenario based on unchanged legislation (*tendency framework*).

On the whole, the EFD 2015 – the first economic and financial document based on the estimates in ESA 2010 instead of ESA 95 – revises the growth forecasts of the GDP and the other variables of the Italian macroeconomic framework compared to the Updated Note of the EFD 2014. The policy scenario indicates the return to growth in 2015 after a lengthy period of recession, implementing an economic policy supporting a more decisive growth in the subsequent three-year period.

However, the presentation of the EFD is followed by strong controversies every year. The Cabinet and the governing parties affirm to propose prudent and realistic estimates. On the contrary, the opposing parties charge the Cabinet with presenting excessively optimistic estimates which do not take account of the macroeconomic trends.

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COMPARING EQUITABLE AND SUSTAINABLE WELL-BEING (BES) ACROSS THE ITALIAN PROVINCES. A FACTOR ANALYSIS-BASED APPROACH

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1. Introduction

The Beyond GDP initiative promoted by the European Commission has recently involved also the Italian institutions, with the National Council for Economics and Labour (Cnel) and the Italian National Institute of Statistics (Istat) proposing a study on the Equitable and Sustainable Well-being (hereafter, BES) for Italy. Aim of that study is to provide a shared framework for evaluating the progress of the Italian society, also highlighting the BES distribution across the Italian regions over the last decade; see Cnel and Istat (2014) and Ciommi et al. (2013).

An important part of this national study is constituted by the Provinces' BES project that has been promoted by Pesaro e Urbino Province with the Istat's scientific and technical supervision. It is focused to provide statistical reports and analysis useful to assess Equitable and Sustainable Well-being at local level (NUTS3) and support local authorities in policy-making (Taralli, 2013).

The project key reference for the BES is the EU Committee of the Regions guidelines for Europe 2020 that recommends to local authorities to define a local "2020 vision", starting from a territorial SWOT analysis. Provinces' BES provides a set of statistical indicators that are both relevant at local level and consistent with the national and international theoretical framework. The project aims at emphasising the well-being disparities among provinces and points out single or multiple lacks of balance and relative deprivations of local districts compared to regional or national parameters.

However, the computation at such detailed geographical level implies a trade-off between the need for synthesis and the loss of information (i.e. variability). In addition, in order to get reliable and robust results for policy making, some critical issues concerning the dataset have to be kept under control, in particular, related to different structures and dimensions of the units of analysis.

2. Methodology

The measurement of a multidimensional phenomenon, such as well-being, requires the identification of a plurality of indicators (Giovannini et al., 2010).

The Provinces' BES is constituted by 88 elementary indicators, or variables, which are grouped into 11 domains. For our analysis we have restricted the set of variables to 70 indicators as listed in Table 1.

The BES is a formative measurement model (Diamantopoulos et al., 2008): the indicators determine the BES, and the construct's meaning derives from indicators themselves. Consequently, elementary indicators are not interchangeable, as each one captures a specific aspect of the construct's domain.

At the current stage, Provinces' BES cannot be considered a perfect model yet, as it does not measure satisfactorily all BES domains. Moreover, it includes redundant information, such as several indicators measuring differences due to gender or generational groups (Taralli et al., 2015).

However, working with a wide set of variables does not allow for a synthetic overview of the whole well-being phenomenon; also, redundancies in the dataset could affect the validity of the results (Fabbris, 1997).

To tackle these issues, we have first applied a Factor Analysis within each BES domain (or pillar).[1] Then, we have synthesized further the information into a single measure, by constructing a composite indicator for each BES pillar. For each Italian province, we have obtained 11 synthetic measures representing their conditions in relation to each domain of the equitable and sustainable well-being.

Our additive procedure extends one of the synthetic methodologies discussed by Giudici and Avrini (2002), namely the weighted average of factor scores. In addition, it overcomes the limitation of full compensability among components (see Mazziotta and Pareto, 2015), since the composite indicators are defined as linear combinations of the factor scores, with weights depending on the distribution of the indicators belonging that factor. In fact, as recommended by the Commission on the Measurement of Economic Performance and Social Progress, average measures should be accompanied by indicators reflecting their distribution (Stiglitz, et al. 2009). The weights associated to each factor are calculated using the Gini index; consequently, higher weights are associated to those factors showing a more unequal distribution. Even if the Gini index is usually defined for transferable variables, according to Becchetti et al. (2014), the possibility of redistribution is not essential for the definition and the measurement of inequality. In this situation, the Gini index can be considered as a synthetic measure of the distribution of resources.

[1] The number of factors is chosen in order to ensure that the cumulative percentage of explained variance is greater than 60%, after a factor rotation based on the Varimax criterion.

In detail, for each BES domain *h (h = 1,…,11),* let k^h and n_i^h be the number of factors in the domain *h* and the number of indicators referring to the i-*th* factor, respectively. Moreover, let F_i^h be the *i-th* factor and G_{ij}^h be the Gini index of the *j-th* indicator belonging to the *i-th* factor. The composite indicator I^h for the domain *h* will be computed as follows:

$$I^h = \frac{1}{G^h} \cdot \sum_{i=1}^{k^h} \left(F_i^h \cdot G_i^h\right), \tag{1}$$

where $G_i^h = \sum_{j=1}^{n_i^h} \frac{G_{ij}^h}{n_i^h}$ and $G^h = \sum_{i=1}^{k^h} \sum_{j=1}^{n_i^h} \frac{G_{ij}^h}{n_i^h}$.

In the aggregation procedure we take into account the relationship between each factor and the corresponding domain. That is, if the meaning of factor F_i^h is positively related to the meaning of well-being, we maintain the original sign of the factor; if, instead, the factor refers to the contrary of well-being, then we reverse its sign. For example, consider the factor *Youth road mortality* in the *Health* domain: higher values of the factor correspond to higher youth's vulnerability to road deaths and, hence, to lower well-being; in this case, the sign of the factor will be reversed.

To better understand formula (1), we now explain more in detail our aggregative procedure for the domain *Education and Training.* It collects 7 indicators, which are partitioned into 3 factors (Table 1). For each factor, we compute the weight as the average of Gini indexes of the elementary indicators belonging that factor. In this case, the weight associated with the first factor, *Competences*, is 0.084. For the second factor, *Participation in Education*, we obtain a weight equal to 0.083, and for the third one, *Lifelong learning*, equal to 0.132; see Table 1. Thus, the composite indicator for this domain is computed as the sum of the product between each factor score and its weight, normalized by the sum of all the weights.

3. Results from the factor analysis

In Table 1 we present the results of the factor analysis that we have conducted for each of the 11 Provinces' BES domains. For each domain Table 1 reports the original variables, their resulting uniqueness (i.e. the portion of variance not explained by the factor model), and the factors with the corresponding value of the Gini index.

Table 1 – *List of variables, factors, uniqueness and Gini index for each domain*

Domain	Variable	Uniq.	Factor	Gini index
1. Health	1.1. Life expectancy at birth (male)	0.168	Life expectancy and diseases prevention	0.031
	1.2. Life expectancy at birth (female)	0.212		
	1.8. Avoidable mortality rate	0.241		
	1.3. Infant mortality rate	0.640		
	1.5. Mortality rate for cancer (20-64 years old)	0.299	Specific vulnerabilities	0.147
	1.6. Mortality rate for dementia (65 years old and over)	0.500		
	1.7. Mortality rate for suicide	0.334		
	1.4. Mortality rate for road accidents (15-34 years old)	0.082	Youths road mortality	0.248
2. Education and training	2.1. Early leavers from education and training	0.221	Competencies	0.042
	2.2. People in working age with lower secondary education or less	0.117		
	2.5. Level of literacy	0.114		
	2.6. Level of numeracy	0.088		
	2.3. Participation in upper secondary education	0.456	Participation in education	0.083
	2.4. Participation in tertiary education (19-25years old)	0.186		
	2.7. Participation in lifelong learning (25-64 years old)	0.028	Lifelong learning	0.132
3. Work and life balance	3.1. Non-participation rate (15-74 years old)	0.060	Local labour market	0.186
	3.3. Employment rate (20-64 years old)	0.049		
	3.5. Youth employment rate (15-29 years old)	0.096		
	3.6. Youth unemployment rate (15-29 years old)	0.091		
	3.7. Incidence rate of occupational injuries, fatal or leading to permanent disability	0.662		
	3.2. Gender inequality in non-participation rate (M-F)	0.076	Occupational gender gap	0.246
	3.4. Gender inequality in employment rate (M-F)	0.047		
4. Economic well-being	4.1. Gross disposable income per household	0.247	Income and wealth	0.108
	4.2. Average remuneration of employees (yearly)	0.078		
	4.3. Working days paid per employee (yearly rate)	0.174		
	4.4. Annual pension income per capita (yearly average)	0.232		
	4.5. Pensioners with a low pension income (<500 euros)	0.302		
	4.6. Households assets (total amount in average)	0.227		
	4.7. Gender inequalities in average remuneration of employees (M-F)	0.232		
	4.8. Age-groups inequalities in average remuneration of employees	0.488		
	4.9. Evictions from home per households	0.320	Households economic problems	0.245
	4.10.Households non-performing loans (input flows)	0.177		

Table 1 (cont.) – *List of variables, factors, uniqueness and Gini index for each domain*

Domain	Variable	Uniq.	Factor	Gini index
5. Social relationships	5.3. Foreigners' acquisitions of Italian citizenship	0.449	Social integration	0.201
	5.5. No-profit organizations	0.100		
	5.6. Volunteers in no-profit organizations (per 100 residents aged 14+)	0.145		
	5.1. Accessible school environments for disabled people	0.446	Conditions for the social inclusion and care of disadvantaged people	0.154
	5.4. Social cooperatives	0.340		
	5.2. Disabled pupils enrolled	0.064	Integration of disabled schoolmates	0.121
6. Politics and institutions	6.1. Electoral participation (European Parliament elections)	0.266	Electoral participation	0.101
	6.3. Young people (<40 years old) and political representation in municipalities	0.210		
	6.2. Women and political representation in municipalities	0.450	Local financial administration	0.176
	6.4. Provincial governments: internal borrowing degree	0.661		
	6.5. Provincial governments: collecting capacity	0.578		
	6.6. Municipalities: internal borrowing degree	0.257		
	6.7. Municipalities: collecting capacity	0.344		
7. Security	7.3. Road mortality index (killed per 100 road accidents)	0.416	Road safety	0.185
	7.4. Road mortality index on rural roads (excluding motorways)	0.327		
	7.1. Violent crimes reported	0.129	Crimes	0.262
	7.2. Common crimes reported	0.177		
8. Landscape and cultural heritage	8.1. Conservation of historic urban fabric	0.509	Museums and historical buildings	0.343
	8.3. Museums and similar institutions	0.362		
	8.4. Paying visitors of museums and similar institutions	0.411		
	8.2. Presence of Historic Parks/Gardens and other Urban Parks recognized of significant public interest	0.059	Urban parks density	0.865

Table 1 (cont.) – *List of variables, factors, uniqueness and Gini index for each domain*

Domain	Variable	Uniq.	Factor	Gini index
9. Environment	9.2. Exceeding of the daily limit for the protection of human health for PM10 (Maximum number)	0.246	Quality of urban air and soft mobility	0.525
	9.5. Urban cycle paths density	0.258		
	9.1. Urban green areas	0.519	Environmental sustainability	0.454
	9.4. Drinkable water supplied every day per capita	0.354		
	9.6. Energy from renewable sources (electricity)	0.405		
	9.3. Household energy consumptions (electricity)	0.334	Environmental resources consumption	0.328
	9.7. Landfill storage of waste	0.498		
10. Research and innovation	10.2. New graduates in R&D (residents - total)	0.220	Knowledge diffusion and application	0.082
	10.3. Production industry specialization in knowledge-intensive sectors	0.318		
	10.1. Propensity to patent	0.026	Patent	0.519
11. Quality of service	11.1. Irregularities in electricity supply	0.290	Public utilities and personal care	0.309
	11.2. Taking charge of users for early childhood services	0.291		
	11.3. Separate collection of municipal waste	0.401		
	11.5. Regional health service outflows (hospital admittance)	0.556		
	11.6. Urban public transport networks density	0.257	Urban public transport services	0.383
	11.7. Urban public transport capacity (seats per kilometres - rate per 1000 inhabitants)	0.281		
	11.4. Prisons overcrowding	0.040	Prisons overcrowding	0.161

For the domain ***Health*** we extract three factors, explaining 69% of the total variance: *Life expectancy and diseases prevention*, *Specific vulnerabilities* and *Youth road mortality*. The first factor is positively correlated with the variables related to life expectancy (1.1 and 1.2) and negatively with the avoidable mortality rate. The elementary indicators related to specific causes of mortality (cancer, dementia, suicide, infant mortality) contribute to the definition of the second factor, while the third factor is the result of a single indicator, *Youth's mortality rate for road accidents*. Note that the first factor refers to the population as a whole, while the second summarizes specific vulnerabilities of certain age groups. Also, the second and the third factors exhibit greater inequality (Gini index) than the first factor.

For the second domain, ***Education and training***, three factors are sufficient to account for more than 82% of the overall variance. The first factor, *Competencies*, is positively determined by literacy and numerical skills of students and negatively by variables 2.1 and 2.2, both connected to early school leaving. The second factor

represents the *Participation in education*, and is related to enrolments in high schools and universities; note that this factor should be considered as an output and not an outcome of well-being. Finally, people of working age participating in lifelong learning define the third factor, named Lifelong learning. This last factor has a much higher value of the Gini index, compared to the other factors.

In the third domain of ***Work and life balance***, two factors are able to explain 84% of the total variance.[2] The first factor, *Local labour market*, includes complementary variables, being positively influenced by the youth unemployment rate and the lack of participation in labour market, and negatively by the employment rate. The indicator 3.7 is also included in this latent variable, but the unexplained variance remains high. The remaining variables, instead, are loaded on second factor *Occupational gender gap*. Note also that concentration is lower in the distribution of the first factor than of the second factor.

The fourth domain, ***Economic well-being***, can be synthesized by two factors, which explain about 75% of the total variance. The indicators associated with income from employment, pensions and family assets form the first factor: *Income and wealth*. The second factor, instead, is related to households' financial straits, being defined by measures of evictions and sufferings of bank loans (*Households economic problems)*. The first factor has a distribution less unequal than the second factor.

In the fifth domain, ***Social relationships***, three factors explain 72% of the total variance. The first factor (*Social integration*) is characterized by the degree of diffusion of social economy: it is highly correlated with voluntary activities and dissemination of no-profit institutions, but it is also connected to the degree of integration of immigrants. The second factor is positively correlated to the accessibility of schools for disabled people, but inversely related to the dissemination of social cooperatives (*Conditions for the social inclusion and care of disadvantaged people*). Note that the indicator associated to the social cooperatives is independent of their dimension and it seems connected to the local political life; hence, it may not represent a good measure of social capital. The third factor is mainly dominated by the presence of the disabled students in schools; consequently, its name is *Integration of disabled schoolmates*. Among the three factors, the one related to disabled pupils presents the lower Gini index.

The ***Politics and institutions*** domain contains two factors explaining 60% of the overall variability. The first factor, *Electoral participation*, includes the indicator of European electoral participation, while the second one is determined by variables associated with local governments' effectiveness and efficiency of local public finance management (*Local financial administration*). In particular, the

[2] Note that, however, the dataset does not include indicators directly related to life balance.

analysis of factors shows that the distribution of the latent variable related to electoral participation is concentrated on positive values if we exclude some very low values that characterize some southern provinces. On the other side, the factor named *local financial administrations* presents a higher inequality.

Crimes and *Road safety* are the names of the two factors extracted for the domain ***Security***, and explain almost 74 % of the overall variance. The first factor includes the indicators of violent and common crimes reported, while the other has high positive coefficients with the variables related to road deaths. Analysing the factors' distribution, there is greater concentration associated to the road mortality.

The fundamental dimensions to describe the ***Landscape and cultural heritage*** domain emerging from the factor analysis are connected to the presence and fruition of *museums and historical buildings*, and to the *density of urban parks*. These two factors can explain about 66% of the total variance, and present highly concentrated distributions; in particular, the second factor is strongly affected by the big outlier of the province of Matera.

In the ***Environment*** domain, the three factors explain the 62% of the overall variance. The first factor, called *Quality of urban air and soft mobility* is strongly positively correlated with the indicators 9.2 and 9.5. Indicators 9.1, 9.4 and 9.6 determine, instead, the second factor: *Environmental sustainability*. The third factor is defined by two indicators negatively correlated with anthropic pressure on the environment, such as burying waste and consumption of electricity for domestic use and so it can be defined *Environmental resources consumption*. Looking to the distributions, the first factor present the higher level of inequality, followed by the second, and by the third.

The domain ***Research and innovation*** is synthesized extracting two factors, which explain 81% of the total variance. In particular, the first factor, *Knowledge diffusion and application*, is determined by the flow of new graduates and the specialization in high knowledge-intensity economic sectors, while the second factor is mainly determined by the indicator 10.1. The Gini coefficient highlights two factors with very different distributions: an almost equal distribution of the first factor is offset by a strongly concentrated distribution of the second factor.

For the last domain ***Quality of services***, three factors explain almost 70 % of the total variance. The first one represents the supply of public services to the community, such as the electric service, the childcare and the health service, so it is defined *Public utilities and personal care.* By contrast, the second factor is linked to both the indicators concerning local public transports (*Urban public transport services*), while the third one to overcrowding of prisons. The distributions of the first two factors are quite similar in terms of Gini index, while the third factor is characterized by a much more equal distribution.

4. Composite indicators for each domain

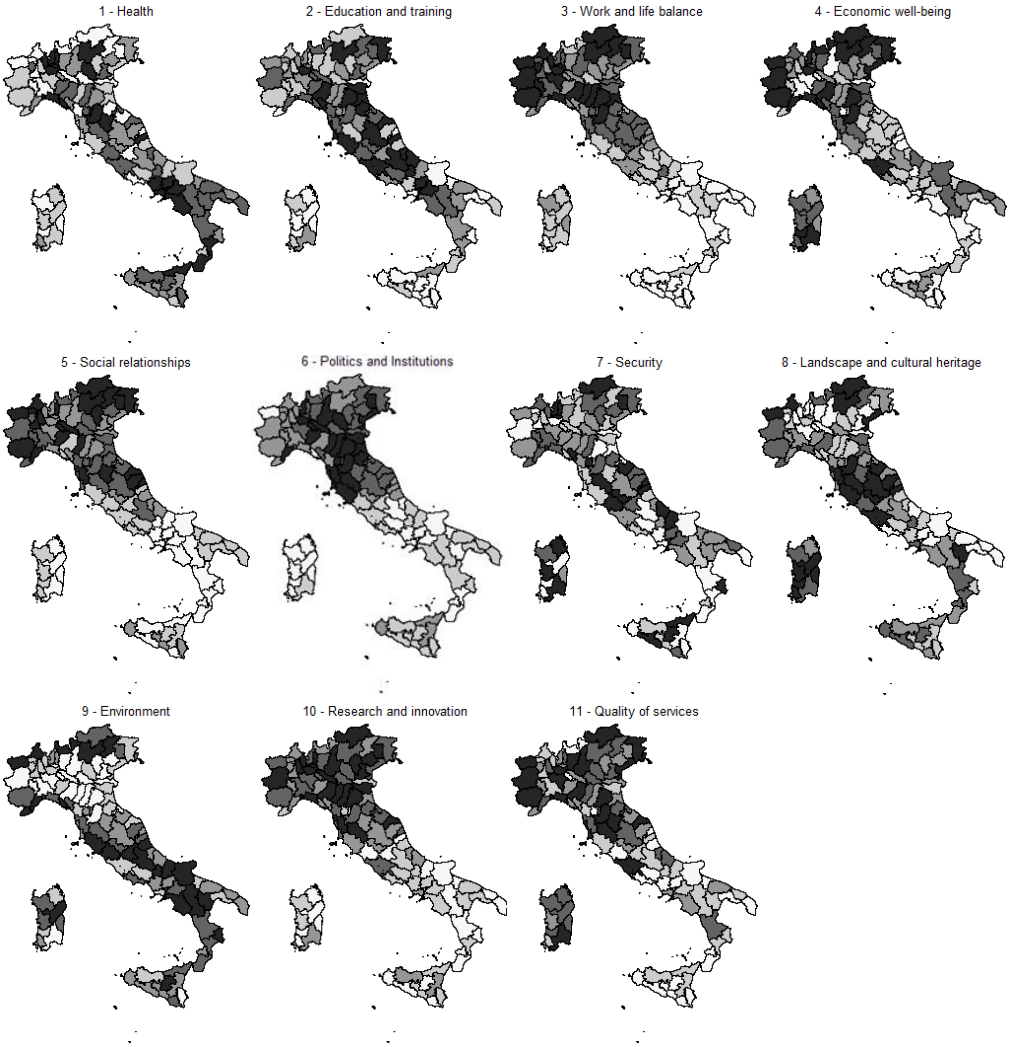
As already mentioned, the factor analysis was instrumental for the construction of composite mono-dimensional indexes, which may help explain and compare the condition of the Italian provinces in relation to each domain and highlight in which BES pillar a province reveals strengths or weaknesses. In particular, we have aggregated factors into a composite index for each BES domain. Figure 1 illustrates the result, by providing a map of Italy in grey-scale, where the Italian provinces are grouped into five classes (quintiles) according to the value of each composite index. For each domain darker colours refer to higher values of the synthetic index, while, conversely, a lighter colour indicates a lower performance in the considered domain. This graphical analysis may help policy makers in easily identifying the domains of well-being in which they should invest more. Figure 1 confirms the gap between the Center-North versus the South of Italy. Similar to what emerges from Istat (2015), the provinces in the South are characterized by a consolidated disadvantage linked to economic hardship, significant social inequalities and lack of integration of foreign residents. Specifically, they are clearly disadvantaged in the labour market, negatively affecting the economic well-being. In addition, political involvement and effectiveness and efficiency of local governments (Politics and institutions domain) are lower in the southern Italy. Also security, quality of services, as well as research and innovation, are worse in the South than in the other Italian provinces. On the other hand, the provinces in the North of Italy have an advantage in terms of economic well-being and a greater job offer. However, this leads to disregard the protection and preservation of the environment, as emphasized by the low values of the index for the environmental domain. Finally, the provinces in the Center of Italy show much positive performance in the Education and training, and also a better landscape and greater cultural facilities. It is also important to note that Politics and institutions and Research and innovation are the domains that more separate and divide Italy into Center-South versus Center-North.

5. Concluding remarks

Aim of this paper was to contribute to the recent and still open debate on how to aggregate the elementary indicators within each domain of the Italian Equitable and Sustainable Well-being (BES). This paper showed the results of a factor analysis approach combined with a method of aggregation based on the Gini index. We have obtained a composite index for each domain, as a weighted mean of the factor scores, with weights that are function of the inequality in the distributions of

the elementary indicators. Future works will be focused at evaluating the robustness of the achieved results, by comparing different aggregation techniques.

Figure 1 – *Italian provinces grouped in quintiles according to the composite indicator of each BES domain.*



Legend: darker colour refer to higher quintile of the composite index, while, conversely, lighter colours indicate lower quintiles.

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SUMMARY

Comparing Equitable and Sustainable Well-being (BES) across the Italian Provinces. A factor analysis-based approach

This paper applies the factor analysis to reduce the huge number of variables included in each of the 11 domains that constitute the Equitable and Sustainable Well-being (BES) of the Italian provinces. Using this method, we extract the minimum number of indicators able to summarize the relationship within the well-being dimensions. Based on these results, for each domain and for each Italian province, we construct a composite indicator that is a linear combination of the estimated factor scores, with weights based on the Gini index of concentration. In particular, we associate smaller weights to those factors that exhibit a more homogeneous distribution across the provinces, while greater weights will be associated with those factors that are more concentrated in few geographical areas.

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WHAT TOURISTS SAY ABOUT THE ITALIAN NATIONAL PARKS: A WEB MINING ANALYSIS

Domenica Fioredistella Iezzi, Francesco Zarelli

1. Introduction

In recent years, national natural parks have attracted more and more tourists. The reasons for this success could be the striking beauty of these areas, but there are three main motivations: (1) sustainable tourism, (2) ecotourism and (3) nature tourism. Nature tourism pushes for the enjoyment of the beauty of flora and fauna but does not make an evaluation of sustainability (Zarelli and Iezzi, 2012; Giannavola, Sole, 2008). Ecotourism analyses similarities and differences in the emotions that emerge from the experience of visiting such places and does not exclude the possibility of investigating and studying the emergence of a conscious attention of the traveller—possibly already mature—to the protection of places, including animals and plants, fragrances and sounds, often so different from the context in which we live. This attitude is typical of tourists in ecotourism, which hence differs from nature tourism because those who practice it explicitly give attention to environmental protection and the conservation of its identity (IX Ecotur Report, 2012). It should be noted that the concept of ecotourism is still difficult to fully explain because it is, first of all, an abstraction, a philosophical model undergoing evolution (Galli, Notarianni, 2002). Sustainable tourism focuses on responsible tourists and respectful contractors of environmental and local culture, offering real benefits to local people.

The aim of this paper is to classify the contents of several reviews published by tourists/hikers about six pilot Italian national parks (Abruzzo, Molise and Lazio; Gargano; Pollino; Maddalena; Circeo and Gran Sasso). It is interesting to describe, in fact, as they talk about their experiences, what activities they participated in, but mostly what are the feelings of those who have decided to practice a nature tourism.

We use opinion-mining methods (Iezzi, 2012a, 2012b) to explore contents and define clusters of reviews and measure the sentiments of tourists who try out nature tourism.

2. The main features of the Italian National Parks

In 2011, 13 million nights were spent in tourist accommodation establishments to visit Italian national parks—approximately 3.7% of all nights spent by tourists in accommodation establishments (Table 1).

Table 1 – *Economic indicators of Italian National Parks in the Italian territorial partitions – Several years.*

Variables	Year	National Parks in the North-West	National Parks in the North-East	National Parks in the Centre	National Parks in the South and Isles	Total National Parks	Italy
Territorial surface (square kilometers) *	2011	1,960	1,246	1,635	9,951	14,793	302,063
Nights spent at tourist accommodation establishments (thousands) ***	2011	1,608	1,133	3,095	8,065	13,899	375,771
Gross occupancy rate of bed places **	2012	0.18	0.24	0.19	0.14	0.16	0.22
% Farms **	2012	14.34	33.01	21.12	22.67	22.52	13.43
% Enterprises in accommodation and food service activities **	2012	23.16	11.75	15.19	9.32	10.88	6.59
% Enterprises in the craft **	2012	28.32	28.10	22.52	20.19	21.27	23.60
Total employed persons (percentage variation) **	1991/ 2011	3.07	5.74	-2.94	-5.12	-3.36	12.69
% Agriculture employed persons **	2011	0.31	0.44	1.55	1.48	1.30	0.39
% Industry employed persons **	2011	10.79	24.30	14.00	17.98	17.36	25.48
% Construction employed persons **	2011	12.09	17.42	14.97	15.83	15.53	9.74
% Commerce employed persons **	2011	17.91	20.66	25.85	27.56	25.94	20.96
% Tourism employed persons **	2011	36.34	18.64	17.78	12.40	15.67	7.43
% Other service activity employed persons **	2011	22.56	18.54	25.84	24.75	24.20	35.99
% SAU/SAT **	2010	44.19	50.97	64.54	60.39	58.62	75.26
SAU (percentage variation)**	1990/ 2010	-34.65	-12.45	-7.93	-15.99	-16.66	-14.55

Source: Ministry of the Environment and Protection of Land and Sea
http://www.areeprotette-economia.minambiente.it/index.php?p=national-parks
** Istat, ** Elaboration of Ministry of the Environment, *** Unioncamere*
*Gross occupancy rate of bed places = (Nights spent in tourist accommodation establishments / bed places *365).*
SAU = utilized agricultural area; SAT = total agricultural area.

More than 8 million nights were spent in national parks in the south and the islands and represent about 58% of the total nights spent in national parks, while national parks in the centre and north account for approximately 20% for each region.

Table 2 – *Economic indicators of Italian National Parks – Several years.*

Variables	Year	Abruzzo, Lazio, Molise	Circeo	Gargano	Gran Sasso, Monti della Laga	Arcipelago de La Maddalena	Pollino
Territorial surface (square kilometers) *	2011	333	145	1,394	1,383	52	2,055
Nights spent at tourist accommodation establishments (thousands) ***	2011	275	156	3,439	184	180	140
Gross occupancy rate of bed places **	2012	0.22	0.19	0.12	0.15	0.15	0.07
% Farms **	2012	18.65	30.89	32.08	30.04	2.18	29.14
% Enterprises in accommodation and food service activities **	2012	20.60	8.53	11.83	10.22	15.34	7.73
% Enterprises in the craft **	2012	23.31	15.11	16.99	26.62	28.95	21.84
Total employed persons (percentage variation) **	1991/2011	14.15	29.88	10.72	-23.14	-16.67	-18.18
% Agriculture employed persons **	2011	0.16	1.28	3.42	1.91	1.45	1.20
% Industry employed persons **	2011	4.55	19.92	12.55	17.42	7.63	15.40
% Construction employed persons **	2011	8.16	12.38	14.19	27.37	13.82	18.89
% Commerce employed persons **	2011	12.71	30.17	28.22	19.46	28.68	31.87
% Tourism employed persons **	2011	28.94	9.87	18.29	15.94	16.58	9.39
% Other service activity employed persons **	2011	45.49	26.38	23.34	17.90	31.84	23.26
% SAU/SAT **	2010	41.31	85.60	78.98	55.09	90.45	59.17
SAU (percentage variation)**	1990/2010	1.59	-24.50	-3.77	-16.57	-84.11	-28.25

Source: Ministry of the Environment and Protection of Land and Sea
http://www.areeprotette-economia.minambiente.it/index.php?p=national-parks
** Istat, ** Elaboration of Ministry of the Environment, *** Unioncamere*
*Gross occupancy rate of bed places = (Nights spent in tourist accommodation establishments / bed places *365).*
SAU = utilized agricultural area; SAT = total agricultural area.

It can be seen that among the national parks examined, the Gargano park, with more than 3 million nights, has the most number of the nights spent by tourists, but its gross occupancy rate of bed places[1] is 0.12. On the other hand, Abruzzo, Lazio and Molise (0.22) has a higher value (Table 2). Although in all national parks combined this indicator is lower, the proportion of tourism-employed people in 2011, with respect to the total number of employed people in these territories, is 15.67% and is therefore more than double the national percentage (7.43%) (Table 1). The abovementioned situation highlights the importance of tourism in socioeconomic issues in local communities concerning parks. Furthermore, the national parks in the northwest present a tourism employment percentage of 36.34% of the total employment in this territory, whereas in the remaining national parks, the figure ranges from 12% to 19%. In this aspect, the percentage of employment is particularly important for the National Park of Abruzzo, Lazio and Molise (approximately 29%), while in Gargano, La Maddalena and Gran Sasso and Monti della Laga national parks the figure ranges from 16% to 18%, and in Circeo and Pollino, around 9% (Table 2). As for the proportions of enterprises in the areas of accommodation and food service, with respect to the total number of enterprises in the parks, we can see further interesting discoveries: in 2012, in Italy the proportion of decrease was 6.59%, while in all national parks, the proportion was 10.88% (Table 1). Moreover, there are remarkable differences among territories of national parks: in the northwest, national parks have the highest percentage of businesses (23.16%), while in the northeast and centre, the percentage is over 11%, and in the south and the islands, 9.32% (Table 2). Much like the abovementioned classifications, the percentage of employment in the National Park of Abruzzo, Lazio and Molise presents the highest proportion of enterprises in accommodation and food service (20.60%), followed by that in Gargano, La Maddalena and Gran Sasso and Monti della Laga (10%–15%), and finally, Circeo and Pollino (l.8%) (Table 2). The percentage of farms in national parks (22.52%) is higher than that in the national territory (13.43%),—but these farms are found mostly in national parks in the northeast (33.01%)—followed by that in the centre and the south and the isles (21%), and then that in the northwest (14.34%) (Table 1).

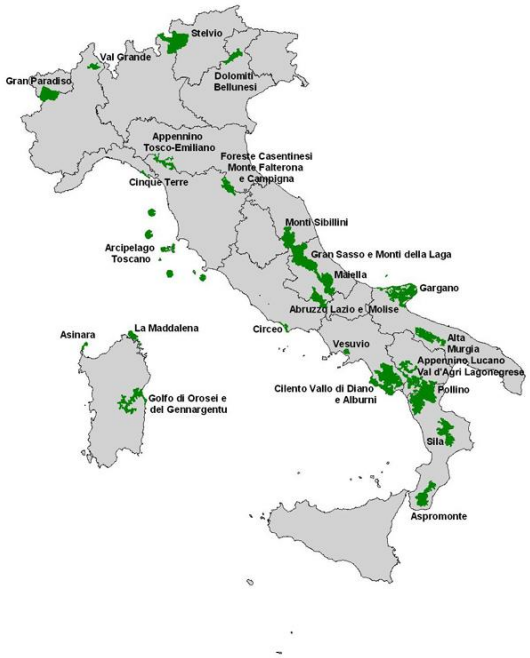
Moreover, the percentages of farms in Gargano, Circeo, Gran Sasso and Monti della Laga and Pollino (29%–32%) are decidedly higher than that in all national parks combined. Then come the national parks of Abruzzo (approximately 18%) and La Maddalena (2%).

[1] Gross occupancy rate of bed places $= \left(\frac{\text{nights spent in tourist accommodation establishments}}{\text{bed places}} \right) \times 365$

3. Data

We collected 2,096 reviews published by TripAdvisor from 2011 to 2015 about Abruzzo, Molise and Lazio; Gargano; Pollino; La Maddalena; Circeo and Gran Sasso Monti della Laga. The corpus is composed of 164,408 tokens, 7,953 types, 2,744 (1.67% of tokens—34.50% of types), with a mean of tokens by text of 78.40. We selected a sample of the different types of parks in Italy, because this study is a pilot survey that we will extend to all national parks. Figure 1 shows the geographic locations of 24 Italian national parks. It is evident that there is a concentration of national parks in the south and centre of the country.

Figure 1 – *Italian National Parks, territorial surface*



Source: http://www.minambiente.it/pagina/elenco-dei-parchi

In the National Park of Abruzzo, which is composed of municipalities in the mountains, the impact of tourism on the ecosystem is under control, through a policy designed to encourage seasonal adjustments and set limits to visits to sensitive areas during peak seasons, summer and winter—in the latter case, also because of the influx of visitors to ski resorts near the park. Importantly, the park

organizes volunteer camps, something that not all parks do (Marino, 2014). Moreover, many accommodations focus on the ecosustainability of their offers, such as the use of renewable energy and recycling (Marino, 2014).
The Circeo National Park, which is composed of municipalities in the coastal areas, is characterized by an influx of tourists in the summer, providing benefits to the communities but making a negative impact on the ecology. To deal with this situation, the Circeo National Park is implementing a series of policies that support a sustainable influx of visitors, such as through participation in the projects of the European Charter for Sustainable Tourism, and at the same time encourage the creation and maintenance of farms and B-and-B hostels and the sale of local products. Even the Gargano National Park, which consists of 18 municipalities, of which as many as 15 are in the coastal areas, is characterized by an increasing influx of tourists during the summer, who visit just to enjoy the beaches, participate in religious activities, etc., is going through considerable pressure in terms of preservation and protection of the ecosystem and management of waste collection, so it is very important to make some planning and monitoring to promote sustainability. Also, many local products should be certified (Marino, 2014). In the National Park of Gran Sasso, which is composed of municipalities in the mountains and hills, tourism pressure is not yet strong, and tourism planning could be done to encourage tourists' longer average stay, production of numerous common products approved by the park and the current fencing of wild boar (Marino, 2014). The National Park of La Maddalena has to deal with a significant number of tourists every year and, consequently, a significantly heavy boat traffic, leaving signs of their presence in the environment. For this reason, the park has adopted a series of measures, such as piers and removable ticketing, to finance their activities and reclaim protected areas (Marino, 2014). The Pollino National Park is made up of 56 municipalities, of which 43 are in mountainous areas and 12 are in coastal areas. The park has done important projects to protect biodiversity and has established a network of local farmers with tourism facilities. The mountain and hill areas are still characterized by insufficient accommodation for nature tourism, while in the coastal areas, there are a considerable number of beds in campsites that stand as hotels.

3. Methods

We applied a text-clustering algorithm proposed by Reinard (1983, 1986) to classify the contents of the reviews and lexical correspondence analysis (LCA) to create sematic maps. We used the Iramuteq software (IRaMuTeQ means R interface for multidimensional analysis of text and questionnaire), which is based

on the R statistical software. This clustering algorithm belongs to the descending hierarchical classification methods, and it decomposes the classes until a predetermined number of iterations fail to result in further significant divisions. The result is a hierarchy of classes, which may be schematized as a tree diagram.

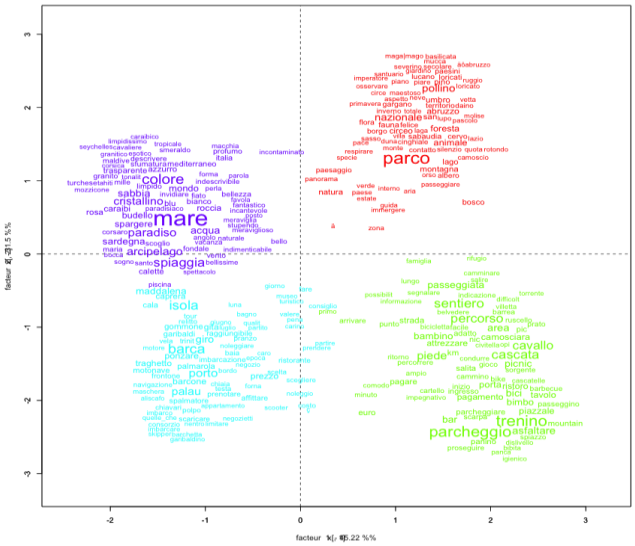
We apply this method because of its advantage of using a robust technique. Term-document matrices, in fact, are mostly made of zeros since only a small part of the whole vocabulary is used in each sentence, and as such, they are very sensitive to artefacts (Reinard, 2003). In this algorithm, the goal is to search, among all possible partitions in two classes, for the one that maximizes the χ^2 of a lexical table.

4. The main results

LCA, based on a contingency table (words x parks), and TC were conducted on 2,096 reviews, 4,928 segments, 11,789 types (lemmatized), 162,827 tokens and 7,786 lemmas. We selected 7,197 active types and 526 supplementary types (stop words) using 2,123 active types with a frequency of more than 4. We classified 4,627 segments (93.89%) and obtained four classes: (1) The *green cluster* (17.2% of the posts) describes sites and activities in the mountain parks (path, train, walk, on horseback, on foot, etc.). The reviews were given by tourists who visited the National Park of Abruzzo mainly in August or October and gave a rating of 1 to 4 (assessments were given on a scale of 1 to 5, where 1 was bad and 5 was excellent). (2) The *red cluster* (28.7% of the posts) focuses on typical flora and fauna in the Mediterranean (reptiles, deer, pine, wild boar, etc.). In this cluster, reviews were given by tourists who visited the Gargano, Abruzzo, Pollino and Gran Sasso parks all year round. (3) The *purple cluster* (28.7% of the posts) analyses some marine parks. In this cluster were given minute descriptions of certain details like the colour of the sand or the sea: crystal clear, fine, cliff, myrtle. Moreover, many comments described the beauty of the landscape, smells and sensations. The tourists were extremely satisfied with their holiday. Those who visited the Maddalena park, especially in July and September, gave a rating of 5. (4) The *light blue cluster* shows activities in marine parks, such as boat trips, port, trip, and dinghy. The reviews described Maddalena and Circeo parks during the months of July to September, and tourists were very satisfied. In fact, they gave a rating of 5, and a word that characterizes those comments is jewel (Figure 2).

Figure 2 − *Plane of the first two axes from the LMC of the reviews a) and the a priori variables (parks, evaluation, month and year of visit)*

a)



b)

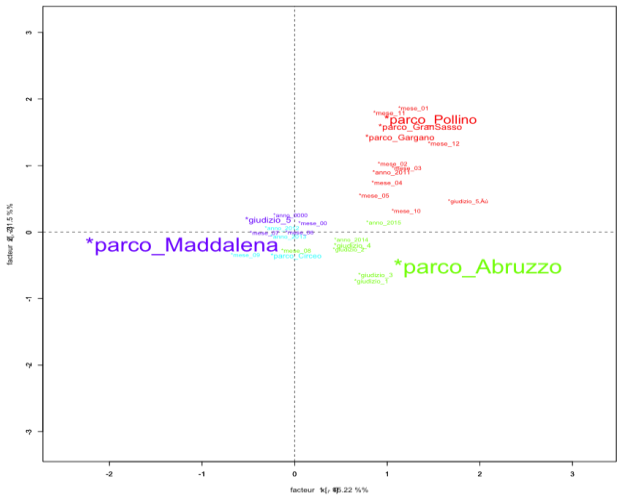


Figure 3 Dendrogram of the reviews

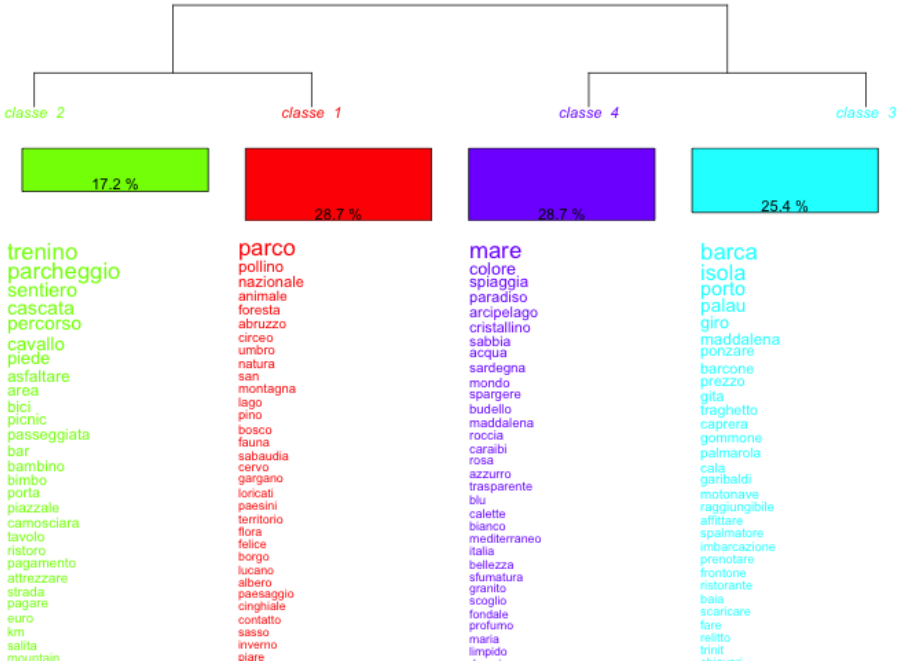


Figure 3 shows four classes, but two large categories of comments are marine and mountain and Mediterranean areas. The visitors were very satisfied with their experiences and expressed extremely positive feelings.

The profiles of the tourists/walkers depend on the park they visit: In the National Park of Gran Sasso, most of the visitors are hikers who know the area and are aware of the beauty of the flora and fauna. In the National Park of Abruzzo, Lazio and Molise, tourists are more inclined to enjoy the beauty of the park without active participation in the activities offered. The national parks of Gargano, Maddalena and Circeo are characterized by summer tourism, as well as geographical position, with enthusiastic tourists enjoying the sea and the beaches.

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SUMMARY

What tourists say about the Italian national parks: a web mining analysis

In Italy, national parks are becoming very attractive to tourists/walkers of different types. In this paper, we analyse 2,096 reviews published by TripAdvisor from 2011 to 2015 about six pilot national parks—Abruzzo, Molise and Lazio; Gargano; Pollino; Maddalena; Circeo and Gran Sasso—in order to examine the opinions and feelings of the tourists. We apply text mining methods to create semantic maps and classify the contents of the reviews.

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SOCIALMENTE ESCLUSI O INCLUSI? ANALISI DEL DISAGIO GIOVANILE IN ITALIA[1]

Domenica Quartuccio, Giorgia Capacci, Clodia Delle Fratte

1. La condizione dei giovani: concetti introduttivi e fonte dei dati

Il miglioramento della condizione dei giovani è sempre stato e continua ad essere la priorità politica per i governi europei. Anche se quasi sempre si parla solo di lotta alla disoccupazione giovanile, la necessità di affrontare direttamente anche i rischi di esclusione sociale è sempre più riconosciuta dalle autorità pubbliche nonché dalle parti sociali e dalla società civile (Milo, 2013). Negli ultimi anni, infatti, si sono attivate molte politiche che hanno avuto come scopo la lotta alla povertà e all'esclusione sociale dei giovani. I fattori da considerare sono molteplici, come "il reddito, la necessità di un'opportunità di lavoro educativo e dignitoso, sistemi efficaci di protezione sociale, l'alloggio, l'accesso alla sanità di buona qualità e di altri servizi, così come la cittadinanza attiva" (Parlamento europeo, Consiglio dell'Unione europea, 2008).

Ma quando parliamo di giovani a chi ci riferiamo? Quali classi di età considerare? La situazione italiana è del tutto particolare specie se confrontata con quella del resto d'Europa, dove si definiscono giovani coloro che si trovano nella fascia di età 15-29 anni. "Quando invece l'Istat e altri enti di ricerca nazionali svolgono una ricerca sui giovani, considerano generalmente la fascia che arriva fino ai 35 anni. Questo perché nel nostro paese è diventata la norma arrivare a 30 anni vivendo ancora con i genitori." (Rosina, 2012). Si diventa adulti, quindi, molto più tardi, contrariamente a quanto accade negli altri paesi europei dove si esce presto dalla famiglia di origine grazie anche a politiche sociali che favoriscono le nuove generazioni. È per questo motivo che effettuare dei confronti internazionali risulta complesso poiché i giovani-adulti (come viene definita la fascia di età 31-34 anni) che vivono in Italia risulterebbero tagliati fuori.

In Italia la quota di giovani è scesa negli ultimi 60 anni più di 10 punti percentuali (passando dal 29,9% del 1954 al 20,4% del 2014) e le ultime previsioni

[1] Seppure l'articolo vada considerato come frutto di una comune riflessione di tutte le autrici, i paragrafi 2 e 4 sono stati redatti da Giorgia Capacci, i paragrafi 3, 3.1, 3.2, 3.2.1, 3.2.2, 3.2.3 da Clodia Delle Fratte e i paragrafi 1, 3.2.4, 3.2.5 da Domenica Quartuccio.

Istat dicono che, in futuro, è destinata ulteriormente a diminuire. Alla fine del 2013, in Italia i giovani tra i 16 e i 34 anni erano circa 12 milioni (il 24,5% della popolazione, di cui il 49% donne): la percentuale di giovani più alta si trova soprattutto nelle regioni del Sud (la Campania con il 24,1%), mentre è molto più bassa al Nord (la "vecchia" Liguria con il 16,7%).

Per poter misurare il livello di esclusione sociale dei giovani bisogna misurarne l'aspetto multidimensionale, grazie all'uso di indicatori che tengano conto dell'ottica oggettiva e soggettiva. Abbiamo usato, quindi, l'indicatore sintetico di *rischio di povertà o di esclusione sociale*[2], che rientra nella strategia *Europa 2020*, calcolato a livello europeo dal progetto Eu-Silc (European Union Statistics on Income and Living Conditions), nato per fornire statistiche ufficiali su povertà, benessere e condizioni economiche delle famiglie e degli individui. Tale indicatore è usato per monitorare uno degli obiettivi della strategia, quello della "lotta alla povertà e all'emarginazione" attraverso l'uscita di almeno 20 milioni di persone da questa condizione entro il 2020. La percentuale di 15-29enni, soglie di età utilizzate da Eurostat per definire i giovani, che vivono in Europa (Ue28) e che sono a rischio di povertà o di esclusione sociale è pari al 29,0%. L'Italia si trova tra i paesi con la percentuale più alta: il valore, infatti, è pari al 34,4% ben sei punti percentuali in più rispetto al valore nazionale (28,4%), mentre Francia e Germania presentano valori al di sotto della media europea (rispettivamente 24,0% e 25,1%).

I dati utilizzati nel presente studio sono quelli dell'indagine Eu-Silc condotta dall'Istat nel 2013 su un campione di 44.622 individui (per un totale di 18.487 famiglie) e, in particolare, di 8.437 giovani di 16-34 anni.

2. Un'analisi descrittiva della realtà dei giovani in Italia

La fascia di popolazione dei giovani è quella che più di tutte risente delle modiche della struttura demografica negli anni recenti. Il declino della percentuale di giovani sul totale della popolazione è, infatti, continuo e senza interruzioni da diversi anni e sta sempre più spostandosi verso la popolazione in età attiva. A ciò si aggiunge una forte disoccupazione giovanile che si è inasprita in questi ultimi anni a causa della crisi economica, a fronte invece di un livello culturale sempre più alto dei giovani che proseguono i loro studi anche oltre l'università.

[2] Si definiscono a rischio di povertà o di esclusione sociale i giovani che vivono in famiglie che sperimentano almeno una delle seguenti tre condizioni: 'a rischio di povertà', cioè famiglie con un reddito equivalente inferiore al 60% del reddito mediano; 'a bassa intensità di lavoro', famiglie i cui componenti di età 18-59 anni lavorano meno di un quinto del tempo che avrebbero potuto lavorare nel periodo di riferimento; in 'condizioni di severa deprivazione materiale', ovvero in una situazione di involontaria incapacità di sostenere spese per determinati beni o servizi.

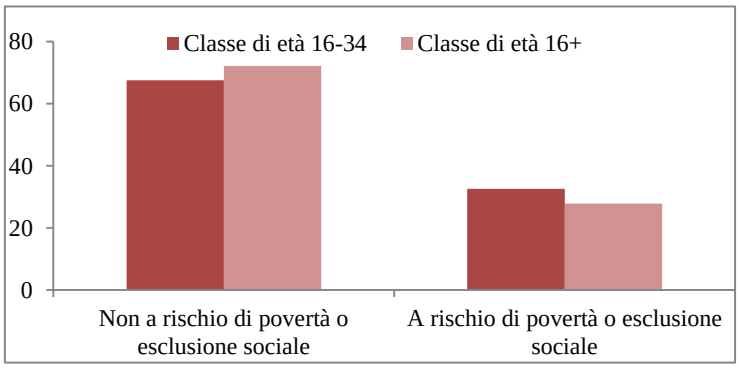
Il panorama del mondo giovanile è talmente variegato da richiedere una riflessione profonda che coinvolga ogni aspetto della loro vita.

Ciò che preme analizzare in questo contesto però sono soprattutto le condizioni di vita dei giovani, in particolare il grado di disagio o di inclusione sociale, alla luce dei risultati dell'indagine Istat Eu-Silc.

Sono state analizzate preventivamente le caratteristiche socio-demografiche degli oltre 8 mila giovani coinvolti nell'indagine. Poiché la fascia di età 16-34 anni da noi scelta è molto eterogenea, per poter meglio interpretare i profili dei giovani, abbiamo deciso si suddividerli in 4 classi di età: 16-20 anni, 21-25 anni, 26-30 anni e 31-34 anni. Il panorama che emerge è che si tratta per la maggioranza di giovani residenti al Nord (42,3%); con un livello culturale medio-superiore – più del 70% ha raggiungo almeno la licenza media superiore o la laurea; la condizione prevalente è quella di occupato (43,8%) seguita, ovviamente trattandosi di giovani, da studente (31,1%). La tipologia di famiglia in cui vivono prevalentemente è quella di coppia con figli (67,8%).

Entrando maggiormente nel dettaglio delle condizioni di vita di questa fascia di popolazione si evidenzia che il rischio di povertà o di esclusione sociale è più alto per i giovani (32,5%) rispetto al totale della popolazione di 16 anni e più (27,8%), sintomo di una significativa condizione di disagio che vivono le persone fra 16 e 34 anni, che probabilmente risente molto anche della crisi economica attuale con tassi di disoccupazione giovanile tra i più alti dei paesi dell'Unione Europea, che penalizza soprattutto le donne.

Figura 1 – *Popolazione a rischio (o non) di povertà o di esclusione sociale per i giovani e per la popolazione di 16 e più anni, Eu-Silc 2013.*



Allo stesso modo, la severa deprivazione materiale[3] è più elevata, anche se con un scarto più lieve, per i giovani (13,7%) rispetto alla popolazione di 16 anni e più (12,2%). Considerando i quinti di reddito, quasi il 50% dei giovani vive in famiglie che appartengono ai primi 2 quinti di reddito più poveri (48,5%), a ulteriore conferma delle condizioni di disagio in cui si trovano.

Se si analizzano i quesiti più specifici sulle valutazioni soggettive delle proprie condizioni di vita emerge che fra i giovani 31-34enni la percentuale di coloro che non si sentono liberi di spendere è più alta rispetto ai 16-30enni, sintomo che finché si è più piccoli la famiglia presumibilmente funge da sussidio e, quindi, ha anche uno scopo di "protezione economica", mentre col crescere dell'età e, quindi, si presume, con l'uscita dalla casa di origine, si amplifica la situazione di fragilità economica tipica del sistema di precarizzazione che caratterizza in questa fase il nostro sistema lavorativo. Parallelamente, ai quesiti se si sente libero di svolgere attività di svago o di uscire con familiari/amici almeno una volta al mese o di disporre di una connessione internet da usare per le proprie esigenze, se scorporiamo il risultato in quattro classi di età emerge che è sempre l'ultima (31-34 anni) ad avere la percentuale più alta di coloro che rispondono "No, perché non possono permetterselo".

Successivamente, abbiamo analizzato i dati del modulo ad hoc "Wellbeing" di Eurostat realizzato per la prima volta nel 2013[4]. In particolare, abbiamo preso in considerazione i quesiti sul grado di soddisfazione: i risultati mostrano che la soddisfazione della situazione della vita attuale è molto buona, dichiarando oltre il 30% un'alta soddisfazione. Diversamente, la soddisfazione della situazione economica attuale della famiglia non è così elevata, anzi, solo il 9% dichiara un'alta soddisfazione. Il lavoro attuale invece è maggiormente apprezzato: solo il 4,7% dichiara una bassa soddisfazione. Piuttosto curioso è invece il risultato sulla fiducia nelle istituzioni, nelle forze dell'ordine è medio alta (per una bassa fiducia hanno risposto solo il 26% dei giovani) mentre bassa è quella per la giustizia, uno

[3] La severa deprivazione materiale corrisponde alla percentuale di individui in famiglie che registrano almeno quattro segnali di deprivazione materiale su una lista di nove: essere in arretrato nel pagamento di bollette, affitto, mutuo o altro tipo di prestito; non poter sostenere spese impreviste con risorse proprie; non potersi permettere: di riscaldare adeguatamente l'abitazione, un pasto proteico adeguato almeno una volta ogni due giorni, una settimana di ferie all'anno lontano da casa, un televisore a colori, una lavatrice, un'automobile, un telefono.

[4] I moduli ad-hoc di Eu-Silc hanno cadenza annuale e sono inseriti al fine di integrare le variabili raccolte abitualmente nell'indagine con variabili supplementari che evidenziano aspetti inesplorati dell'inclusione sociale. Nel 2013, il modulo ad hoc "Wellbeing" si è posto come obiettivo quello di fornire una misura di benessere attraverso una serie di quesiti a livello individuale e familiare su differenti dimensioni del benessere (deprivazioni, condizioni di salute, condizioni lavorative, livelli di soddisfazione generale).

su due ha risposto di avere bassa fiducia. Molto deludente il risultato della politica, l'84% dichiara di avere una bassa fiducia.

3. Analisi multidimensionale dei dati

Uno degli obiettivi del presente lavoro è l'individuazione di gruppi di giovani in base al loro livello di esclusione o inclusione sociale; l'analisi multivariata contribuisce al perseguimento di un tale risultato. In particolare, è stata effettuata un'analisi delle corrispondenze multiple (ACM) seguita da una analisi dei gruppi (cluster analysis). L'ACM è la tecnica di analisi multivariata che fornisce come risultato le coordinate di ogni modalità delle variabili coinvolte nell'analisi e quelle di ogni osservazione (ogni rispondente) sugli assi fattoriali, che, per costruzione, rappresentano le variabili di tipo quantitativo che meglio riproducono le caratteristiche di similitudine o distanza tra le osservazioni. Grazie a queste variabili quantitative è possibile applicare la cluster analysis che suddivide in gruppi omogenei i rispondenti, con l'obiettivo di studiarne le caratteristiche ed individuare i diversi profili.

Abbiamo definito nove variabili attive con un totale di trenta modalità associate e sedici variabili illustrative con un totale di 72 modalità. Le variabili attive considerate, a parte la classe di età, sono incentrate sulla deprivazione individuale, ovvero sull'involontaria incapacità di sostenere spese per determinati beni (possibilità di sostituire abiti consumati con capi di abbigliamento nuovi; disporre di due paia di scarpe, di cui almeno uno utilizzabile in ogni stagione, disporre di una connessione internet da usare per le proprie esigenze), servizi sanitari (aver avuto bisogno di una visita dal dentista e dallo specialista che poi non sono state fatte) o attività di svago (possibilità di: incontrarsi con familiari/amici per bere/mangiare almeno una volta al mese, svolgere regolarmente attività di svago fuori casa, spendere liberamente una piccola somma di denaro ogni settimana per le proprie esigenze personali).

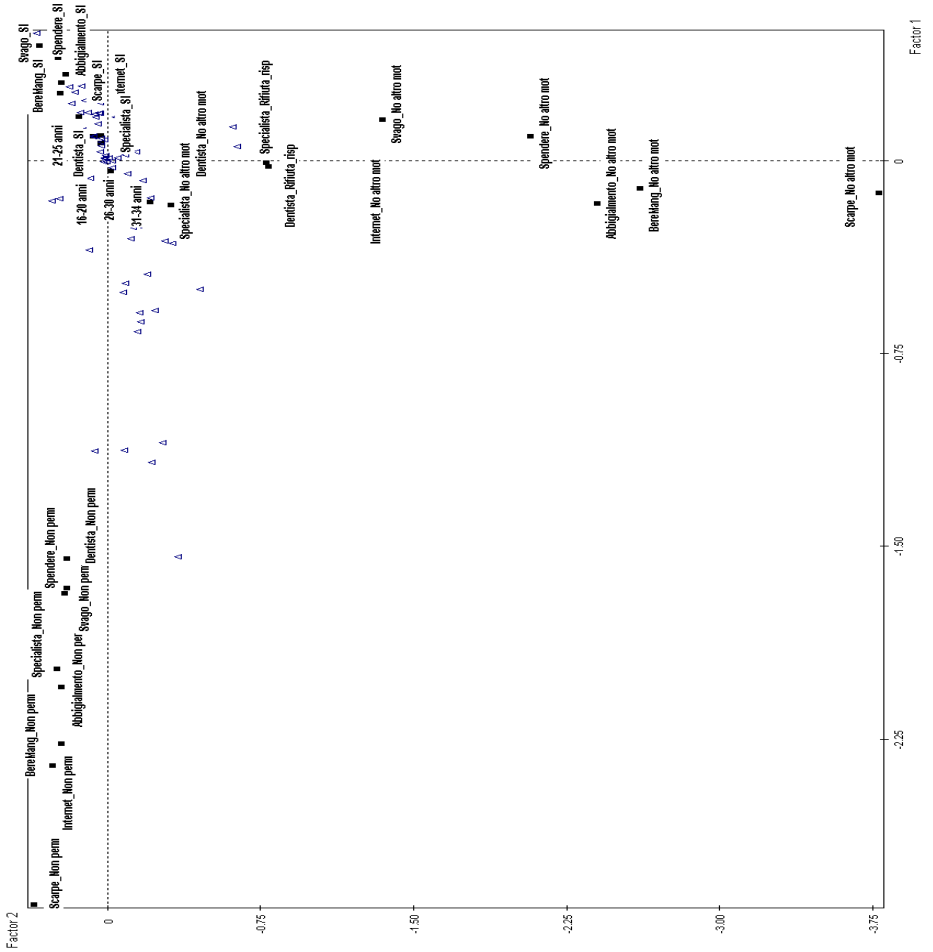
Come illustrative abbiamo scelto una serie di variabili socio-demografiche come sesso, titolo di studio, condizione professionale, tipologia familiare e ripartizione geografica e due variabili che identificano la situazione economica della famiglia in cui vive il giovane: i quinti della distribuzione di reddito e l'indicatore sintetico di rischio di povertà o di esclusione sociale.

3.1. Analisi delle corrispondenze multiple

L'ACM calcolata sulle nostre variabili ha prodotto 27 fattori estraibili, considerando ciascuna modalità attiva come una variabile. La quota di inerzia

riprodotta dai primi due fattori è pari al 35,4% che, rivalutata con la formula proposta da Benzécri (Bolasco, 1999), arriva a spiegare il 62,7% della variabilità del fenomeno.

Figura 2 - *Analisi delle corrispondenze multiple, variabili attive e illustrative, Eu-Silc 2013.*



I quadri rappresentano le variabili attive e i triangoli le illustrative. Di queste ultime non si mostrano le etichette per problemi di visualizzazione.

La figura 2 presenta le modalità attive proiettate sul piano costituito dai primi due fattori estratti dall'ACM.

Le caratteristiche dei giovani che si trovano sul primo asse fattoriale risultano evidenti già da una prima analisi delle modalità attive che vi si distribuiscono. Si

tratta di giovani che non dispongono di due paia di scarpe, non si incontrano con familiari/amici per bere/mangiare e non svolgono regolarmente attività di svago fuori casa non per motivi economici, ma per altri motivi, probabilmente perché non sono particolarmente interessati.

Guardando il secondo asse, nel semiasse positivo, si trova chi si può permettere di svolgere attività di svago e acquistare beni, contrapponendosi a chi si colloca sul semiasse negativo, dove si trovano i giovani in peggiori condizioni economiche. Si tratta di chi non si può permettere di incontrarsi con familiari/amici per bere/mangiare, di spendere liberamente una piccola somma di denaro per le proprie esigenze personali e di disporre di due paia di scarpe.

3.2. Analisi dei gruppi

L'interpretazione degli assi fattoriali prodotti attraverso l'ACM non consente di spingersi oltre nel descrivere le caratteristiche dei giovani socialmente esclusi o inclusi. L'applicazione della cluster analysis ha consentito invece di sfruttare meglio l'informazione rilevata e ottenere una segmentazione dei giovani molto più precisa.

Tramite la cluster analysis si riconoscono cinque gruppi corrispondenti ad altrettanti profili di giovani. Il primo gruppo, da noi chiamato "Giovani-studenti-benestanti", rappresenta il 59,3% del campione; il secondo, "Giovani-adulti-occupati", il 21,1%; il terzo, "In coppia-socialmente isolati", il 4,2%; il quarto, "Poveri-disoccupati-poco istruiti", il 10,1% e l'ultimo, "Poveri-occupati", il 5,3%.

3.2.1. Primo gruppo: giovani-studenti-benestanti

Il primo gruppo, il più numeroso con circa 5 mila individui, è formato da giovani che si possono permettere di acquistare beni e di svolgere varie attività: si incontrano con familiari/amici almeno una volta al mese per bere/mangiare (98,6%) (Tabella 2), dispongono di due paia di scarpe (99,4%) effettuano visite dallo specialista (96%) o dal dentista (94,7%) quando ne hanno necessità. Si tratta del gruppo più "giovane" dato che nel 57,1% dei casi hanno tra i 16 e i 25 anni. E' anche il gruppo con le migliori condizioni economiche, infatti ha la percentuale più alta di giovani che vivono in famiglie non a rischio di povertà o esclusione sociale (77,3%) e che appartiene ai due quinti più ricchi (quarto e quinto) della distribuzione dei redditi familiari (42,5%). Inoltre, raccoglie il maggior numero di laureati (20,8%) e studenti (40,3%). Il 44,9% dei giovani di questo gruppo risiede al Nord.

3.2.2. Secondo gruppo: giovani-adulti-occupati

Il secondo gruppo raccoglie 1.779 individui ed è abbastanza affine al primo. Anche in questo gruppo c'è chi si può permettere due paia di scarpe e capi di abbigliamento nuovi, di incontrarsi con familiari e amici e di spendere una piccola somma di denaro, ma, a differenza del precedente gruppo, non sembrano essere interessati a svolgere attività di svago.

Tabella 2 – *Cluster per variabili attive, Eu-Silc 2013.*

Variabili attive	Cluster					Totale 16-34 anni
	1	2	3	4	5	
Classi di età						
16-20 anni	29,0	7,1	27,7	22,3	11,6	22,7
21-25 anni	28,1	21,7	20,3	23,7	22,6	25,7
26-30 anni	24,7	33,1	25,4	26,2	30,4	27,0
31-34 anni	18,2	38,0	26,5	27,8	35,5	24,6
Sostituisce abiti consumati						
Sì	94,8	88,7	-	18,9	49,7	79,5
No, non può permetterselo	2,5	5,7	-	75,5	43,4	12,6
No, altro motivo	2,7	5,6	99,4	5,6	6,9	7,9
Dispone di due paia di scarpe						
Sì	99,4	99,8	14,4	55,6	88,2	90,9
No, non può permetterselo	-	-	.	43,4	11,2	5,3
No, altro motivo	-	-	85,6	-	-	3,8
Dispone di una connessione internet						
Sì	97,6	51,5	28,1	34,0	54,6	76,2
No, non può permetterselo	1,4	-	-	56,7	28,5	8,6
No, altro motivo	1,0	47,1	67,5	9,4	16,9	15,2
Si incontra con familiari/amici						
Sì	98,6	79,3	14,7	20,1	65,6	81,3
No, non può permetterselo	1,1	2,6	-	77,3	29,7	10,7
No, altro motivo	-	18,1	82,5	-	-	8,0
Svolge attività di svago						
Sì	92,3	28,9	16,8	3,6	20,4	63,0
No, non può permetterselo	6,4	6,7	-	93,6	70,9	18,7
No, altro motivo	1,3	64,4	77,5	-	8,7	18,4
Spende una piccola somma di denaro						
Sì	91,9	65,0	20,6	6,2	41,2	71,9
No, non può permetterselo	6,8	7,3	9,1	91,8	53,5	18,1
No, altro motivo	1,3	27,6	70,3	-	5,4	10,1
Ha effettuato una visita dal dentista quando ne aveva bisogno (a)						
Sì	94,7	89,7	87,6	91,9	14,2	88,7
No, non può permetterselo	0,9	2,1	-	3,4	81,3	5,7
No, altro motivo	1,0	2,5	-	-	-	1,5
Rifiuta di rispondere	3,4	5,7	9,2	4,5	.	4,1

Tabella 2 (segue) – *Cluster per variabili attive, Eu-Silc 2013.*

Variabili attive	Cluster					Totale 16-34 anni
	1	2	3	4	5	
Ha effettuato una visita dallo specialista quando ne aveva bisogno (a)						
Sì	96,0	92,2	90,7	94,1	35,3	91,6
No, non può permetterselo	.	-	-	-	59,5	3,2
No, altro motivo	0,6	2,1	-	-	-	1,2
Rifiuta di rispondere	3,4	5,7	8,2	4,3	-	4,0
TOTALE	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

(a) Negli ultimi dodici mesi dal momento dell'intervista.

(-) Stima corrispondente ad una numerosità campionaria al di sotto delle 20 unità.

Sono per lo più giovani-adulti (38%) che hanno una buona condizione economica, dato che vivono anch'essi in famiglie non a rischio di povertà o di esclusione sociale (71,7%) e sono nella maggior parte dei casi occupati (56,4%, valore più alto tra i gruppi). Il loro titolo di studio si ferma alla scuola media superiore (58,1%, valore più alto tra i gruppi) e vivono da soli (9,6%, valore più alto tra i gruppi).

3.2.3. Terzo gruppo: in coppia-socialmente isolati

Il terzo gruppo è quello meno numeroso, raccoglie solo 356 individui. È caratterizzato soprattutto da chi non acquista beni e non svolge attività per "altro motivo", quindi vi rinuncia probabilmente perché non è interessata o non ha tempo di farlo. Non acquistano capi di abbigliamento (99,4%), non si incontrano con familiari e amici (82,5%), non hanno una connessione ad internet personale (67,5%). Sono per lo più coppie (80%, valore più alto tra i cluster), di cui con figli ben il 76,2%. Questo può presumibilmente spiegare la mancanza di tempo o di interesse nello svolgere determinate attività. Il gruppo non naviga in buone condizioni economiche: è disoccupato (20,7% contro il 14,3% di tutti i giovani 16-34enni) e si trova nel primo quinto della distribuzione dei redditi nel 40,9% dei casi.

3.2.4. Quarto gruppo: poveri-disoccupati-poco istruiti

Le condizioni peggiorano quando guardiamo al quarto gruppo (450 individui). E' caratterizzato essenzialmente da chi non può affrontare economicamente l'acquisto di beni o svolgere attività di integrazione sociale: non si recano mai al cinema o al teatro o ai concerti per motivi economici (93,6%), non si sentono liberi di spendere una piccola somma di denaro per le proprie esigenze personali

(91,8%), non escono con familiari e amici (77,3%). Tuttavia tengono molto alla salute, dato che non rinunciano a fare visite dallo specialista e dal dentista qualora ne avessero bisogno (rispettivamente 94,1% e 91,9%).

Sono poco istruiti, il loro titolo di studio si ferma, infatti, al massimo alla licenza media inferiore (48,7%) e sono il gruppo che raccoglie la più alta percentuale di disoccupati (30,7%). I giovani di questo gruppo vivono in pessime condizioni economiche: hanno i valori più elevati sia per il rischio di povertà o esclusione sociale (76,2%) sia per l'appartenenza al quinto più povero della distribuzione dei redditi familiari (68,8% contro 28,5% di tutte le famiglie con individui 16-34enni). La percentuale più alta dei 16-34enni del quarto gruppo risiede nel Mezzogiorno ed è pari al 61,6%, contro il 38,7% del complesso dei giovani.

3.2.5. Quinto gruppo: poveri-occupati

Il quinto gruppo è formato da 849 individui che si trovano in condizioni molto simili a quelle del quarto. Anch'essi sono, infatti, in condizioni economiche precarie dato che vivono in famiglie a rischio di povertà o di esclusione sociale nel 59,1% dei casi e appartengono al primo quinto (55,8%). Tuttavia la condizione professionale di chi si trova in questo gruppo è migliore, dato che gli occupati sono il 42,6%, valore molto vicino al totale dei giovani 16-34enni (43,8%). Grazie a questa condizione, probabilmente, riescono a sostenere spese per l'acquisto di beni e servizi. Infatti, oltre la metà dei componenti del gruppo possono permettersi di uscire con familiari e amici per bere e mangiare almeno una volta al mese (65,6%) e una connessione ad internet per uso personale (54,6%).

Si tratta del cluster più "femminile" (il 57,7% è formato da donne) e anche quello con il maggior numero di monogenitori (16,5%). Considerando che i giovani-adulti (31-34 anni) di questo gruppo sono il 35,5%, possiamo dedurre che presumibilmente siano proprio loro i monogenitori.

4. Conclusioni

Se ci soffermiamo ad una semplice analisi descrittiva delle variabili l'analisi dei dati ci permette di concludere che i giovani in Italia sono più socialmente esclusi che inclusi. Al contrario se prendiamo in considerazione una pluralità di variabili combinate ne emerge che i giovani sono più inclusi che esclusi e che la tardiva uscita dalla famiglia, tipica dei giovani del nostro paese e oggetto di numerosi studi sociologici, probabilmente li mette maggiormente al riparo da rischi di disagio; la famiglia sembra quindi avere un effetto «protezione» sui giovani.

D'altra parte, in una situazione di crisi come quella che l'Italia sta vivendo l'aumento delle difficoltà che i giovani hanno trovato negli ultimi anni, in carenza di adeguate politiche, ha ancora più accentuato la necessità di affidarsi al sostegno della famiglia che quindi assume sempre più spesso la funzione di *welfare state* (Scabini, Marta, 2013). La famiglia aumenta ancora di più la sua importanza, accentuando il suo ruolo di sostegno e contribuendo concretamente a realizzare, nonostante le difficoltà, obiettivi importanti per il futuro dei giovani.

In una società sempre più anziana, come quella italiana, le politiche di sostegno sono quasi totalmente rivolte a questa fascia di popolazione, mentre sono carenti quelle verso i giovani, in particolare quelle per aiutare l'occupazione giovanile e la ripresa della fecondità, ma non solo. A ciò bisogna aggiungere, e sottolineare, che la futura e continua riduzione della classe dei giovani a fronte di una costante crescita della classe degli ultrasessantacinquenni, aumenterà il rischio di disagio che questa classe sarà destinata a sopportare, soprattutto per carico economico-finanziario che sarà chiamata a sostenere in termini di *welfare*.

Si rende, quindi, sempre più necessaria una revisione delle politiche sociali che consenta ai giovani di ottenere una maggiore indipendenza economica e morale dalla famiglia di origine attraverso una più equa distribuzione della ricchezza non più rivolta verso le classi di età più elevate ma che soddisfi anche le esigenze delle classi di età più giovani, consentendo loro una maggiore inclusione sociale ed un maggior benessere.

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SUMMARY

Socially excluded or included? Analysis of youth disadvantage in Italy

The article aims to analyse the social conditions of Italian youth based on the data of EU-Silc survey and in particular the risk of poverty or social exclusion. A multiple correspondence analysis and consequently a cluster analysis have been used in order to consider a large set of variables. The results show the importance of the family of origin to "protect" young people and reduce the risk of disadvantage.

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MESAURING EQUITABLE AND SUSTAINABLE WELL-BEING (Bes) FOR POLICY-MAKING AT LOCAL LEVEL (Nuts3)

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1. Background

This paper introduces to "Provinces' Bes", a Statistical Information System (SIS) designed to assess Equitable and Sustainable Well-being (Bes) at Nuts3 level in Italy in order to describe the Bes level and structure in a province, so as to point out strong and weak points. The results of these analysis may support local governments in the decision-making process. Over time Bes SIS is expected to provide statistical information that is useful to evaluate policies' results and outcomes and to strengthen social reporting and accountability al local level.

Project's achievements and procedings will be introduced and discussed examining improvements needed to refine indicators and enhance reports, and in order to get reliable and robust results for evidence-based policy making and evaluation. The project was launched in 2011 as a pilot study by the Province of Pesaro e Urbino in partnership with Istat, and from 2013 it has been extended to other Provinces and Metropolitan areas[1]. In 2015 it was listed in the National Statistical Programme as Statistical Information System and it has become so a current commitment of Cuspi (Coordination of statistical offices of Italian provinces) and Istat.

The theoretical framework of Provinces' Bes refers to the OECD studies and projects (OECD 2011; 2014), the "SSF Report" (Stiglitz et al., 2009) and the Istat-Cnel Steering Committee resolutions (Istat-Cnel, 2013). Regarding to the well-being statistical application to policy-making, the main reference is the EU Committee of the Regions guidelines for Europe 2020, especially where it

[11] Currently, 29 Statistical Offices of Italian Provinces and Metropolitan areas, located in 14 different Italian regions, are contributing to the development of the prototype SIS made from Pesaro and Urbino, the project leader. The Provinces of Alessandria, Vercelli, Mantova, Cremona, Treviso, Trieste, Ravenna, Parma, Rimini, Forlì-Cesena, Pisa, Grosseto, Terni, Salerno, Lecce, Potenza and the Metropolitan areas of Roma, Milano, Genova, Bologna, have joined the pilot study in 2013. During 2015 four other Provinces (Siena, Lucca, Ancona, Taranto) and three other Metropolitan areas (Napoli, Bari e Reggio Calabria) entered the project.

recommend local authorities to define a local "2020 vision", starting from a territorial SWOT analysis[2].

The Commission on the Measurement of Economic Performance and Social Progress underlines that "it has long been clear that GDP is an inadequate metric to gauge well-being over time particularly in its economic, environmental, and social dimensions, some aspects of which are often referred to as sustainability" (Stiglitz, cit, 2009, p. 8). Considering progress with this different point of view, entails going beyond GDP and tackling the more difficult task of measuring well-being, a multi-dimensional concept which can be structured in 8 dimensions[3]. A further contribution considered in the Provinces' Bes Study is the OECD "How's Life" report, issued in 2011 under the "Better Life" project, which compared well-being in advanced and lagging countries using a broad set of statistical indicators organized in two pillars (living material conditions and quality of life) and 11 dimensions. "How's Life in Your Region?", is the most OECD recent issue (October 2014): considering that "many factors that influence people's well-being are local issues, such as employment, access to health services, pollution and security" it suggests that taking into account local differences beyond national averages can improve policies' effectiveness and impact on well-being for the country as a whole.

In 2012, Cnel (National Council for Economy and Labour) and Istat outlined the official statistical model to measure Equitable and Sustainable Well-being in Italy, determining 12 fundamental domains of Bes[4] and setting a complex of over 130 indicators (www.misuredelbenessere.it). However, in order to assess geographical differences, most of the indicators cannot be broken down over the Nuts 3 scale.

Provinces' Bes reports and database, issued for the first time in June 2013, provide statistical information at Nuts3 level that is both consistent with the national and international theoretical framework and relevant for specific needs at local level (www.besdelleprovince.it).

Specifying Bes at a so detailed geographical level implies, as known, a trade-off between information needs and data availability.

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[2] EU COR - European Union Committee of The Regions, *Delivering on the Europe 2020 Strategy. Handbook for Local and Regional Authorities*, Bruxelles, October 2012

[3] i. Material living standards (income, consumption and wealth); ii. Health; iii. Education; iv. Personal activities including work; v. Political voice and governance; vi. Social connections and relationships; vii. Environment (present and future conditions); viii. Insecurity, of an economic as well as a physical nature.

[4] 1. Health; 2. Education and training; 3. Work and life balance; 4. Economic well-being; 5. Social relationship; 6. Politics and Institutions; 7. Safety; 8. Subjective well-being; 9. Landscape and cultural heritage; 10. Environment; 11. Research and innovation; 12. Quality of services.

Moreover, "what we measure affects what we do; and if our measurements are flawed, decisions may be distorted" (Stiglitz, cit, 2009, p. 13).

Thus many other critical issues concerning dataset and reports have to be considered in order to get useful and reliable information for policy making.

By this point of view, a notable issue is the performance of statistical indicators at local scale. Sometimes indicators are available at a very detailed territorial level but they are not enough robust or complete, so that no comparison in space or in time can be confidently made. In addition, sometimes national indicators do not fit to local scale simply because of a lack of information (few cases observed and high random variability in time and space) or due to the presence of outliers that also results from the different structures and dimensions of the units under study. In some other case replying national indicators at local scale with no adjustment entails a change of meaning or a reduced relevance.

Above all, the main problem affecting local statistical sources and administrative archives is the trade-off between relevant information supplied and unknown quality. This kind of data sources are widely used in Provinces' Bes SIS.

Furthermore Provinces' Bes reports focus on Bes inequalities at local level and they are settled to point out single or multiples lacks of balance and relative deprivations of local districts compared to regional or national parameters: for this reason it is of basic importance to use robust indicators and to adopt reliable and unbiased analytical approaches, as also stated by the principles of official statistics.

2. Provinces' Bes SIS: constraints, opportunities and distinctive features

In order to set a dashboard of well-being indicators, suitable to assess inequalities at local level, it is requested to balance the "top-down approach" and the "bottom-up" one: disaggregation of national statistics and indicators must be complemented by local indicators as information is required at both national and focused territorial level. Thus Provinces' Bes SIS is structured into three categories of indicators: "Bes measures", "Other indicators of general relevance", "Specific indicators".

This last group includes those indicators that have been identified to assess how the local government contributes to social well being at local level. These indicators are directly connected to the Provinces' functions, services and projects. They are related to one or more Bes dimensions and have been implemented by Provinces' administrative archives. They will no longer be considered later on in the exposure, as the work focuses on "Bes measures" and "Other indicators of general relevance".

These last two blocks of Provinces' Bes SIS supported the first reports on Equitable and Sustainable Well-being in Italian provinces, published by Cuspi and Istat in 2014. SIS and reports have now being updated to 2015, with a total of 88 indicators in 11 Bes domains, calculated at Nuts3, Nuts2 and Nuts1 level.

To briefly introduce the structure of the information provided by Provinces' Bes SIS, some other considerations are useful.

First it should be noted that "Provinces' Bes measures" can be further distinguished considering their statistical and conceptual coincidence or proximity to Bes' ones.

Provinces' Bes database contains all Bes indicators that can be calculated and detailed at Nuts3 level. The database obtained through the coincident indicators is a small one because almost all Istat's surveys as well as environmental or economical accounting matrices do not produce estimates at Nuts3 level: at the first stage of the dataset implementation (in 2012) just 29 indicators at Nuts3 level coincided with the Bes ones, and two dimensions – Economic well-being and Subjective well-being – lacked at all. Hence we needed to supplement this first dataset with additional indicators derived from national statistical or administrative sources, giving high priority to relevant, reliable and comparable data and fostering data sources and collection methods that can be maintained over time in terms of workflows and financial feasibility in order to ensure comparability in time and space.

This process brought to enrich the "Bes measures" dataset with proxy indicators, produced a better coverage or completion of many domains and has laid the foundations to start filling the "Other indicators of general relevance" dataset.

As an example of proxy measures we can refer to indicators which are related to phenomena and aspects that are similar to those that constitute the Bes but implemented from different data-sources or using different calculations or definitions with respect of the national ones: for instance in Provinces' Bes the social participation indicator "Volunteers in non-profit organizations" results from an economic total survey[5] whereas the Bes measure comes from a current social survey on households[6]. Moreover, sometimes Provinces' Bes makes use of different measures to similar concepts. One case is the level of education of the adult population, "People in working age with lower secondary education or less" whereas Bes considers "People with at least upper secondary education".

Currently the provinces' Bes not yet satisfactorily approximates all domains of Bes. The main constraint is the absolute lack of subjective indicators, from which it follows the absolute lack of important measures in all Bes domains at Nuts3 level. Subjective well-being (which is not still considered), Social relationship and

[5] Non-profit Institutions Census

[6] Istat Multipurpose survey: aspects of daily life

Economic well-being show the most severe gaps. In some cases it was possible to fill in those gaps using alternative measures of aggregate type: for instance "Per capita net wealth" was replaced by "Households assets (total amount in average)", a macroeconomic estimate at Nuts3 level; "Evictions from home per households" and "Households non performing loans (input flows)", aggregate measures derived from the flow of administrative courts and banks, and so on.

Provinces' Bes SIS is largely implemented by aggregated data: so it is impossible to analyse distributions at households or individual level as it was strongly recommended by the Stiglitz-Sen-Fitoussi Commission and by Istat-Cnel Steering Committee. Trying to overcome this limitation, some indicators were added to specify Bes measures highlighting differences in gender or generation groups so as to approach the equity dimension at Nuts3 level. Differential rates by gender or age-group were introduced to analyse disparities in labour market and wage structure, while additional labour market indicators (employment and unemployment rate - total and youth's) were added to deepen the specific situation of young people in the local labour market.

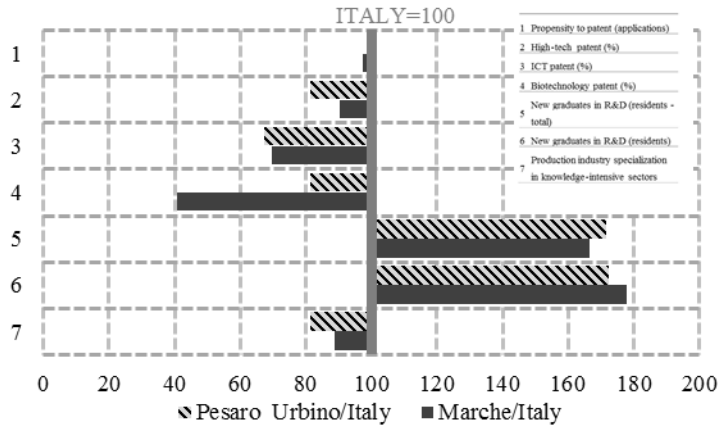
"Other indicators of general relevance" do not measure Bes at local level, but they are required in the Provinces' Bes SIS to meet the specific information needs of local governments. Through those indicators it is possible to deepen the analysis of well-being in the context in which local policies take place, highlighting strengths and weaknesses in relation to the responsibilities and strategic choices that local governments play in many Bes domains. This group of indicators relate to the Italian Provinces' main functions, services and projects: for example many Italian Provinces manage safety and road maintenance in non-urban areas, therefore, "Security" domain includes road deaths total and in rural roads. Otherwise, given the Italian Provinces' competences in the fields of school buildings management and social services for disabled students, "Social relationships" domain contains indicators concerning "Accessible school environments for disabled people" and "Disabled pupils enrolled", in order to illustrate what are the conditions for the social inclusion of disabled and the outputs of the social policies implemented in this field. For this reason, some domains of Provinces' Bes currently have a different or a wider content than the Bes, but, in any case, consistent with the other theoretical references mentioned above. "Social relationships" is an example of this difference: Bes measures refer to civil society, social economy and family, whereas Provinces' Bes suggests to tackle the issue of integration of vulnerable social groups, such as disabled, immigrants, prisoners, to the benefit of which most policies in the field of school, labour and social integration are locally developed.

3. The Provinces' Bes reports: drawing a profile of well-being at local level

In the Provinces' Bes reports, the profile of each Province under consideration is determined, for each domain, by exposing the indicators' values at Nuts3 and by systematically comparing them with the reference values at Nuts2 and Nuts1 level.

Indicators are placed in comparison both in absolute and relative terms. In order to do this, for each domain indicators' values are presented in a statistical table which shows the data related to the three territorial levels chosen for geographical comparisons. Tables are supplemented by a graphical analysis of geographic index numbers, useful to compare geographic areas at a point in time, as a ratio of Nuts2 and Nuts3 indicators (Figure 1).

Figure 1 – *"Research and Innovation": geographic index numbers at Nuts3 and Nuts2 level (Italy=100)*



Source: Provinces' Bes SIS

In the national context the province and the region under consideration do not express a marked propensity for patenting: in fact the first couple of horizontal bars (indicator 1) deviates very little from the vertical axis that marks the comparison value. This result is associated with lower rates of patents in High Tech, ICT and Biotechnology (indicators 2-4) and to a lower specialization of the local economy into knowledge-intensive sectors (indicator 7). In summary, geographic indexes point out an overall weakness in the "Research and Innovation" domain. This finding goes in contrast with the larger availability of new graduates in Science and Technology (S&T) both in the Province and in the Region (indicators 5 and 6).

The joint examination of those figures shows a pattern of risk and opportunity: on the one hand the local economy has a lower capacity to exploit S&T graduates

(with the risk of wasting this new capital of highly-qualified human resources), on the other hand this new human capital is a potential to leverage for an improvement in this domain.

Here is a concrete example of how the geographical comparisons of the Provinces' Bes indicators (i.e. Bes measures and Other indicators of general relevance) can give directions to the strategic planning and to the sector and cross-sector policies.

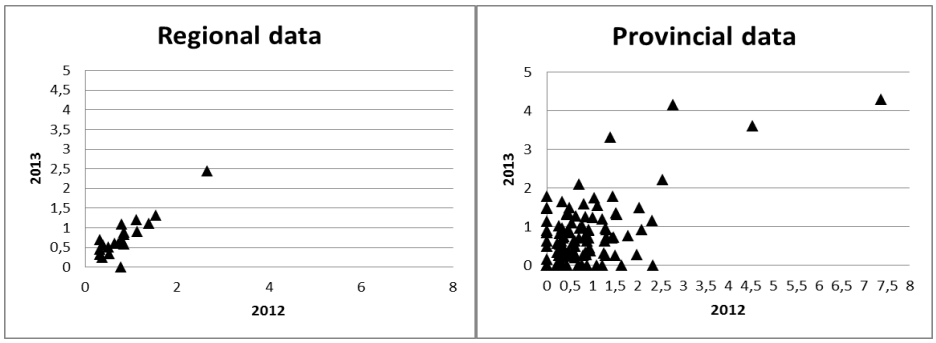
4. Evaluation of statistical information and reports

To assess the quality of statistical information contained in the SIS and, in particular, its suitability for evaluation exercises, an analysis of the database it was carried out, examining the main descriptive statistics that summarise features and structures of statistical distributions. The analysis highlighted some strengths and some critical indicators. The main focus was to appreciate the indicators performance when dealing with comparisons in space and time, looking for possible improvements in this direction to get more robust and reliable information in the next future.

4.1. Weak reliability of some indicators at the geographical level of interest

Faced with rare phenomena the trend indicator is subject to strong randomness. It follows a risk of drawing wrong conclusions from geographical comparison or to see the results of the analysis reversed from year to year (Figure 2).

Figure 2 – *Homicide rate, comparison between two years*



Source: Provinces' Bes SIS. Data processed by Istat

These indicators have to get to be more reliable to be really useful in SWOT analysis. In some cases it will be useful to replace the annual measure with a moving average; other detailed indicators, which are included in the database as a battery, should rather be replaced by others, more general. Infant mortality rate and mortality rates for specific causes and age are an example. Renouncing to segmentation by age-group and death-causes to balance the more detailed information at territorial level, the latter battery of indicators could be replaced by the avoidable mortality rate, which seems to be able to capture in aggregate the vulnerability of the population's health to specific risks at local level.

4.2. Incidence and impact of outliers on distributions

The impact of outliers is especially relevant in some domains . The domain "Landscape and cultural heritage", for example, which includes five indicators, presents 8 outliers in the provincial distribution of the " Presence of Historic Parks" (VIII-2) and 9 in the provincial series of " Paying visitors of museums and similar institutions" (VIII-4). Outliers cause high coefficients of variation (Table 1) and also have other considerable impact that needs to be taken into account in further analysis.

Table 1 – *Dimension Landscape and cultural heritage.*

Indicator	Mean	Standard Deviation	CV%
VIII-1	60,62	9,67	15,96
VIII-2	3,07	4,92	160,24
VIII-3	1,04	0,76	73,10
VIII-4	14361,24	25525,98	177,74
VIII-5	33,25	19,24	57,86

Indicator	N° outliers	ωi	normalized ωi
VIII-1	5	10,2	0,2
VIII-2	8	49,2	28,9
VIII-3	3	4,0	4,8
VIII-4	9	499353,6	59,9
VIII-5	0	0,0	0,0

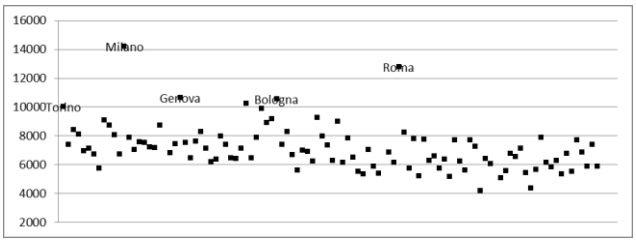
Source: Provinces' Bes SIS. Data processed by Istat

4.3. Characteristics of the analysed population

At the Nuts3 level it is possible to appreciate some particularities that remain hidden in the analysis at Nuts2 level.

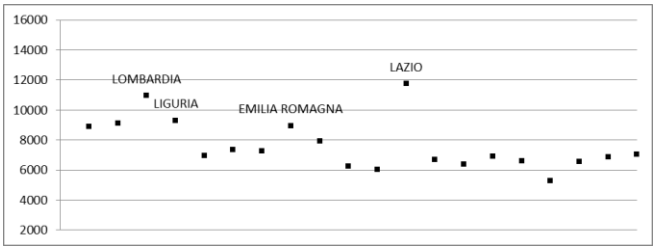
Looking at the "Age-groups inequalities in average remuneration of employees", for example, it can be noticed that the indicator's level at regional scale is strongly influenced by the presence of a metropolitan area (Figures 3 and 4). Influential

Figure 3 – *Age-groups inequalities in average remuneration of employees – provincial data*



Source: Provinces' Bes SIS. Data processed by Istat

Figure 4 – *Age-groups inequalities in average remuneration of employees – regional data*



Source: Provinces' Bes SIS. Data processed by Istat

Rome is a case in point, due to the coincidence between the metropolitan capital and the metropolitan area as a whole and because of the high relative weight of the city of Rome on the whole Region of Lazio; in Campania, for example, the weight of Naples is counterbalanced by other provinces as Caserta or Salerno, that are rather populous. These differences, hidden by the regional averages, emerge when the well-being indicators are analysed at Nuts3 level. At the same time the comparison among indicators at the different NUTS levels, that reflect the administrative hierarchy, becomes less effective when outliers and dominant units affect the distribution. This can result in a reduced ability of the analysis developed in the Provinces' Bes reports to highlight all the features of some area. A solution which may be tested, also useful for further in-depth geographical analysis, is to purify the compared data from the effect of relevant units (for example, Lazio

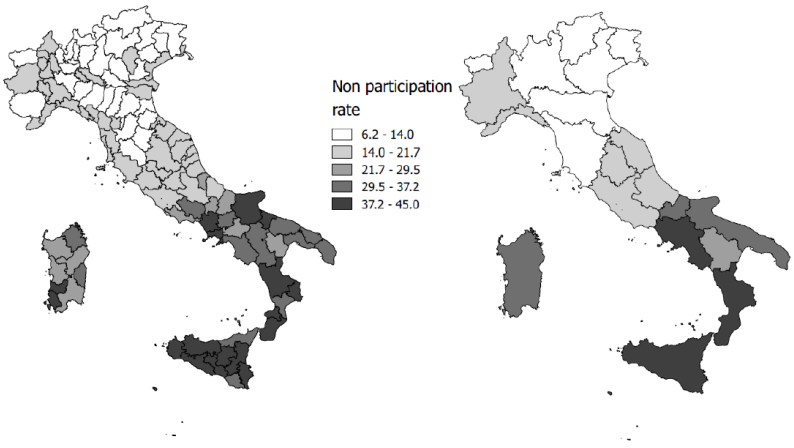
average net Rome). In addition spatial analysis is a complementary approach to be tested.

4.4. Spatial autocorrelation

Many phenomena, and many indicators, have similar values and trends in neighbouring areas: an example is given by Figure 5, that highlights a substantial spatial autocorrelation concerning the BES' Labour Market indicator called "Non-participation rate (15-74 years)".

Even the spatial autocorrelation limits the potential of the comparisons carried out at the level of administrative and territorial hierarchy: therefore, in addition to the absolute and relative differences at regional or national scale, they should also be considered the differences among provinces as compared to neighbouring areas, regardless of the region boundaries.

Figure 5 – *Non-participation rate (15-74 years)*



Source: Provinces' Bes SIS. Data processed by Istat

This approach could bring out actual territorial differences useful to assess disparities accurately which were overlooked by other analysis; in Figure 5 Latina and Frosinone (that are part of Lazio region) are by far the most penalized areas as compared to Lazio, but this statement may be resized looking at neighbouring areas beyond regional borders. By contrast Matera, which is in line with the regional average and in a slight advantage in the regional context, is in a better position when compared with the surrounding area.

4.5. Correlation between indicators

Some indicators within the domains have very high correlation coefficients, in some cases greater than 0.9; this is due to the fact that similar indicators, connected or complementary, sometimes are included in the same domain to specify more general indicators or to provide a complete measure of a complex aspect of the domain. The main reasons for these choices have been explained above.

In order to balance parsimony and completeness of the Provinces' Bes SIS, it is necessary to monitor and assess the persistence of those correlations and their intensity over time, so to take the most appropriate choice case by case.

Next advancements could concern: synthesize elementary indicators which are complementary; select a subset of key indicators to be monitored annually; eliminate the indicators that provide the lower contribution in terms of information. In some cases, though strongly correlated with each other, the indicators perform important functions and cannot be replaced nor can be excluded: in particular, this concerns the "Measures of Bes".

5. Concluding remarks

The Provinces' Bes database already allows a broad analysis of Equitable and Sustainable Well-being at Nuts3 level for policy making. The SIS is already providing the basic data to update yearly the Provinces' Bes profiles, and to realise the SWOT analysis and the geographical comparisons. This statistical information is potentially available for all Italian Provinces.

The work presented here, was undertaken to assess the content of the statistical database. Its results indicates that some measures have to be strengthened and that the Provinces' Bes profiles can be enriched and completed by spatial analysis. In the future implementation of the SIS, the availability of data in time series will support new analysis and will help to furtherly assess the robustness and sensitivity of indicators. At the same time the information set can be refined either by selecting key indicators or by implementing new indicators, especially those related to local policies (i.e. "Other indicators of general relevance" and "Specific indicators"). Most of these indicators have been already identified and designed, and they will soon be included in the Provinces' Bes SIS. Nevertheless, the lack of subjective measures and, in particular, the lack of information on social inequality, on poverty and social exclusion, and on subjective well-being are still a pending problem.

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SUMMARY

Measuring Equitable and Sustainable Well-being (Bes) for policy-making at local level (Nuts3)

Bes measures can support evidence-based decision making and policy evaluation. The Guidelines for Europe 2020 Local Planning, recommends local authorities to define a "2020 vision" based on a SWOT analysis at local level. The Statistical Information System (SIS) "Provinces' Bes" fits for this purpose by providing statistics to assess Bes at local level. The SIS matches both the quality standards of Official Statistics and the information needs listed above. Conversely, in making statistics at local level, some problems arise: less availability of data; information validity limits; loss of relevance of some indicators. Moreover, some Bes measures have different performances at different territorial scales. This is the main problem to face when implementing Bes indicators at local level which must to be applied in the decision making process; indicators should be robust and reliably despite of the increasing scattering and random variability that affect detailed statistical information. Furthermore, reports provided by the "Provinces' Bes" SIS apply a "bottom-up" approach, comparing each Provinces' Bes measures with the regional and national figure. By this point of view it is required to improve analysis and reports taking into account the heterogeneity of Italian Provinces and the different contribution of each Province to regional or national average. A spatial analysis can properly point out those features which are masked or under/over-estimated by the ecological analysis. I order to strengthen the reporting system, in the next advancements it will be useful to deepen the study of the spatial correlation among the indicators of the SIS, starting from the NUTS 3 level.

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EFFICIENTAMENTO E RISPARMIO ENERGETICO NEL SETTORE RESIDENZIALE: UNA LETTURA INTEGRATA DI DATI AMMINISTRATIVI E CAMPIONARI.[1]

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Introduzione

I consumi energetici delle famiglie hanno assunto un peso crescente nel tempo nella determinazione dei complessivi consumi nazionali, pari, nel 2012, a oltre il 26% del totale dei consumi nell'EU-28 (http://www.eea.europa.eu). In conseguenza di ciò, il settore residenziale è stato, nel corso degli ultimi anni, interessato da numerose misure di politica, comunitaria e nazionale, per la promozione dell'efficienza energetica e delle fonti rinnovabili.

Il contributo delle famiglie sul fronte dell'efficientamento energetico, in particolare, rappresenta un tema di grande attualità rispetto a obiettivi di tutela ambientale, ma anche in quanto direttamente correlato ad un'esigenza di risparmio energetico che discende dalla recente crisi economica che ha investito il nostro paese, portando con sé evidenti ricadute sui bilanci delle famiglie.

Obiettivo di questo lavoro è studiare le caratteristiche delle famiglie italiane che hanno effettuato investimenti per ridurre le spese energetiche, attraverso informazioni che derivano da una sperimentazione che integra tra loro dati amministrativi e dati campionari. Infatti, le fonti utilizzate sono: a) l'Indagine sui consumi energetici delle famiglie, effettuata dall'Istat nel 2013, per la prima volta in Italia, con riferimento all'intero territorio nazionale; b) le collezioni di microdati realizzate nell'ambito del progetto Istat 'ARCHIMEDE' (ARCHivio Integrato di Microdati Economici e Demografici).

[1] Il lavoro è frutto della collaborazione congiunta degli autori. In particolare, il paragrafo 2.1 è a cura di Daniela Bonardo, il paragrafo 2.2 è a cura di Sara Casacci, i paragrafi 1.2 e 3.1 sono a cura di Valentina Talucci, i paragrafi 1.1 e 3.2 sono a cura di Paola Ungaro.

1. L'indagine Istat sui consumi energetici delle famiglie

1.1 Il contesto normativo delle statistiche energetiche in Italia e in Europa

A fronte della crescente rilevanza che il settore energetico ha assunto, in termini economici e, ancor più, per il suo impatto sull'ambiente, la Commissione europea, negli ultimi anni, sta dedicando particolare attenzione ai temi della sostenibilità energetica (Commissione Europea, 2010). Il "Pacchetto Clima-Energia" di Europa 2020, individua tre obiettivi per il 2020 (i cosiddetti obiettivi Europa 20-20-20) finalizzati alla sostenibilità energetica in vista del contenimento dei cambiamenti climatici, uno dei quali prevede la riduzione del 20% del fabbisogno di energia primaria, attraverso l'aumento dell'efficienza energetica (Direttiva 2012/27/UE). In base a quest'ultimo provvedimento, in Italia, così come in molti altri paesi europei, sono state previste una serie di azioni quali l'efficientamento degli edifici della pubblica amministrazione; l'obbligo di certificazione energetica per gli edifici ad uso residenziale; ecc.. Tra queste iniziative sono compresi gli incentivi per interventi finalizzati al risparmio energetico per i quali spetta una detrazione d'imposta. In conseguenza di tali importanti innovazioni normative, anche il quadro della statistica ufficiale europea è stato investito da rilevanti cambiamenti. Con l'obiettivo di un sempre più stringente monitoraggio dei consumi energetici del settore residenziale, il Regolamento "Statistiche sull'energia rinnovabile e sul consumo energetico finale" (n. 1099/2008) è stato infatti di recente modificato ad includere l'obbligo per gli Stati Membri di fornire annualmente dati sui consumi energetici delle famiglie per destinazione finale e fonte energetica. In questo contesto, l'Istituto nazionale di statistica (ISTAT), a seguito di un Accordo di collaborazione stipulato con l'Agenzia nazionale per le nuove tecnologie l'energia e lo sviluppo economico sostenibile (ENEA) ha realizzato nel 2013, la prima indagine sui consumi energetici delle famiglie del settore residenziale.

1.2 La fonte campionaria e il risparmio energetico: la prima indagine Istat sui consumi energetici delle famiglie

L'indagine assume dunque un'importanza cruciale in relazione all'obiettivo di fornire, per la prima volta in Italia, dati statistici puntuali sui comportamenti energetici delle famiglie residenti nel nostro paese, colmando così una lacuna informativa avvertita a livello sia nazionale sia internazionale.

Effettuata nel 2013 con l'obiettivo di stimare i consumi energetici delle famiglie per destinazione d'uso e fonte energetica (gas, energia elettrica, gasolio, biomasse, ecc..). E' stato intervistato, con metodologia CATI, un campione di 20.000 famiglie rappresentativo a livello regionale di 25.872.613 famiglie residenti,

ricorrendo a un disegno di campionamento a uno stadio con stratificazione dei circa 8.000 comuni italiani per dimensione demografica e zona altimetrica.

Le famiglie intervistate hanno dichiarato di aver effettuato, nel corso degli ultimi cinque anni, investimenti in denaro per ridurre le spese energetiche. Nel 54.1% si tratta di ridurre le spese per l'energia elettrica, nel 21.4% le spese per il riscaldamento dell'abitazione, nel 15% quelle per il riscaldamento dell'acqua e, infine, nel 10% le spese per il condizionamento (Istat, 2014a).

Gli investimenti più elevati fanno capo alla riduzione dei consumi di energia elettrica, di cui la progressiva sostituzione delle lampadine tradizionali con quelle a risparmio energetico è quella più rilevante (interessa 51 famiglie su 100), ma un certo peso è assunto anche dalle spese effettuate per acquistare elettrodomestici più efficienti (10,6%). Gli interventi finalizzati al risparmio nelle spese per il riscaldamento e il condizionamento sono indubbiamente costosi, poiché legati all'ammodernamento e all'efficientamento delle dotazioni e delle abitazioni (sostituzione apparecchiature, isolamento termico abitazione, sostituzione infissi, eccetera). Il ventaglio dei possibili investimenti per ridurre le spese energetiche spazia dalla mera sostituzione delle lampadine tradizionali, che solo in parte può essere inteso come un investimento di efficentamento energetico in senso stretto; ad interventi più strutturali e più onerosi. Per questa ragione sono stati individuati e selezionati solo alcuni tra tutti i possibili tipi di investimento, la cui combinazione ha consentito la costruzione di un indicatore sintetico di più immediata lettura e più rappresentativo del fenomeno. In particolare, il calcolo dell'indicatore si è basato sul numero di famiglie che hanno dichiarato di avere effettuato i seguenti investimenti di risparmio energetico: "sostituito caldaia/ apparecchi singoli riscaldamento/elettrodomestici con apparecchi più efficienti; e/o installato impianti rinnovabili per riscaldamento/produzione di energia elettrica; e/o applicato apparecchi per ridurre i consumi (contabilizzazione calore, regolatori di intensità luminosa, ecc.); e/o isolato termicamente l'abitazione e/o sostituito porte, finestre, infissi", basandosi dunque su tipologie di investimento più comparabili con quelli per cui sono previsti gli incentivi fiscali.

L'indicatore sintetico mostra una certa variabilità territoriale (c.v.=14.1%). Le regioni che mostrano la maggiore propensione da parte delle famiglie ad effettuare investimenti per il risparmio energetico si trovano nel Nord Italia (Tabella 1). In particolare Liguria (circa 34%), Trento (33,5%), Valle d'Aosta (32%), Lombardia (circa 32%), Piemonte (32%), Emilia Romagna (31%). Le scelte di efficientamento e risparmio energetico sono ancora contenute al Centro e al Sud. I valori più lontani dalla media italiana si registrano in Sicilia (17,3%), Abruzzo (23%) e Puglia (23%).

2. La promozione dell'efficienza energetica: ARCHIMEDE e i segnali nei dati amministrativi

2.1 La fonte amministrativa e il risparmio energetico

Da diversi anni l'Istituto Nazionale di Statistica promuove l'uso intensivo delle fonti amministrative sia per contenere i costi legati alle attività di rilevazione diretta, sia per soddisfare la crescente richiesta di informazione statistica nuova, tempestiva e con un maggior dettaglio territoriale. I dati amministrativi rappresentano, infatti, una base informativa a costo ridotto e offrono da un lato, la possibilità di ottenere una copertura totale delle popolazioni di riferimento e dall'altro, un ampliamento rilevante dei contenuti informativi.

Al fine di produrre informazione statistica riferita a specifici settori di indagine, l'Istat dispone di una vera e propria infrastruttura informativa (Sistema Integrato di Microdati - SIM) dalla quale è possibile derivare collezioni di dati attraverso il trattamento e l'integrazione di informazioni provenienti da fonti di natura sia amministrativa sia statistica.

In tale contesto si colloca il progetto ARCHIMEDE (ARCHIvio di Microdati Economici e DEmo sociali), il quale si pone l'obiettivo di realizzare collezioni di dati elementari riferiti a diverse unità di analisi, utili alla ricerca sociale ed economica, alla programmazione territoriale e settoriale, alla valutazione delle politiche pubbliche a livello nazionale, regionale e locale (Garofalo 2014).

Nell'ambito di tale progetto, è stata predisposta una base di microdati che colleziona un set di informazioni, prevalentemente di natura fiscale e contributiva, per realizzare studi sulle condizioni socio-economiche delle famiglie ad un livello di disaggregazione territoriale molto fine.

Da tale base dati è possibile desumere indicazioni relative a comportamenti 'ambientali' delle famiglie italiane. Nello specifico, le informazioni utilizzate per questo lavoro sono ricavabili dalla Banca Dati Reddituale (BDR), una base di dati statistica di titolarità del Ministero dell'Economia e delle Finanze contenente una selezione di informazioni derivanti dalle dichiarazioni dei redditi (modelli Unico, 730, 770) dei contribuenti italiani.

Le informazioni di interesse sono di natura fiscale e sono rappresentate dalle spese per interventi finalizzati al risparmio energetico di immobili (e condomini) sostenute dai possessori di un titolo di proprietà o altro diritto reale, concessione demaniale, locazione o comodato, in un arco di tempo determinato (nell'anno 2012 e/o negli anni dal 2008 al 2011), per cui spetta una detrazione d'imposta del 55% , il cui riferimento normativo è il decreto interministeriale del 19 febbraio 2007, come modificato dai decreti del 7 aprile 2008 e del 6 agosto 2009. La detrazione può essere fruita dal possessore o detentore dell'immobile o dal familiare

convivente al quale risultano intestate le fatture ed i bonifici relativi alle spese sostenute per gli interventi.

Le tipologie di interventi per i quali sono previste le detrazioni sono:

1) Interventi di riqualificazione energetica di edifici esistenti. Rientrano in tale tipo di intervento la sostituzione o l'installazione di climatizzazione invernale anche con generatori di calore non a condensazione, con pompe di calore, con scambiatori per teleriscaldamento, con caldaie a biomasse gli impianti di cogenerazione, rigenerazione, gli impianti geotermici e gli interventi di coibentazione.

2) Interventi sull'involucro degli edifici esistenti. Sono tali gli interventi su edifici esistenti o parti di essi relativi a strutture opache verticali (pareti), strutture opache orizzontali (coperture e pavimenti), fornitura e posa in opera di materiale coibente, di materiale ordinario, di nuove finestre comprensive di infissi, miglioramento termico di componenti vetrati esistenti, demolizione e ricostruzione dell'elemento costruttivo.

3) Installazione di pannelli solari. Sono tali gli interventi per l'installazione di pannelli solari, anche realizzati in autocostruzione, bollitori, accessori e componenti elettrici ed elettronici utilizzati per la produzione di acqua calda ad uso domestico.

4) Sostituzione di impianti di climatizzazione invernale. Per interventi di sostituzione di impianti di climatizzazione invernale si intendono quelli concernenti la sostituzione, integrale o parziale, di impianti di climatizzazione invernale esistenti con impianti dotati di caldaie a condensazione e contestuale messa a punto del sistema di distribuzione.

2.2. I dati deducibili dai segnali amministrativi

Ai dati contenuti nelle dichiarazioni dei redditi, sono state affiancate le informazioni derivanti da altre fonti amministrative, al fine di descrivere alcune caratteristiche socio-economiche della popolazione che ha effettuato, nel corso degli ultimi anni, scelte di consumo volte al risparmio energetico.

Operativamente, la procedura per lo sfruttamento statistico dell'informazione amministrativa ha consentito di individuare, tra tutte le famiglie anagrafiche residenti in uno dei comuni italiani allo 01/01/2013, quelle in cui almeno un componente ha fruito di una detrazione fiscale per interventi finalizzati al risparmio energetico.

In prima battuta, si osserva che le famiglie che hanno fruito di detrazioni per interventi finalizzati al risparmio energetico sono 1.260.848 (pari al 4,9% del totale delle famiglie residenti), in cui vivono 3.224.872 individui.

La distribuzione territoriale di queste famiglie mostra, in buona misura, risultati coerenti con quelli ottenuti dall'indagine (Tabella 1). L'incidenza percentuale nazionale rappresenta la linea di demarcazione tra le famiglie residenti nelle regioni del Nord, più impegnate sul fronte del risparmio energetico (tra cui spiccano la Provincia autonoma di Trento con un'incidenza media del 10.6% e la regione Piemonte con un'incidenza media del 9.8%) e quelle del Centro e del Sud, tra cui si identificano come meno virtuose quelle residenti in Campania (1.3%), Calabria e Sicilia (entrambe 1.2%). Una delle caratteristiche maggiormente in grado di discriminare le famiglie che fruiscono di detrazioni per interventi finalizzati al risparmio energetico dalle altre è rappresentata dall'ammontare del reddito di cui esse dispongono. All'aumentare del reddito familiare cresce, infatti, la quota di famiglie che hanno fruito della detrazione: meno dell'1% delle famiglie con reddito inferiore a 10 mila euro annui ha indicato in dichiarazione investimenti per il risparmio energetico; al contrario, il 15.7% delle famiglie con reddito superiore ai 70 mila euro annui ha fruito della detrazione.

Tabella 1 – *Andamento regionale delle famiglie residenti per tipologia di indicatore*

Regioni	Famiglie che dichiarano di aver effettuato, negli ultimi 5 anni, investimenti in denaro per ridurre le spese di riscaldamento dell'abitazione e/o di energia elettrica (per 100 famiglie)	Incidenza percentuale delle famiglie residenti che fruiscono di detrazioni per interventi finalizzati al risparmio energetico, per regione (ogni 100 famiglie residenti)
Piemonte	31,6	9,8
Valle d'Aosta	32,0	7,9
Liguria	33,7	8,7
Lombardia	31,8	7,0
Trento	33,5	10,6
Bolzano	27,6	8,1
Veneto	30,2	6,4
Friuli-Venezia Giulia	27,9	8,3
Emilia-Romagna	30,7	6,5
Toscana	27,0	4,2
Umbria	29,9	3,6
Marche	25,1	4,7
Lazio	27,4	3,2
Abruzzo	22,7	2,8
Molise	26,8	2,7
Campania	24,3	1,3
Puglia	23,0	2,1
Basilicata	25,9	3,1
Calabria	26,2	1,2
Sicilia	17,3	1,2
Sardegna	28,2	2,7
Italia	**27,7**	**4,9**

Fonte: Istat, Indagine sui consumi energetici delle famiglie – Anno 2013 e Istat, ARCHIMEDE (ARCHivio Integrato di Microdati Economici e Demografici) – Anno 2012

3. L'Integrazione tra le fonti

3.1 Le fasi e i risultati dell'integrazione

Il processo d'integrazione tra dati di indagine e dati amministrativi può essere effettuato attraverso metodologie di *record linkage* di tipo deterministico, quando si dispone di chiavi univoche di aggancio, o probabilistico, quando si ricorre a profili di similarità tra unità ottenuti da un insieme di variabili caratterizzanti i record. Lo scopo del processo di integrazione è individuare la presenza della stessa unità elementare (in questo caso la famiglia) nelle due fonti prescelte. Nel presente lavoro è stato effettuato un *record linkage* deterministico, dal momento che in entrambe le fonti sono presenti chiavi di linkage univoche, rappresentate dai codici anagrafici delle famiglie e dai codici fiscali dei loro componenti. Le famiglie incluse nel campione dell'indagine sui consumi energetici delle famiglie rappresentano un sotto-insieme delle famiglie contenute nella base dati di ARCHIMEDE.[2]

L'indagine possiede una ricchezza informativa maggiore rispetto ai dati amministrativi. Le famiglie intervistate dichiarano infatti se, negli ultimi 5 anni (2009-2012), hanno effettuato investimenti in denaro per ridurre le spese di riscaldamento dell'abitazione e/o di energia elettrica. I quesiti cui fanno riferimento le tipologie di investimento sono molto particolareggiati.

Invece, da BDR non è distinguibile la tipologia di intervento apportato, in quanto è presente solo il dato relativo all'importo della rata delle spese per tutti gli interventi finalizzati al risparmio energetico effettuati.

Attraverso il record-linkage, ai dati campionari è stata aggiunta l'informazione, derivata da fonte amministrativa, relativa all'eventuale fruizione di detrazioni per interventi finalizzati al risparmio energetico.

Come si evince dalla tabella 2, le fonti utilizzate risultano coerenti per il 73,4% delle famiglie, la maggior parte delle quali (70,1%) ha dichiarato di non aver effettuato investimenti volti al risparmio energetico compresi nell'indicatore sintetico e non aver usufruito di detrazione fiscale, mentre una minoranza (3,3%) risulta aver sostenuto spese di efficientamento a partire da entrambe le fonti. All'opposto, per solo il 2,2% di famiglie emerge un'incongruenza tra dato campionario e dato amministrativo, avendo queste dichiarato di aver effettuato una detrazione fiscale ma non un investimento tra quelli compresi nell'indicatore sintetico. Tale incoerenza, tuttavia, è plausibilmente da attribuire sia alla non totale sovrapposizione di tipologie di interventi delle due fonti, sia al parziale disallineamento dei periodi di riferimento (per l'indagine da marzo 2008 a luglio 2013; per il dato amministrativo da gennaio 2008 a dicembre 2012). Inoltre, alcune

[2] Con la differenza che l'indagine raccoglie informazioni anche sui "componenti di fatto".

famiglie possono aver richiesto, in alternativa alla detrazione fiscale, contributi comunali, regionali o locali riconosciuti per i medesimi interventi (D.Lgs. 30 maggio 2008, n.115 e risoluzione n.3/E del 26 gennaio 2010). Il 24,4% delle famiglie, infine, dichiara di avere effettuato investimenti di efficientamento energetico non sottoposti a detrazione fiscale.

Tabella 2 – *Famiglie residenti per esito del record linkage e tipologia di investimento per ridurre le spese energetiche (valori assoluti e percentuali)*

Investimenti per risparmio energetico nell'indicatore sintetico						
Detrazione fiscale	Assenza		Presenza		Totale	
	v.a.	%	v.a.	%	v.a.	%
Assenza	18.130.100	70,1	6.316.533	24,4	24.446.633	94,5
Presenza	569.511	2,2	856.469	3,3	1.425.980	5,5
Totale	18.699.611	72,3	7.173.002	27,7	25.872.613	100,0

Fonte: Istat, Indagine sui consumi energetici delle famiglie – Anno 2013 e Istat, ARCHIMEDE (ARCHivio Integrato di Microdati Economici e Demografici) – Anno 2012

3.2 La lettura integrata dei dati

La non completa sovrapponibilità delle informazioni di fonte campionaria con quelle di fonte amministrativa incoraggia una lettura integrata dei dati, finalizzata ad una più ampia ed articolata descrizione dei comportamenti del settore residenziale italiano in ambito energetico. Tale lettura può essere effettuata rispetto ad alcune caratteristiche sia delle abitazioni sia dei nuclei familiari.

Tra quanti hanno dichiarato di aver effettuato investimenti per la riduzione delle spese per l'energia elettrica e per il riscaldamento dell'abitazione, la percentuale di famiglie che hanno anche fruito di detrazioni fiscali ammonta a solo il 12% (Tabella 3). Le motivazioni di una così ridotta incidenza, come si è visto, possono essere individuate nel parziale disallineamento dei periodi di riferimento o nella possibilità per le famiglie di ricorrere ad incentivi locali per la stessa tipologia di interventi. Non è da escludersi, inoltre, che il fenomeno risenta di una non ancora capillare diffusione di informazione in merito alle possibilità di sgravio fiscale offerte al settore residenziale, così come della presenza, specie in talune zone del paese, di aree di economia sommersa, in cui le spese effettuate potrebbero essere non sempre regolarizzate da un punto di vista fiscale.

Nondimeno, appare evidente come nel settore domestico prevalgano spese per il risparmio energetico che non sono comprese tra le tipologie detraibili. Si tratta perlopiù di investimenti meno "strutturali" rispetto a quelli di riqualificazione energetica degli edifici previsti dal sistema di incentivi fiscali, ma spesso anche meno onerosi economicamente: la sostituzione di elettrodomestici o di apparecchi

per il riscaldamento con apparecchi più efficienti, l'installazione di strumenti per la contabilizzazione del calore, di regolatori di intensità luminosa, ecc.. Compresi tra i dati rilevati dall'Indagine sui consumi energetici e non tra quelli di fonte fiscale sono, inoltre, gli investimenti finalizzati all'installazione di impianti ad energia rinnovabile per la produzione di energia elettrica, perlopiù impianti fotovoltaici che, grazie ai recenti programmi di incentivazione (il cosiddetto "Conto Energia"[3]), hanno subito negli ultimi anni una crescita notevolissima (Istat, 2014b; GSE, 2014).

Guardando alle caratteristiche dell'abitazione (Tabella 3), l'incidenza complessiva degli investimenti per ridurre le spese energetiche, oltre a risultare più elevata nelle case, casali, ville o villette (34%), mostra, per gli appartamenti, un andamento crescente rispetto alle dimensioni complessive dell'edificio (da 23,5% per gli appartamenti in stabili di piccole dimensioni a 33,2% per quelli in edifici più grandi), segno della presenza di "economie di scala" derivanti dalla condivisione delle spese tra condomini. Un analogo andamento si riscontra rispetto alla quota di famiglie che hanno usufruito di sgravi fiscali, con un'incidenza inferiore alla media negli appartamenti dei piccoli edifici e superiore in quelli dei grandi stabili, mentre le abitazioni unifamiliari e plurifamiliari registrano valori solo leggermente inferiori al valore medio.

L'epoca costruttiva dell'abitazione contribuisce alla definizione di standard energetici differenziati che, in maniera differenziata, richiedono azioni di ammodernamento ed efficientamento energetico. Le abitazioni costruite in anni recenti (dal 1990 ad oggi), come prevedibile, sono quelle in cui si concentra la quota minore di famiglie che hanno effettuato investimenti sia complessivi (22,7 su 100) sia detratti (9,3), mentre quelle che risalgono agli anni Cinquanta-Sessanta e Settanta-Ottanta registrano i valori più elevati degli indicatori considerati. Le abitazioni più antiche si collocano, infine, su standard medi.

La percentuale di famiglie che hanno effettuato spese per il risparmio energetico (siano esse detratte o non detratte) risulta crescente all'aumentare della dimensione dell'abitazione: si va dal 20% per gli appartamenti più piccoli (con una quota di investimenti portati in detrazione pari al 4,4%) al 33% per quelli di dimensioni superiori ai 100 metri quadri (dei quali, 14 su 100 detratti).

[3] Introdotto nel 2005 (D.M. 28 luglio 2005, modificato dal D.M. 6 febbraio 2006) in sostituzione del precedente sistema di incentivazione basato su contributi in conto capitale, e arrivato nel 2012 alla sua quinta edizione (Quinto Conto Energia; D.M. 05 luglio 2012), è indirizzato a persone fisiche, persone giuridiche, soggetti pubblici, enti non commerciali e i condomini di unità abitative e/o di edifici.

Tabella 3 – *Famiglie che hanno effettuato investimento per ridurre le spese energetiche per principali caratteristiche dell'abitazione, per 100 famiglie con investimento e per 100 famiglie con investimento e con sgravio fiscale.*

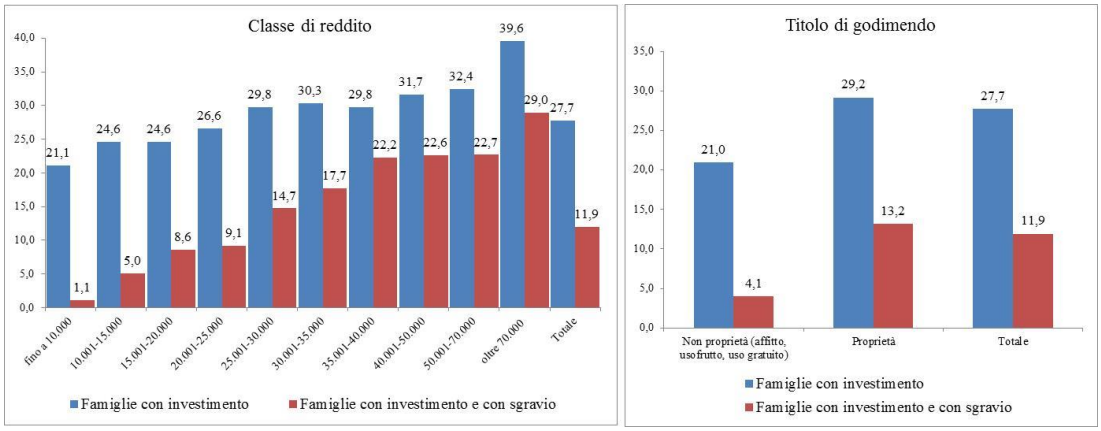
	Famiglie con investimento per 100 famiglie	Famiglie con investimento e con sgravio per 100 famiglie che hanno effettuato investimenti
Tipologia di abitazione		
Casa, casale, villa o villetta unifamiliare	27.6	11.1
Casa, casale, villa o villetta plurifamiliare o a schiera	33.8	11.0
Appartamento in edificio con meno di 10 apt	23.5	9.9
Appartamento in edificio con 10-27 apt	27.9	15.5
Appartamento in edificio con 28 o più apt	33.2	15.3
Anno di costruzione dell'immobile		
Prima del 1950	27.8	11.7
Anni cinquanta-sessanta (1950-1969)	29.5	14.0
Anni settanta-ottanta (1970-1989)	30.3	12.1
Dal 1990 ad oggi	22.7	9.3
Superficie dell'abitazione in metri quadri		
fino a 60	19.7	4.4
da 61 a 70	25.9	11.0
da 71 a 80	27.0	10.1
da 81 a 90	25.8	13.2
da 91 a 100	28.1	13.1
Oltre 100	33.0	13.9
Totale	**27.7**	**11.9**

Fonte: Istat, Indagine sui consumi energetici delle famiglie – Anno 2013 e Istat, ARCHIMEDE (ARCHivio Integrato di Microdati Economici e Demografici) – Anno 2012

La dimensione dell'abitazione risulta d'altra parte correlata con il reddito, che rappresenta, tra le caratteristiche del nucleo familiare, la più importante determinante della propensione a investire (Figura 3). L'incidenza di famiglie che ha effettuato spese aumenta infatti in maniera pressoché costante con il crescere della disponibilità economica familiare: dal 21% per gli investimenti dei nuclei a più basso reddito (con una quota di interventi detraibili quasi nulla), al 40% per le famiglie con reddito di 70.000 Euro annui e oltre (il 30% dei quali di natura detraibile). L'incidenza di famiglie che hanno fruito di detrazioni per il risparmio energetico mostra peraltro un variabilità più elevata rispetto alla quota complessiva di famiglie che hanno sostenuto spese, a riprova di come gli investimenti detraibili rimandino ad una categoria di interventi più strutturali e, in quanto tali, costosi e dipendenti dalla disponibilità economica. Il titolo di godimento, infine, contribuisce

alle scelte di risparmio energetico nella direzione attesa, con una maggiore incidenza di investimenti effettuati tra le famiglie che risultano proprietarie delle abitazioni.

Figura 3 – *Famiglie che hanno effettuato investimento per ridurre le spese energetiche per principali caratteristiche del nucleo familiare, per 100 famiglie con investimento e per 100 famiglie con investimento e con sgravio fiscale.*



Fonte: Istat, Indagine sui consumi energetici delle famiglie – Anno 2013 e Istat, ARCHIMEDE (ARCHivio Integrato di Microdati Economici e Demografici) – Anno 2012

Conclusioni

Il presente lavoro è il risultato di una prima sperimentazione di tale integrazione, operata con l'obiettivo di approfondire il tema dell'efficientamento del settore domestico. L'analisi ha mostrato come, benché nel settore residenziale prevalgano investimenti non detraibili, la quota di famiglie che effettua spese detraibili vari in relazione sia a caratteristiche dell'abitazione (quali la tipologia, l'anno di costruzione e la dimensione) sia a caratteristiche del nucleo, quali il titolo di godimento dell'abitazione e, soprattutto, il reddito, facendo ipotizzare un collegamento tra investimenti detraibili ed interventi di efficientamento più costosi.

Tali andamenti inducono ad ampliare l'analisi nella direzione dell'approfondimento della relazione tra disponibilità economica e ulteriori comportamenti di consumo energetico rilevati con l'indagine campionaria, sempre tenendo sotto controllo le ulteriori caratteristiche che definiscono l'abitazione e il nucleo familiare.

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SUMMARY

Italian households meet crisis reducing energy expenditure? Administrative data and samples integrated.

The aim of this work is to investigate the characteristics of Italian households which have invested into reduce energy costs. The methodology used is based on the integration of administrative and sample data (record linkage). The sources used are: a) the survey on energy consumption of households, carried out by Istat in 2013, for the first time in Italy, with reference to the entire national territory; b) the collection of microdata carried out under the project Istat 'ARCHIMEDE': integrated database of Microdata Economic and Demographic. On survey data it has been, preliminarily, compute a synthetic indicator that combined energy investments. Secondary, through the integration with administrative data (ARCHIMEDE project), has been possible to attribute to sample households a "flag". This flag allows to identify the households which has benefited from a tax advantage for one of the following investments (energy upgrading of existing buildings, interventions on the casing of the existing buildings, installation of solar panels, replacement of equipment winter heating). The information from the sample with those from administrative sources are not entirely overlapping. This encourages an integrated reading of data, aimed at a broader and more articulated description of the behavior of the Italian residential sector in the energy field.

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THE ROLE OF REMITTANCES ON THE BUSINESS CYCLE: THE CASE OF THE PHILIPPINES

Leonardo Di Marco, Olga Marzovilla, Luciano Nieddu

1. Introduction

Remittance flows to developing countries increased considerably in the last decades. According to estimates of the "Migration and Development Brief" (World Bank, 2015) remittances reached the amount of 436 billion dollars in 2014.

Their relevance has made them the subject of several studies aimed to examine the impact on the various aspects related to the process of growth of the recipient countries.

Many studies have considered the positive impact of remittances on poverty reduction (Adams and Page, 2003), on consumption, on the process of multiplication of income, on the markets expansion, on the expectations of economic agents and on investments (Glytsos, 2002; Ratha 2003; Orozco 2004; Zarate-Hoyos, 2004; Kapur, 2005; Wahaba, 2005); on capital formation (Giuliano, Ruiz-Arranz, 2005; Wahaba, 2005); on the banking and credit system (Aggarwal, Demirguc-Kunt, Martinez Peria, 2006); on growth (Faini, 2002; Chami, 2003); on human capital formation (Cox Ureta, 2003; Yang, 2006); on balance of payments (Glytsos, 2002; Oecd, 2006); on the business cycle (Agarwal, Horowitz, 2002; Osili, 2007; Kapur, 2005; Rapoport, Docquier, 2005; Julian Ruiz-Arranz, 2005) and so forth.

Several studies, however, have considered different panels of countries reaching different conclusions: some studies have emphasized the positive effects of remittances, while others have focused on the negative effects. Indeed, these conclusions cannot always be generalized.

The impact of remittances on countries' economies depends on their specificity: their structural characteristics, the importance of migrations, the degree of commercial opening, etc. In such perspective, the present study deals with the case of the Philippines, considering the impact of remittances on the business cycle.

The choice of the Philippines is motivated by some of its characteristics that make it an interesting case study: the country presents strong migration outflows that feed relevant remittance inflows, making it the world's third largest destination of migrants transfers; the fact that the currency inflows resulting from remittances

substantially exceed those related to aids and other forms of movements of capitals; the circumstance that the country has been affected by two important crisis (the Asian crisis in 1997 and the most recent in 2008).

In particular our study, after a brief examination of the role of remittances in developing countries, will examine the relationship between migrants transfers and business cycle focusing on the main theoretical reasons that justify the sending of remittances. The analysis will be carried out, at first, according to a correlation analysis and, then, using a covariance model.

2. The relevance of remittances in developing countries

According to the IMF, remittances are the sum of "*personal transfers, that consist of all current transfers in cash or in kind, made or received by resident households to or from nonresident households, and compensation of employees, that refers to the income of border, seasonal and other short term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities"*. However, these data underestimate the real extent of the phenomenon because, in this definition, money transfers that occur through informal channels are not included: such flows fluctuate, in many cases, between 10% and 50% percent of the total remittances of certain countries (Demaria, 2007).

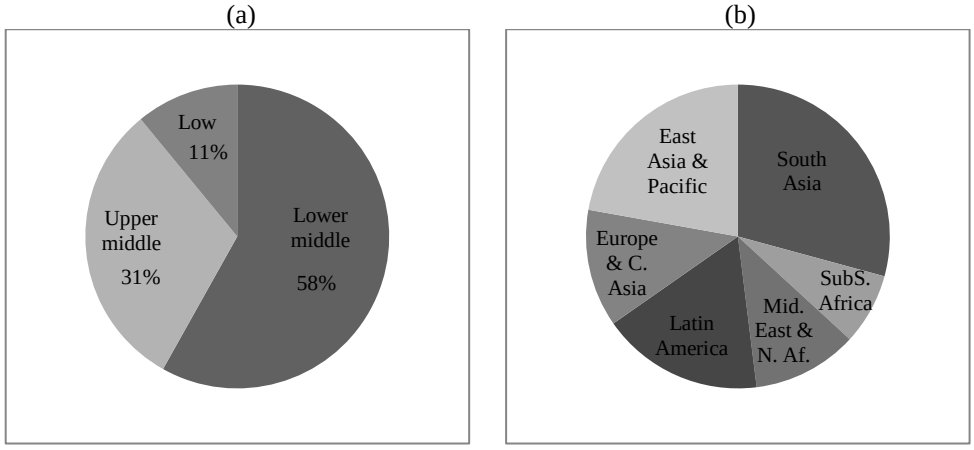
In 2013 remittances to developing countries reached the amount of 420 billion dollars, with an average growth in the last eight years by more than 11%, despite the reduction in flows of about 5% recorded in 2009, caused by the extension to the world of the US financial crisis (World Bank, WDI 2014).

Considering a classification of countries in low income, low-middle income and upper middle income countries, it results (Figure 1a) that those with lower middle income are the major recipients of remittances, followed by the upper middle income countries and, finally, those with low income. This dynamic seems to reflect that of migration flows and, in particular, the well-known phenomenon of migration curve that implies the existence of a functional relationship between income level and intensity of migrations (Schiff, 1995).

In particular, the amount of the flows is lower in correspondence of lower income countries; it grows with income up to a maximum, then it starts to decrease when income grows further and it becomes very low in countries with high income levels. The underlying logic of such relationship is that migrants should be able to afford the costs of the migration, both in economic terms and in terms of greater knowledge and education. Therefore, the intensity of migration flows will be greater in countries with a medium growth rates and smaller in heavy industrialized

countries or underdeveloped ones. Obviously, this also effects the dynamics of remittances.

Figure 1: *Distribution of remittances for classes of income of developing countries (b) and for geographical area (b) in 2013.*

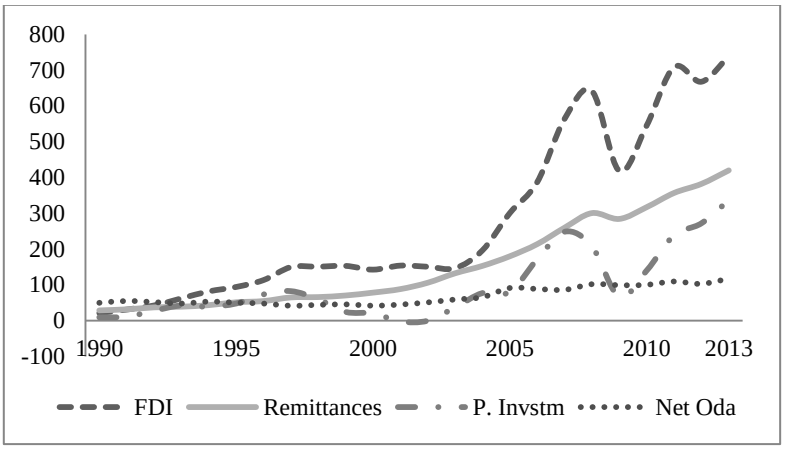


Source: World Bank, World Development Indicators 2014

As shown in Figure 1b, South-East Asia was in 2013 the region that received the largest flow of remittances (more than 50% of total remittances to developing countries). Some of the major receiving countries (India, China, the Philippines, Bangladesh, Pakistan and Indonesia) are located in this area. In particular, India, China and the Philippines were, along with Mexico, the main recipients of remittances in 2013.

Since the end of the 90's remittances have ensured to developing countries (considered as a whole), a flow of currency second only to that resulting from foreign direct investments (FDI), as shown in Figure 2. Furthermore, remittances have proved to be a stable source of foreign currency. While portfolio investments and foreign direct investments tend to grow during a positive cycle and decrease in periods of recession, migrants' transfers react less strongly to the fluctuations of the business cycle. Visually, this effect is clearly depicted in Figure 2. It is worth noticing that, after the shock of 2008, portfolio investment and FDI have fallen sharply, while only a mild contraction in remittances has been registered.

Figure 2 – *Remittances, FDI, Portfolio investments and net Official Development Assistance (ODA) in developing countries. (Billions $)*



Source: World Bank, World Development Indicators 2014

In the group of developing countries, however, it is possible to select a subset where remittances have been the main source of foreign exchange reserves, namely: India, Philippines, Nigeria, Egypt, Pakistan, Vietnam, Ukraine, Indonesia, Morocco. In the rest of the paper we will focus our attention on the case of the Philippines.

3. The role of remittances in the Philippines

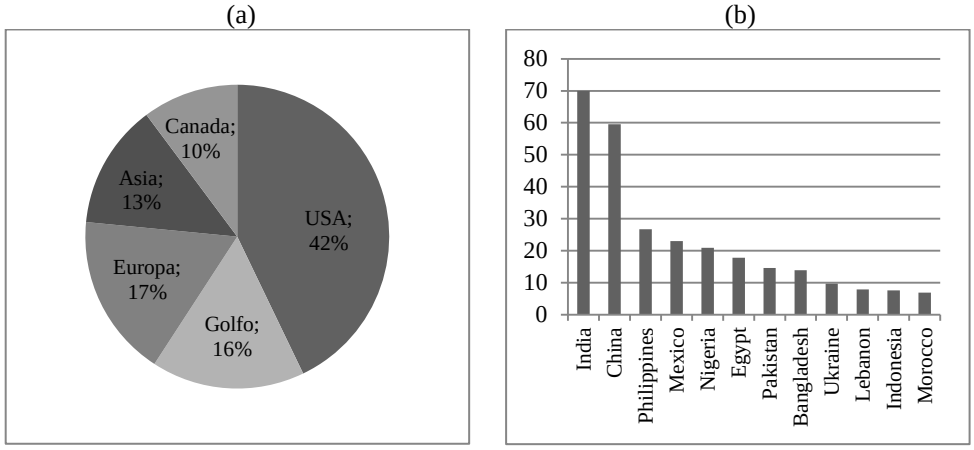
The migration phenomenon regarding the Philippines has grown strongly over the last thirty years. In 2013 nearly 6 million Filipinos, equal to 5.5% of the total population, have emigrated.

According to the 2011 Survey of Overseas Workers it is evident that migrations affect especially the younger part of the population: about 30% of the population between 25 and 40 years of age is working abroad. In addition, the percentage of high skilled workers has increased over time. In particular, in the period from 2000 to 2010 it has risen from 7% to 12%, although the majority are still low-skilled workers.

Considering the geographical composition of host countries where the remittances have been originated (Figure 3a), the USA is the main country of origin of flows (42% of total inflows), followed by the Gulf countries (16%), Europe (17%), Asia (13%) and Canada (10%) (IMF Country Reports, 2013).

The relevance of the migration phenomenon makes the Philippines the world's third largest recipient country of remittances (see. Fig. 3b); in 2014 they exceeded $28 billion, equal to 9.81% of GDP and of 23% of exports. In addition, as shown in Figure 4a, remittances are the largest source of foreign exchange, far exceeding FDI and portfolio investments.

Figure 3 – *Origin countries of Filipinos' remittances in 2011 (a) and top recipient developing countries (b). (Billions $)*



Source: World Bank, World Development Indicators 2014

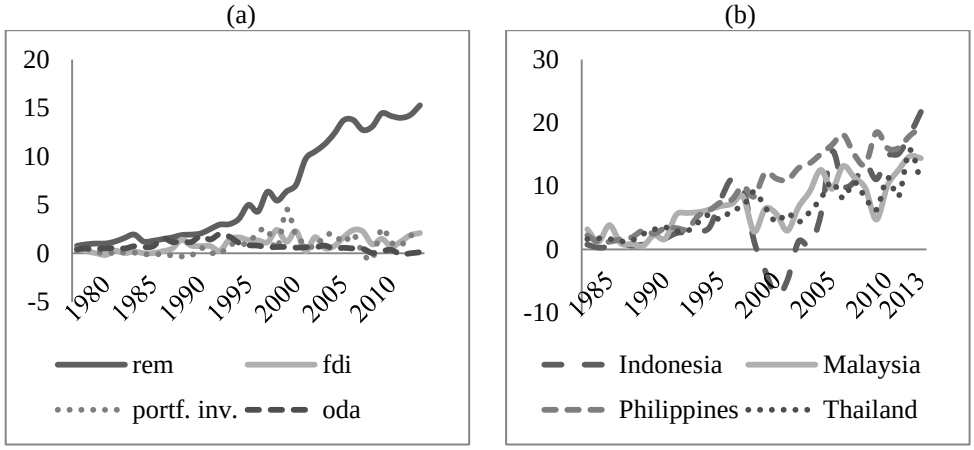
Therefore, the migrants transfers play an important role in the process of economic growth, even though, as noted by Ang (2007), it did not affect equally all regions of the Philippines.

Our study, however, mainly focuses on the relationship between remittances and the business cycle. Our interest stems from the peculiar history of the Philippines being the country that has suffered less the effects of the 1997 Asian crisis compared to other involved economies, suggesting the possibility that the transfers of migrants may have played a stabilizing role on the business cycle.

It is worth noticing, in this regard, how the foreign exchange inflows associated with remittances helped to offset the capital outflows regarding portfolio investment and FDI, unlike what happened in other countries that suffered the same economic crisis (Fig. 4b).

Moreover, while other countries affected by the crisis (Indonesia, Malaysia, South Korea, Thailand) experienced steep capital outflows, in the Philippines such outflows were much lower (Figure 4b). This result, according to the IMF, can be attributed to the role of remittances that have anchored investors' confidence, stabilizing the flow of capitals (IMF, 2013).

Figure 4 – *Remittances, FDI, Porfolio investment and net ODA (Official Development Assistance) in the Philippines (a) and net inflows of remittances, FDI and Portfolio investment in the Asian (b). (Billions of $)*



Source: World Bank, World Development Indicators 2014

4. Remittances and business cycle in Philippines

In a study about Botswana, Lucas and Stark (1985) used a microeconomic approach to identify two main reasons justifying the flows of remittances: *pure altruism, pure self-interest*.

In the case of *pure altruism*, migrants send back part of their income abroad to improve the living conditions and alleviate the economic hardship of the families left behind in their home countries.

An alternative motivation, in the case of *self-interest*, states that monetary transfers are dictated by their need to protect property left at home or to make investments in houses, lands or small businesses, in the prospective of their return. This case is also known as "*attachment to homeland*"[1].

The prevalence of one motivation over the other plays a key role in the impact of remittances on the business cycle.

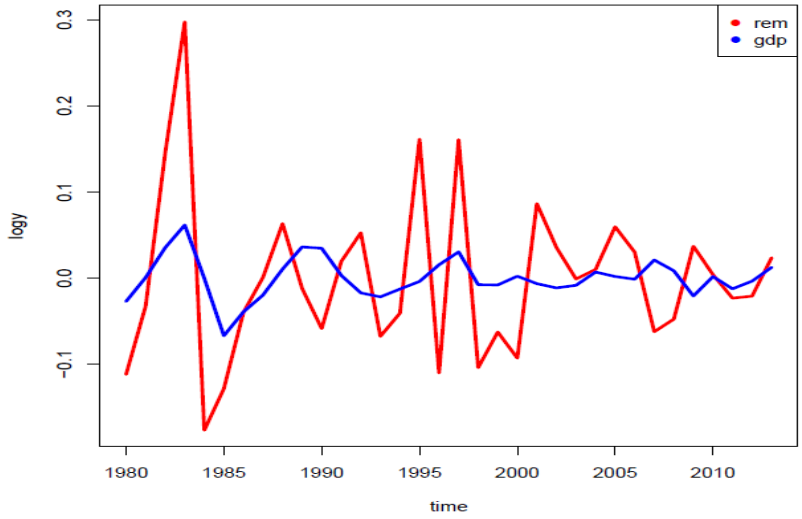
[1]An intermediate situation between *pure altruism* and *self-interest* consists in *enlightened self-interest*. This model considers the relationship between the migrant and his family as a sort of implicit contractual agreement, where the emigration is a Pareto efficient situation and remittances are a mechanism to distribute their benefits. The model has been declined in various versions (Stark, 1991;Townsend, 1994; Poirine, 1997; Ilahi e Jafarey,1999; Agarwal e Horowitz, 2002; Gubert, 2002, Marzovilla, Mele, 2015).

Remittances have a counter cyclical effect if the altruistic motivation is prevailing. In particular, if their main determinant is to meet the families' needs, they can increase in times of crisis, helping to reduce the volatility of GDP and stabilizing the cycle (Agarwal, Horowitz, 2002; Osili, 2007; Kapur, 2005; Rapoport, Docquier 2006).

Remittances can have a pro-cyclical effect if the motivation of self-interest prevails. In particular, they may increase in the favorable phases of the economic cycle, stimulated by the more optimistic expectations on the country's economic situation, and they may decrease in those adverse, with the worsening of the expectations. Therefore, in the self-interest scenario, remittances would have a destabilizing effect, deepening of cyclical waves (Giuliano, Ruiz-Arranz, 2005).

With reference to the Philippines, Tuano-Amador et al. (2007), found a positive correlation between GDP and remittances by applying the Hodrick-Prescott filter to the historical series of the values of the GDP and remittances for the period 1989-2007 and by correlating the cyclic components of the filtered values. They obtained a correlation coefficient equal to 0.119 which seems to endorse the prevalence of a self-interest motivation w.r.t. remittances in the Philippines during the considered time frame.

Figure 5 – *Business cycle of remittances (rem) and GDP, 1977-2013.*



Following the same approach we will apply the Hodrick-Prescott filter to the time series for the GDP and remittances in the Philippines for the 1977-2013 period, determining the correlation between the filtered values (see Fig. 5). The

annual data have been obtained from the World Bank database and have been depicted in logarithmic scale.

A correlation coefficient of 0.496 between the two time series seems to confirm the results already found by Tuano-Amador et al. (2007), suggesting the presence of a pro-cyclical effect in the Philippines during the considered time period. The overall correlation coefficient, over the time span of 36 years, is a synthesis of what seems to be different types of interdependences as displayed in Figure 5. Namely, the pro-cyclic effect is clearly marked in the first part of the graph (from the 80s to the late 90s) while the same effect does not seem to be so clear-cut in the right-hand side of the plot.

The possible change in the effect of GDP on remittances over the years should then be studied and it will be the focus of the next Section of the paper.

5. Remittances and business cycle in the Philippines: an empirical analysis

To study more in detail the effect of variations of GDP on fluctuations of remittance, a covariance model has been applied. The basic idea is that variations on GDP could influence the variations in the remittances. Such an influence can be caused either by an altruistic driver (negative correlation), implying a stabilizing effect of the remittances on the GDP, or by an individualist driver (positive correlation), implying a deepening effect on the cyclic wave. Starting from Figure 5 we have allowed for a structural break in the effect of GDP on remittance. This has been achieved introducing an interaction term in the linear model with a dummy variable which indicates whether the year the data refers to is prior or post a certain date. Various time cut-points have been considered and only the one that provided the best fitting was retained:

$$rem_t = a + b * gdp_t * I_{(cutpoint)} + \epsilon_t \quad (1)$$

Where $I_{(cutpoint)}$ is an indicator variable equal to 1 if the year is greater than "cutpoint" and zero otherwise. The model providing the best fit was the one with cutpoint=1999. The parameter estimates for such model have been displayed in Table 1, together with their estimated standard errors and p-values.

Prior to 1999 there is a pro-cyclic significant effect of GDP on remittances. Positive fluctuations in the GDP tend to produce a positive fluctuation on remittances. The presence of the interaction term suggests that such a dependence changes abruptly after 1999, maintaining almost the same strength (the variation on remittances is roughly twice that on the GDP on the log scale) but with an opposite sign.

Table 1: *OLS results for model* (1)

	estimate	Std. error	p-value
$\hat{a}$	-0.002861	0.018294	0.876790
$\hat{b}$	2.338093	0.626129	0.000788
$\widehat{I_{\{1999\}}}$	0.004881	0.028527	0.865283
$b{:}\widehat{I_{\{1999\}}}$	-4.135377	2.160456	0.065186

The data suggest that the behavior of Filipino expats w.r.t. remittances has changed in the time span considered in this analysis. Namely the Filipinos have been principally driven by a self-interest motivation prior to the 1997/98 crisis. Following that date there has been a change in their behavior, and it can be noticed in the reversal of the sign of the estimate of the regression parameter. Fluctuations in remittances have had a counter cyclical effect after the crisis, suggesting an altruistic behavior and therefore a stabilizing effect on the business cycle. This evidence shows that the motivation of who sends remittances can change depending on the economic contingency.

6. Conclusions

The high volume of remittances plays a fundamental role for the Philippines economy and the underlying motivations for their sending can play a key role on their impact on the business cycle. If the altruistic motivation prevails, remittances can have a counter cyclical effect; if the self-interest motivation prevails, they can have a pro-cyclical effect.

Although the correlation analysis for the period 1977-2013 has shown the existence of a pro-cyclic effect on GDP, suggesting the idea of the prevalence of a self-interest motivation, the subsequent use of covariance model has shown, however, that the entire observational period can be divided in two different phases, in which the behaviors of migrants have changed.

Namely the Filipinos have been principally driven by a self-interest motivation prior to the 1997/98 crisis, accentuating the expansive phase of the economic cycle. During the economic crisis their behavior has shifted, resulting in more remittances during the bad phases of the economic cycle and therefore resulting in a stabilizing effect on the economy.

The main conclusion is that the reasons that prompt migrants to transfer money can change over the time and adapt to the particular moment in time, according to the economic situation of the country.

This also implies that analyzing long time spans can result in the overlooking of some interesting aspects and effects that a more refined analysis based on shorter time span would show.

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SUMMARY

The role of remittances on the business cycle: the case of the Philippines

This study examines the effect of remittances on the business cycle of the Philippines from 1977 to 2013. The relation between the two time series will be considered on the basis of two main theoretical justifications: *pure altruism, pure self-interest*.

In the case of *pure altruism*, migrants send part of their income abroad to improve the living conditions of the families left behind in their home countries. In the case of *self-interest*, monetary transfers are dictated by the need to protect property left at home or to make investments in homes, lands or small businesses, in view of an eventual return back home. The prevalence of one motivation over the other plays a key role in the impact of remittances on the business cycle. If the altruistic motivation is prevailing, remittances have a counter cyclical effect. If the motivation of self-interest prevails remittances can have a pro-cyclical effect.

Our study, using a covariance model, comes to the conclusion that the reason that pushes migrants to send remittances may change over time according to the economic situation of their home-country and that the consideration of long periods of time, on the basis of a simple correlation analysis, can mask out the existence of different types of behaviors.

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"LIFESTYLES" OF IMMIGRANT HOUSEHOLDS: A STATISTICAL ANALYSIS ON THE DATASET EU-SILC

Stefania Girone, Sara Grubanov-Boskovic

1. Structure of the analysis: data sources and sample of reference[1]

The generalized economic crisis which has been affecting Europe, and thus Italy, for over 5 years now has shattered our sound family model traditionally based on a high propensity to save, to purchase the house rather than rent as well as on a limited indebting and on wealth inequality which – in a European comparison – is less emphasized than the income inequality. The perseverance of the crisis in Italy has emphasized even more the territorial differences and inequalities between social classes and has contributed to a significant rise of indicators such as material deprivation, poverty risk in Central and South area as well as income inequality. For that reason, the analysis on "economic hardship" that has spread over the Italian soil was carried out by identifying the living conditions of those households that particularly are at a risk of poverty, such as those composed entirely or in part of immigrant members. The choice of studying "lifestyles" of immigrant and/or mixed (Italians and foreigners) households is linked to the rise of the phenomenon of "familization" among immigrant collectivities in Italy: in fact, between the last two census surveys (2001-2011) there has been an increase of households with at least one immigrant member equal to 172,1%. In the total number of households residing in Italy, those having at least one immigrant component represent a share of 7,4%. While households composed solely of immigrant members constitute 74,2% of all households reporting at least one immigrant component.

The primary data source used is the Reddito e condizioni di vita delle famiglie con stranieri survey carried out for the first time in Italy in 2009 on a sample of 6.000 households with at least one immigrant member residing in Italy. The fact that this survey has applied the same methodological tools as those used in the Reddito e condizioni di vita delle famiglie (EU-SILC) survey conducted on Italian household also in 2009, enables also to make comparison between three types of households: those composed entirely of immigrant members, those represented

[1] This work will illustrate one part of the results that are an outcome of the research activities carried out within the framework of the two-year project "Determinants and Socio-Economic Consequences of Territorial Mobility of Populations in the Intermediterranean Context: the Case of Italy" financed by the Istituto di Studi Politici S. Pio V from Rome.

only by Italians and the mixed ones, i.e. those composed of both immigrant and native members.

Given these premises, an analysis on living conditions of households with at least one immigrant member, distinguished by the immigrant's nationality, was conducted in relation to four fields of observation – demographic traits, housing conditions, income distribution and living conditions (economic hardship, material deprivation, etc.) – and its results will be illustrated in part hereinafter. Our approach, which was developed by computing indicators on socio-economic wellbeing and/or hardship, has allowed us to identify heterogeneities and homogeneities not only among different types of households previously mentioned but also among those nationalities that are currently the most represented ones in Italy. Therefore, the originality of this type of analysis, in respect to the current literature, lies in the comparison made between the 3 most represented immigrant nationalities in Italy – Romanians, Albanians and Moroccans – while taking into the consideration, at the same time, the general trends of other categories of immigrant households – those originating from the EU and the extra-EU area.

The dataset employed has enabled us to work on a sample which allows distinguishing not only between foreigners born abroad and those born in Italy[2], but also between households composed entirely of immigrant foreigners and those composed of foreigners and Italians[3]. If we observe the share of total households having at least one immigrant member residing in Italy, in some 80% of cases these families are composed entirely of immigrants while the remaining share are the mixed unions. In particular, focusing on three nationalities of our interest (Romanians, Albanians and Moroccans), it appears that the share of mixed households that have an Albanian or Moroccan breadwinner is rather limited and even below the average registered for remaining households originating from the extra-EU. Similarly, the percentage of Romanian mixed households seems lower in comparison to the average value reported for the rest of the mixed households with a breadwinner holding an EU citizenship. In terms of household typology it is possible to identify, in overall, an equivalent behavior among the considered immigrant communities, bearing in mind however that the Romanian households should be studied apart in all areas of analysis since they enjoy rights reserved to

[2]This differentiation shed light on one particularly important aspect: among the total number of foreigners – out of which 72,8% is born abroad – the percentage of minors under 14 is divided between the scarce share of 28,4% of those who were born abroad and another, all but modest, share of 71,6% of those born (and residing) in Italy.

[3]This additional categorization becomes highly important since the presence of mixed families can be seen as indicative, in a certain way, of the degree of integration of foreigners into the native community. The literature has, in fact, revealed that the economic hardship of mixed families tends to be more limited in its extent in comparison to the condition of hardship that affects the households composed solely of immigrants.

the citizens of the EU and, thus, can have a more privileged access to welfare services and job market than the one Albanians and Moroccans have.

Besides the household typology, also the household composition together with some of its demographic traits might provide additional information regarding the inclusion of immigrants into the national society. In specific, some information on the number of household members and their age structure could, to a certain extent, reflect also the nature of the migratory project, whether it is a medium-long term one or assumes a more temporary nature. Some data elaborations performed on our dataset of reference permitted us to notice how mixed families tend to be more numerous than those composed entirely of immigrant members: this information reconfirms the hypothesis that the major degree of integration of mixed households is linked to the migration projects focused mainly on the permanent settlement. In terms of the pattern, looking at single nationalities studied, Albanians register a higher number of components in relation to households composed entirely of immigrants than in mixed ones, while Moroccans show a greater number of components in mixed households than in households of only immigrants. Moreover, both nationalities reported an average number of household components and for both types of households higher than the average for households originating from the rest of the extra-EU area. Correspondingly the Romanian households appear to be somewhat more numerous in comparison to the category of households holding another EU citizenship.

2. Housing conditions

The housing constitutes a key factor within the existential dimension of any individual as well as in the definition of lifestyles of the households. Living in a decent and not fortuitous housing helps the inclusion of households, especially immigrant ones, in the socio-economic context of any country by ensuring a condition of stability and thus facilitating individuals' life paths. The choice among different housing types depends on the conditions of access to the real estate market, but foremost it depends on a level and composition of the household income. Purchasing a house is a project that is highly difficult to accomplish for those households facing a limited availability of economic resources as well as, in general, for those more recently created households.

In light of these considerations and according to data observed, the share of households renting a property appears to be significantly higher than the number of households owning property, having the usufruct or free housing in relation to all three analysed nationalities and, in particular, such pattern appears more pronounced for Albanian and Moroccan households and less for Romanian ones.

However the concept of housing conditions is not referred exclusively to the aspect of housing typology, but it also includes a number of dimensions that are not necessarily associated with the concept of successful (or not) enjoyment of the housing right. Certainly one of these dimensions is "housing wellbeing or hardship" that can be measured both on the basis of objective and subjective variables depending if the housing wellbeing/hardship is a condition actually lived or a condition which is perceived. Leaving aside the subjective type of considerations – that however would have been interesting to analyse since the perceptions that individuals have regarding their own conditions could allow to measure better the wellbeing or hardship than do the objective evaluations provided by an external observer – we have decided at this stage to analyse the "actual" housing conditions of surveyed households using certain indicators such as the "average number of rooms per person" and "number of m^2 per person". Both indexes show better housing conditions for Romanians – with values that nevertheless are lower than those reported for households originating from the rest of the EU, but higher in comparison to the average for immigrant households in total – and somewhat inferior conditions for Albanian and Moroccan households that show values lower than those registered for immigrants from the rest of the extra-EU as well as those applicable for immigrants in general (Tab. 1).

Table 1 – *Housing conditions of immigrant households.*

Citizenship	Average number of rooms per person per persona	Average number of m^2 per person
Romania	1,2	31,3
Rest of the EU	1,4	37,4
Average all foreigners	*1,1*	*29,0*
Morocco	0,9	23,5
Albania	0,9	23,1
Rest of the extra-EU	1,1	28,4

Source: own elaborations on the dataset "Reddito e condizioni di vita delle famiglie con stranieri".

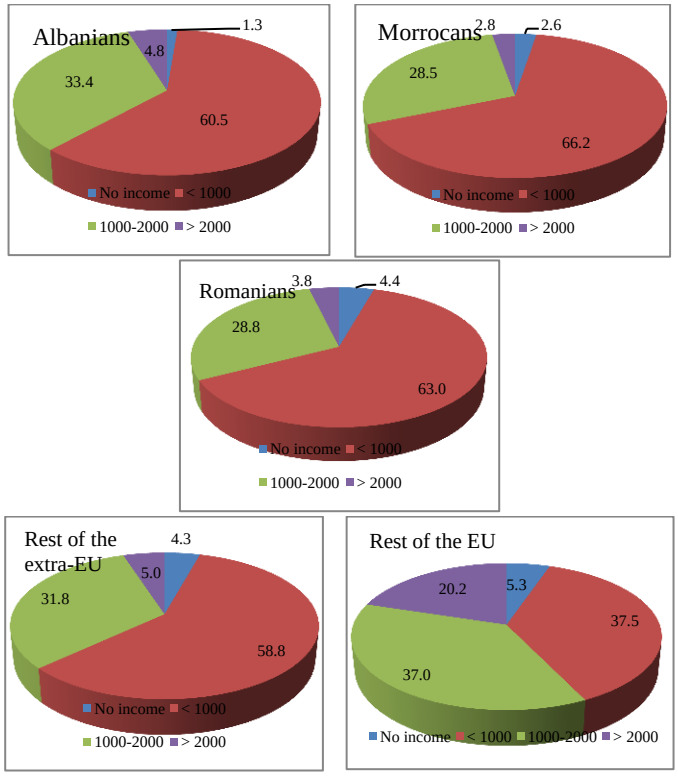
We have also carried out an analysis (results not shown here) on the average monthly expenditure pro capita (in euro) on housing, which includes not only the mortgage or rent but also all costs associated with housing purposes. In this sense, it should be mentioned that Romanians appear, in comparison with other nationalities, those who on a monthly basis spend more on housing.

3. Economic conditions

On the topic of economic conditions, the analysis of income has allowed us to further validate what was previously highlighted in terms of heterogeneities and/or homogeneities in behaviors between the nationalities observed.

In light of these considerations, for each nationality considered we have computed shares of households according to 4 income categories (Fig. 1) and, in addition, provided kernel density estimations[4] (Fig. 2).

Figure 1 – *Distribution of equivalised monthly income by nationality in percentage.*



Source: own elaborations on the dataset "Reddito e condizioni di vita delle famiglie con stranieri".

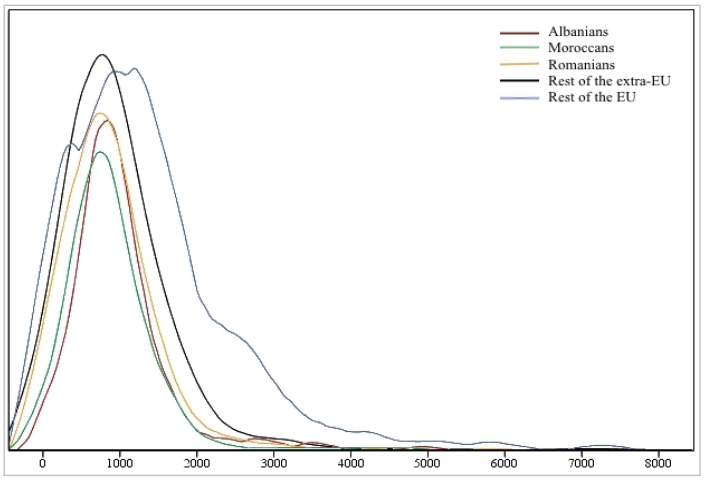
As it is shown in Figure 1, in case of all three main nationalities of our interest – Albanians: 60,5%, Moroccans: 66,2% and Romanians: 63,0% – the biggest share of households declared an income below 1.000 euro. Whereas Albanians and Moroccans resemble the behavior common to immigrant households of extra-EU

[4] Epanechnikov kernel with bandwidth equal to 0,05 applied.

origin, which also declared in a large share (58,8%) a monthly equivalised income below 1.000 euro, Romanians on other hand show significant differences in behavior when comparison is made with immigrants from the rest of the EU out of which only 37,5% registered an income lower than 1.000 euro and 57,2% an income higher than 1.000 euro. Hence, those households that have one or all members originating from the EU area, excluding Romanians, are the ones that among all nationalities studied claim an income distribution which substantially reflects better economic conditions.

This pattern can also be observed in the Fig. 2 where the horizontal axis represents the equivalised disposable household income while the vertical axis gives the density of households at different income levels. In fact, EU households, excluding Romanian ones, report the highest density within the income range 900 - 1.400 euro as well as a bigger density in higher income ranges (>1.400 euro) in comparison to other nationalities considered which are characterized by a single-peak distribution with majority of households located in proximity of the 800 euro threshold.

Figure 2 – *Kernel Density Estimation*



Source: own elaborations on the dataset "Reddito e condizioni di vita delle famiglie con stranieri".

Overall, while Moroccans register lowest levels of income, the immigrants from the rest of the EU zone report the highest one. These positions are reconfirmed both in reference to households composed entirely of immigrants as well as in the case of mixed ones. Furthermore, the study on income distribution by geographic area has revealed greater income levels in North-West and even more so in North-

East for all considered nationalities, while somewhat lower levels were reported in Central Italy and the lowest ones in the South and on the Islands.

In order to obtain some additional insights on income conditions of immigrant communities we have calculated the Gini coefficient, as an indicator of income inequality, together with the at-risk-of-poverty-rate in relation to which we have applied a threshold – given by Istat – equal to 9.382 euro in 2008 (Tab. 2).

The results pointed out the highest income inequality in relation to households originating from the rest of the EU zone (43,0) and Romania (37,0). As the Table 2 suggests, the income inequality of EU households residing in Italy is more pronounced than inequality in their country of origin – Romania – and the EU-28 in general. On the other hand, the Albanians present the lowest scores of income inequality (31,0) followed by the Moroccans whose scores align with levels of inequality reported for the rest of the extra-EU households (34,0). Also, both Albanian and Moroccan households residing in Italy are characterized by lower income inequality scores than those registered in their respective countries of origin.

In terms of poverty, the extremely precarious conditions of immigrant households emerge quite clearly: around half of the Moroccan, Romanian and households from the rest of the extra-EU are at risk of poverty in comparison to the 17,4% of households composed only of Italian nationals afflicted by the same condition. Among the nationalities observed, the households from the rest of the EU appear to be the least affected by the condition of poverty risk: in other terms, this immigrant community reported around 60,0% less households at risk of poverty in comparison to another EU nationality – Romanians. On the other hand, among the households originating from the non-EU area, the Albanians stand out with the lowest shares of households at risk of poverty associated with the lowest income inequality scores.

Table 2 – *Income inequality and poverty*

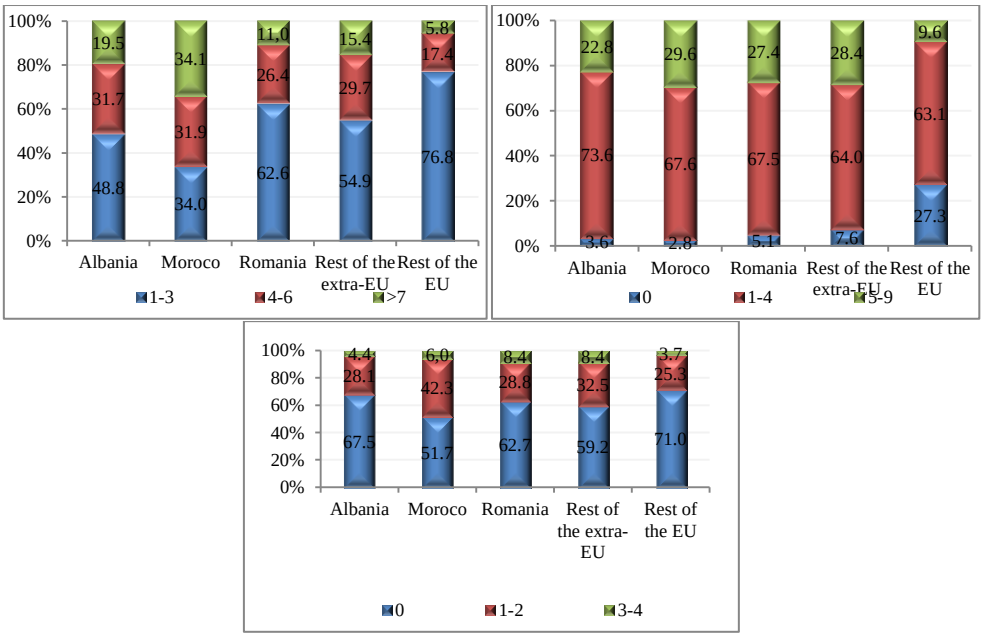
Citizenship	Gini coeff. in Italy	Gini coeff. country of origin	At-risk-of-poverty rate in Italy
Albania	0,31	0,34 (2008 World Bank)	39,2
Romania	0,37	0,27 (2011 World Bank)	50,0
Morocco	0,34	0,41 (2007 World Bank)	50,5
Rest of the Extra-EU	0,34	N/A	46,6
Rest of the EU	0,43	0,31 (2012 Eurostat)	31,3

Source: own elaborations on the dataset "Reddito e condizioni di vita delle famiglie con stranieri"; World Bank (2015) and Eurostat (2015).

Having outlined what are the income conditions of immigrant households residing in Italy in general terms and in reference to certain dimensions, we have proceeded with verifying if these different income levels are sufficient or not to

permit to the immigrant household to accomplish everyday life activities considered as "essential", that is to ensure them life styles that go beyond mere conditions of social exclusion and consequent deprivation.

Figure 3 – *State of deprivation: A) basic needs; B) access to consumer goods; c) adequate housing.*



Source: own elaborations on the dataset "Reddito e condizioni di vita delle famiglie con stranieri".

Therefore, given the set of information at our disposal we have identified 25 functions as indicative of the state of economic deprivation and, in specific, as representative of the following three dimensions: 1) basic needs; 2) access to consumer goods; 3) adequate housing. On that ground, we have then calculated the share of households which have registered, during the year previous to the survey, difficulties and/or hardship in relation to indicators of deprivation chosen for each one of the three identified dimensions[5] (Fig. 3).

[5]In reference to the "Basic needs" 11 indicators were computer: *Inability to sustain unforeseen expenses equal to 750 euro, Inability to afford necessary clothing, Inability to afford basic food, Inability to afford a proper meal at least every two days, Inability to pay rent, Inability to pay electricity, gas, telephone and other bills, Inability to pay medical expenses, Inability to pay transportation expenses, Inability to pay taxes, Inability to pay school subsidies for children, Asked help from someone (not cohabiting) to provide goods.* For the "Access to consumer goods" 9

Globally the Moroccan households find themselves in a situation of most acute hardship in comparison to other studied foreign communities. The condition of deprivation of Albanian households – which corresponds in general to the state of deprivation of other extra-EU household – despite appearing to be relatively less precarious than what has been reported for Moroccan households, it still remains extremely alarming. Finally, the situation of Romanian households seems closer to the one seen for the Albanian households and those originating from the rest of the extra-EU, presenting thus a significant gap in respect to what has emerged for the households originating from the rest of the EU which show a decisively better "status vivendi" among those studied.

4. Relation between main socio-demographic traits and household income

In order to complete the observations previously made, we have tried to provide also some empirical evidence concerning the interrelations between the economic conditions, seen in terms of income, and main socio-demographic traits of households composed in part or entirely of immigrants residing in Italy.

With that aim, we have identified those factors that reveal to be mostly correlated with income conditions of immigrant households by using the multiple linear regression with Forward variable selection method[6]. The dependent variable is given as the logarithm of the equivalised disposable household income while predictors incorporate a set of 9 variables comprising both main socio-demographic traits of the household (number of components, presence of young and elderly people in the household, household type and geographical location) as well as certain traits related to the conditions of the head of the household (employment and marital status, age and years of residency in Italy). The results of our model are

indicators have been determined: *Inability to afford paying for one week annual holiday away from home, Does not have access to internet, Does not have a car, Does not have a dishwasher, Does not have a washing machine, Does not have a personal computer, Does not have a telephone (including a cellphone), Does not have a color TV, does not have a refrigerator* (all to be intended for sole use of household). Whereas the " Adequate housing" dimension was measured with 5 indicators: *Does not have a kitchen, Does not have bath or shower in dwelling, Reports leaking roof, damp walls/floors/foundation or rot in window frames or floor, Inability to keep home adequately warm, Does not have indoor flushing toilet* (all to be intended for sole use of the household).

[6] This model includes in the model one covariate at the time, starting with the one having the highest statistically significant partial correlation with the dependent variable – which in this case is disposable income – and proceeds by including the second independent variable that presents the highest partial correlation coefficient and so on until the coefficient of partial correlation coefficient is not significant anymore at the predetermined level.

enclosed in the Table 3 in form of standardized coefficients (β) of the multiple linear regression performed separately for each considered foreign nationality.

First of all, in case of Albanian and Moroccan households the analysis pointed out as variables of major importance the employment status together with the geographical area, while in the model related to the households from the rest of the extra-EU area the employment status was followed by the variable household type. In the models related to Romanian households and those originating from the rest of the EU zone the variables of highest impact were also represented by the employment status and the household type whereas the geographical area ranked third.

Table 3 – *Multivariate analysis: socio-demographic determinants of the equivalised disposable income*

Predictors	Albanians	Moroccans	Romanians	Rest extra-EU	Rest EU
HOUSEHOLD					
Number of components	.112***	.092***	.249***	.137***	-.022***
Geographical area					
South and Islands (ref. North and Centre)	-.201***	-.227***	-.153***	-.142***	-.179***
Household type					
Mixed (ref. only immigrants)	.136***	.030***	.224***	.234***	.183***
Presence of young under14					
Yes (ref. No)	-.132***	-.265***	-.133***	-.139***	-.042***
Presence of elderly 60+					
Yes (ref. No)	-.043***	-.009***	.025***	-.021***	-.007*
HEAD OF THE HOUSEHOLD					
Employment status					
Unemployed (ref. employed)	-.308***	-.182***	-.311***	-.223***	-.273***
Marital status					
Not married (ref. married)	.044***	-.046***	.059***	-.029***	-.122***
Age	.152***	-.075***	-.096***	-.024***	.044***
Years of residing in Italy	.028***	.033***	.122***	.038***	.057***
R^2	*15,0%*	*12,0%*	*17,0%*	*12,0%*	*14,0%*

Source: own elaborations on the dataset "Reddito e condizioni di vita delle famiglie con stranieri".

Observing the most incisive variables in our models, it can be noted that the unemployment status of the head of the household in confront to the employment status reduces the income most significantly – by 0,31 – in case of Romanians and Albanians and somewhat less significantly – by 0,18 – in case of Moroccans. Moreover, the household residing in the South and Islands would have at its disposal an income that is by 0,23 or 0,20 or 0,15 lower for Moroccan, Albanian

and Romanian households respectively in comparison to those residing in the North-Central area. Regarding the household type, the income of mixed families in respect to those composed only of immigrants would be higher by 0,22 in case of Romanians, by 0,14 in case of Albanians and by 0,30 in case of Moroccans.

In terms of the household structure, it should be pointed out that the presence in the household of children under14, ceteris paribus, would be negatively associated to the level of disposable income: in fact, in comparison to households where children under14 are absent, those that have them show a reduction of income by 0,13 in case of Albanians and Romanians and by 0,27 in Moroccan case. Also the presence of elderly tends to diminish, despite with a marginal effect, the disposable income in confront to households where they are not present. It can be also noted that the age of the head of the household is negatively associated with the household income in all models except those related to Albanian households and those originating from the rest of the EU area. Finally, the years of residency in Italy appear to affect positively the household income, although with a marginal effect in conformity with literature findings.

At the end of this work, it is certainly possible to affirm that the role played by the socio-economic traits in defining the economic conditions of immigrant households in Italy – seen primarily through the income lens – reflects generally the mechanisms that are typical for the universe of immigrant households residing in any country different from the one they hold the citizenship and/or are born in, incorporating at the same time some of the distinctive elements linked to the particular Italian socio-economic context. Having said that, in the next future we engage – assuming that the future statistical surveys on immigrants will allow it – to analyse also the impact that ethno-cultural and linguistic traits might have in determining the economic status of immigrant households in Italy. Introducing this integration to the work presented in this occasion would permit to obtain more precise indications on the areas that should be in the focus of government actions with an aim of improving the economic conditions of immigrant households that today appear to be particularly precarious. Furthermore, the fact that the employment of foreigners in midst of the economic crisis (2008-2012) reported an increase in absolute terms (equal to slightly less than 300.000 units according to the Ministry of Labour) raises another important issue to be investigated: i.e. whether this employment increase has brought an improvement of living conditions of immigrant households or, in substance, has been linked to an increase of underpaid foreign force generating thus an additional aggravation of already existing deprivation state of immigrants.

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SUMMARY

The "Lifestyles" of immigrant households: a statistical analysis on the dataset Eu-Silc

Between the last two census surveys (2001-2011) there has been an increase of households with at least one immigrant member equal to 172,1%. This research paper aims at analysing the living conditions of households with at least one immigrant member, distinguished by the immigrant's nationality, in relation to four fields of observation – demographic traits, housing conditions, income distribution and living conditions (economic hardship, material deprivation, etc.). The primary data source used is the "Condizioni di vita delle famiglie con stranieri" survey carried out for the first time in Italy in 2009 on a sample of 6.000 households with at least one immigrant member residing in Italy which allows comparisons between three types of households: those composed entirely of immigrant members, those represented only by Italians and the mixed ones. Our approach, which was developed by computing indicators on socio-economic wellbeing and/or hardship, has allowed us to identify heterogeneities and homogeneities not only among different types of households but also among those nationalities that are currently the most represented ones in Italy (Romanians, Albanians and Moroccans).

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SATELLITE IMAGERY FOR STUDYING DEVELOPMENT? THE ITALIAN CASE STUDY

Francesco Maria Chelli, Alessio Guandalini

Introduction

The number of active satellites currently orbiting earth is about 1,100. Among them, about 60% are used for communications while the remaining aids in weather forecasting, national defense, science and agriculture. For the high volume, velocity and variety of information gathered by them, satellite data are commonly referred as big data.

Since when, in 1972, the Earth Resources Technology Satellite (later re-named LANDSAT) was launched, several projects for cartography, geology, foresting, hydrology, agriculture have been started. Also statisticians and National Statistical Institutes began to use satellite imagery for mapping territory. For instance, the Italian National Institute of Statistics (ISTAT) used them in occasion of the 4th Agricultural Census (Benedetti and Ciovatella, 2006) and the Australian Bureau of Statistics (ABS) recently evaluated some methodological approaches for estimating crop yield and land cover (Marley *et al.*, 2014). Another application field, still close to mapping territory, firstly attempted in developed and recently in developing country, is the measure of the urban sprawl (Sudhira *et al.*, 2004).

The advantage in using satellite data is strictly related to their characteristics. They overcome some problems of the traditional data collection process in these fields, such as difficulty in gathering data in hard to reach places, homogeneity, rough approximation of measures and also non-response. Moreover, satellite data are inexpensive[1], periodically collectable[2], spatially explicit[3] as well as globally available.

What has been just said is clear and intuitive for land cover problems, but it is more cumbersome to understand for socio-economic parameters. However, in a preliminary work Doll *et al.* (2000) and Doll *et al.* (2006) demonstrate that

[1] Several organizations, owners of satellite data, release them for free. For Instance, they are free downloadable from NASA (National Aerounatics and Space Administration, http://www.nasa.gov), ESA (European Space Agency, http://www.nasa.gov), etc.

[2] The release are carried out periodically.

[3] The satellite data are georeferenced. They are aligned to a known coordinate system, that is each value is unequivocally linked to a point in the map with specific latitude and longitude.

nighttime satellite data can be used to estimate global urban population, gross domestic product (GDP), total carbon dioxide and economic activity level. In fact, these parameters are highly related to brightness of nocturnal lighting (see Elvidge *et al.*, 2012 and references therein).

Elvidge *et al.* (2012) derived an empirical measurement of human development solely from nighttime satellite imagery and population density. The Night Light Development Index ($NLDI$), they proposed, has strong correlation with the Human Development Index (HDI) that is a key statistic for United Nation, World Bank and other International Agencies to properly analyse the development of countries.

$NLDI$ is based on global satellite maps of lighting that can be produced in a consistent, repeatable manner on an annual basis and, therefore, it overcomes some limitations of HDI. The HDI is a well-known index proposed in 90s to go beyond the simple idea of development measured in terms of national income (see e.g. UNDP, 2011). HDI can be affected by differences in data collection among countries. Moreover, for some countries old information only are available and for few others not even that (Wolff *et al.*, 2011). Finally, through HDI, the difference existing within a country can be more complicated to appreciate.

In the present work, we present a slight modification of $NLDI$ for overcoming some drawbacks. Both indexes, $NLDI$ and our proposal, have been computed not only at national level, but also for each geographical area (NUTS-1), region (NUTS-2). In particular for Marche region the indexes have been computed at provincial level (NUTS-3). Some questions about the interpretation of the indexes in a particular context like the Italian one, especially at subnational level, arose.

The paper is organized as follows. In Section 1, the methodology on the basis of $NLDI$ is presented. In Section 2, devices for overtaking some limits in the actual $NLDI$ definition are introduced, while the data used are extensively illustrated in Section 3. Finally, in Section 4, the values of $NLDI$ are shown and an interpretation for the specific Italian case is given. In this section also a brief focus on the Marche region is presented. Section 5 contains concluding remarks.

1. The Night Light Development Index ($NLDI$)

The Night Light Development Index ($NLDI$) has been introduced by Elvidge *et al.* (2012). The authors showed that it is strongly correlated with the Human Development Index (HDI) at country level. $NLDI$'s peculiarity is due to the data used. In fact, $NLDI$ does not use monetary measures of wealth, but nighttime satellite and population density data.

$NLDI$ is based on an idea built up over the years, since when in 1994 the National Geophysical Data Center (NOAA) started to derive and study satellite

maps of nighttime lights from data collected in the US Air Force Defence Meteorological Satellite Program (DMSP). Nocturnal lights are proxy of public goods, services, pavements, built infrastructures and economic activities. It can be assumed that people living in brightly lit areas have easier access to goods and services than people living in "dark" areas. Therefore, they have better living conditions. The more brighter and diffused – with respect to the number of "lit inhabitant" – the light , larger will be the development.

Ultimately, Elvidge *et al.* (2012) assume that the level of equality in the distribution of outdoor lighting among inhabitants, measured through the Gini index (Gini, 1914), can be considered a development index, indeed the $NLDI$. To take a deeper dive into the meaning of the index, let us show how the $NLDI$ is derived.

The inputs of $NLDI$ are two geospatial grids. The one of the nighttime lights contains the radiance level for each cell derived from the satellite imagery[4], while the one of the related number of inhabitants, the population count in each cell available from Census. What is really important is that the two grids must be spatially co-registered, that is, cells must have same size and coordinate.

Figure 1 – *Radiance light level grid (a) and population density grid (b).*

Grid a
Radiance level per cell

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	2	0	0	0
0	0	0	0	2	2	10	1	2	0
0	0	0	0	2	50	150	50	5	0
0	0	0	0	10	150	255	150	10	2
5	0	0	0	2	50	150	50	5	3
0	0	0	0	0	5	10	5	2	0
0	0	0	0	0	0	0	0	0	0

Grid b
Population count per cell

0	0	0	0	0	0	0	0	0	0
0	0	1	1	2	1	2	1	4	1
1	1	3	2	3	4	4	4	3	1
1	1	4	5	5	5	10	5	5	2
1	2	5	5	10	10	10	10	10	3
1	3	5	5	10	30	50	30	10	4
2	2	5	10	10	50	100	50	10	10
15	5	5	5	10	30	50	30	10	3
4	3	5	5	10	10	10	10	10	2
0	2	5	5	5	5	10	5	5	1

In Figure 1, the example in Elvidge *et al.* (2012, p. 25) is reported. It is related to a very typical urban situation, in which, from the city center to suburbs, brightness and population density decrease. Grid a is related to the radiance level. The values in grid a are between 0 ("black" pixels, minimum radiance) and 255 ("white" pixels, maximum radiance). Grid b contains the number of inhabitants in each cell.

[4] In some cases some processes to clean up the map and bring out outdoor lights are needed.

The data in the two grids are aggregate to have a tabular list with both radiance level and population count. Then, the data are sorted increasingly by brightness light level and aggregated in radiance level classes. A tabular form such as in Table 1 is obtained.

Table 1 – *Population count per light level for the example in Figure 1.*

i	Light level DN	Population in DN	Cum % of light	Cum % of population
1	0	205	0.0	25.0
2	1	10	0.1	26.2
3	2	90	1.5	37.2
4	5	55	3.7	43.9
5	10	40	7.2	48.8
6	50	120	24.6	63.4
7	150	200	77.6	87.8
8	255	100	100.0	100.0
Total	1,137	820		

Table 1 is a frequency distribution and the Gini index (Gini, 1914),

$$R = 1 - \frac{2\sum_{i=1}^{n-1} Q_i}{n-1}, \qquad 0 \le R \le 1 \tag{1}$$

is used to measure the equality in distribution of the light. $R = NLDI$, where $Q_i = \sum_{j=1}^{i} x_j \,/\, \sum_{j=1}^{n} x_j$ is the proportion of lights in the hands of the proportion P_i of inhabitants, P_i=$\sum_{j=1}^{i} x_j \,/n$. The closer is $NLDI$ to 0, more developed the area can be considered. In the example $NLDI$=0.672 that, following the interpretation given by Elvidge *et al.* (2006), it denotes a middle and lower development in the area.

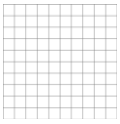
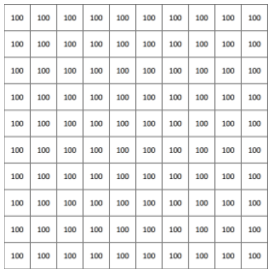
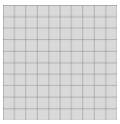
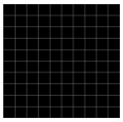
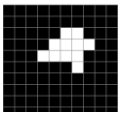
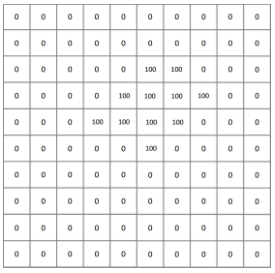
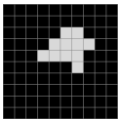
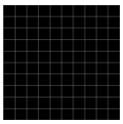
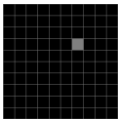
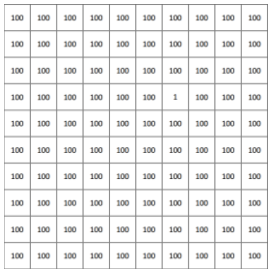
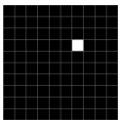
2. An improvement of NLDI

The index, as defined in the previous section, assumes its lower value when the lights are evenly distributed among inhabitants. Instead, it is equal to its maximum, when one person has lights and the rest lives "in the dark".

Table 2 gives a partial idea of the behavior of $NLDI$ in extreme cases. It is noticeable that $NLDI$, as proposed in Elvidge *et al.* (2012), assumes the same value (0 or 1) in very different situations, independently of light brightness.

Therefore, to overcome this drawback, a penalization that takes into account the average of light brightness, is introduced.

Table 2 – *Radiance level grid (a) and population density grid (b), when* ***NLDI****=0 and* ***NLDI****=1. Several scenarios.*

	Grid a Radiance light level per cell		**Grid b** Population count per cell
		NLDI = 0	
		Case 1	
1a		$\mu(x_i)$ = 255	
1b		$\mu(x_i)$ = 127.5	
1c		$\mu(x_i)$ = 0	
		Case 2	
2a		$\mu(x_i)$ =255	
2b		$\mu(x_i)$ = 127.5	
2c		$\mu(x_i)$ = 0	
		NLDI = 1	
		Case 3	
3a		$\mu(x_i)$ = 0.00005	
3b		$\mu(x_i) \cong$ 0.00258	

Note: $\mu(x_i)$ *is the weighted mean (with respect to the population count of the cell) of radiance level registered in the area.*

Among the several possible solutions for the correction of $NLDI$, one of the simpler has been chosen. $NLDI^*$ is defined as follow:

$$NLDI^* = \left(\frac{\mu(x_i)}{255}\right) NLDI + \left(1 - \frac{\mu(x_i)}{255}\right) \qquad 0 \leq NLDI^* \leq 1 \qquad (2)$$

where $\mu(x_i)$ is the weighted mean (with respect to the population count in the cell) of radiance level registered in the area. The index in (2) discounts $NLDI$ in (1) by the ratio between $\mu(x_i)$ and his maximum, 255 – all the population units live in an area with 255 of radiance level. Therefore, the weaker the light is, less important the inequality in the lights distribution is. Furthermore, a term that takes into account the brightness level in the area is added. In these way, it is possible to discriminate the scenarios in case 1. In fact, $NLDI^*$ is equal to 0 for scenario 1a, 1 for 1c and 0.5 for 1b. The same happens for case 2, in which scenarios 2a ($NLDI^*$=0) is related to a better situation than 2b ($NLDI^*$>0). Scenario 2c has the same $NLDI^*$ of 1c. In case 3a and 3b, $NLDI^*$=1.

As $NLDI$, $NLDI^*$ is defined between 0 and 1. In general, in case of maximum dispersion of lights ($NLDI$=1) and when $\mu(x_i)$=0 – the area is completely "in the dark" – $NLDI^*$ =1. Moreover, same level of inequality (same $NLDI$) corresponds to different level of development depending on the level of light brightness in the area measured by $\mu(x_i)$.

3. Data

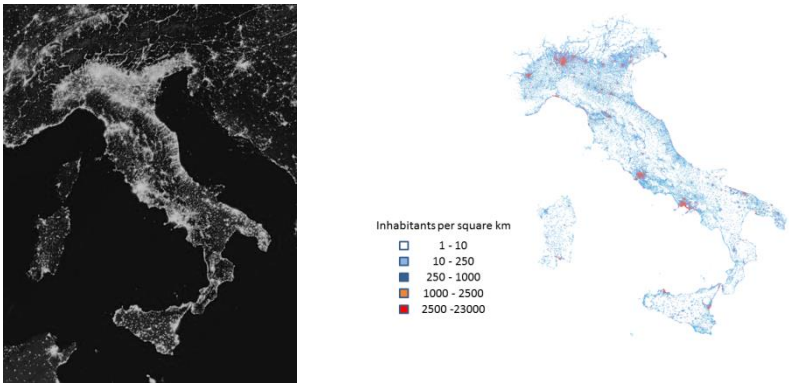
To derive $NLDI$ and $NLDI^*$, data on nighttime light and on population density are needed. NASA makes the nighttime satellite imagery available for free from its website (http://earthobservatory.nasa.gov/Features/NightLights/page3.php). The imagery (see Figure 2, a) have been caught through the Suomi NPP satellite between April and October 2012. The satellite is equipped with a spectroradiometer called VIIRS (Visible Infrared Imaging Radiometer Suite). VIIRS detects photons of light in 22 different wavelength bands and filters them to distinguish even isolated highways lamp, fishing boat, faint and nocturnal atmospheric light. In fact, the use of VIIRS allowed to improve ten to fifteen times the resolution with respect old systems. For each pixel, corresponding to a square of 742 meters (0.46 miles), the outdoor light have been isolated and the radiance light level have been derived.

The data on population density are provided by EUROSTAT. Tanks to GEOSATA 1A project the results of the 2011 year European censuses have been plotted on km² grids. One of these grids gathers the data on population count, in

which each cell contains the numbers of inhabitants per km². The grid is downloadable for free from EUROSTAT website (http://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/populationdistribution-demography). In Figure 2(b) a representation of the population density for the Italian territory is given.

Figure 2 – *Nighttime satellite imagery (a) and population by square kilometer (b). Italy, year 2011..*

a **b**



Snippet from NASA Night Lights 2012, Flat Map

Our elaboration on GEOSTAT Population grid (Eurostat - October 2011).

The difference in time between the two datasets is slight and it can be assumed negligible. Therefore, the two grids have been properly overlapping through the open-source software QGIS and a double distribution of radiance level and population count in cells to derive the indexes has been produced.

4. The $NLDI$ in Italy

The $NLDI$ and the proposal modification have been applied to the Italian case. The indexes have been computed for the whole territory, the geographical areas (NUTS-1), the regions (NUTS-2) and few provinces (NUTS-3). The regional values of $NLDI$ and $NLDI^*$ have been compared with the HDI (UNDP, 2011) and the $QUARS$[5] (Sbilanciamoci!, 2011).

Looking at Table 3, $NLDI$ and $NLDI^*$ produce similar rankings for the regions even if their values are quite different. The correlation between the two indexes is

[5] The QUARS is an index that takes into account 41 macro-indicators related to 7 dimensions: environment, economy and work, Rights and citizenship, health, education and culture, equal opportunities, participation. It is computed for all the Italian regions (NUTS-2).

obviously close to 1, because $NLDI^*$ is a linear transformation of $NLDI$. since at nuts-1 level the original interpretation of nldi in Elvidge seems do not hold. The original interpretation of the NLDI state that lower NLDI is, more developed the area is (the same should hold for $NLDI^*$ in light of above). The most developed regions would be Campania, whilst among the less developed would be Bolzano and Trento.

Table 3 – ***NLDI***, ***NLDI****, ***HDI*** *and* ***QUARS*** *for Italian geographical areas (NUTS-1) and regions (NUTS-2), year 2011.*

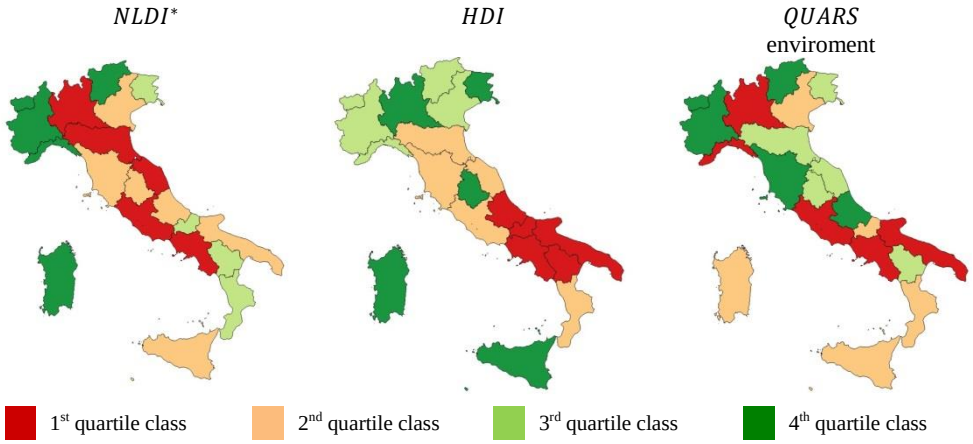
	NLDI		*NLDI**		*HDI*		*QUARS* enviroment	
Piedmont	0.375	*(17)*	0.717	*(17)*	0.876	*(11)*	0.19	*(16)*
Aosta Valley	0.421	*(16)*	0.905	*(20)*	0.885	*(16)*	1.15	*(21)*
Lombardy	0.139	*(7)*	0.331	*(5)*	0.895	*(19)*	-0.30	*(5)*
Bolzano	0.594	*(21)*	0.932	*(21)*	0.883	*(14)*	0.96	*(19)*
Trento	0.531	*(20)*	0.888	*(19)*	0.877	*(12)*	0.96	*(20)*
Veneto	0.185	*(11)*	0.410	*(10)*	0.884	*(15)*	-0.08	*(10)*
Friuli Venezia Giulia	0.285	*(15)*	0.608	*(14)*	0.890	*(17)*	0.00	*(11)*
Liguria	0.409	*(18)*	0.750	*(18)*	0.878	*(13)*	-0.33	*(4)*
Emilia-Romagna	0.130	*(4)*	0.330	*(4)*	0.875	*(10)*	0.00	*(12)*
Toscany	0.151	*(8)*	0.357	*(8)*	0.874	*(9)*	0.26	*(17)*
Umbria	0.155	*(9)*	0.384	*(9)*	0.894	*(18)*	0.01	*(13)*
Marche	0.110	*(3)*	0.296	*(3)*	0.870	*(8)*	0.03	*(14)*
Lazio	0.082	*(2)*	0.228	*(2)*	0.852	*(7)*	-0.34	*(3)*
Abruzzo	0.132	*(6)*	0.344	*(7)*	0.833	*(1)*	0.32	*(18)*
Molise	0.264	*(13)*	0.576	*(13)*	0.840	*(4)*	-0.27	*(6)*
Campania	0.059	*(1)*	0.183	*(1)*	0.849	*(5)*	-0.43	*(2)*
Apulia	0.131	*(5)*	0.339	*(6)*	0.840	*(3)*	-0.69	*(1)*
Basilicata	0.273	*(14)*	0.625	*(15)*	0.836	*(2)*	0.03	*(15)*
Calabria	0.220	*(12)*	0.507	*(12)*	0.850	*(6)*	-0.10	*(9)*
Sicily	0.179	*(10)*	0.410	*(11)*	0.897	*(20)*	-0.27	*(7)*
Sardinia	0.324	*(16)*	0.634	*(16)*	0.897	*(21)*	-0.16	*(8)*
Nord-West	0.257		0.519		0.885		-	
Nord-East	0.226		0.476		0.887		-	
Centre	0.116		0.293		0.881		-	
South	0.137		0.333		0.848		-	
Island	0.218		0.472		0.843		-	
Italy	0.193		0.423		0.874		-	

Note: in brackets the position of regions in the ranking ordered increasingly for each index.

It seems wrong. In fact, the two indexes are weak correlated with the regional HDI (correlation lower than 0.3) and moreover, in this case we have a positive correlation, while in Elvidge *et al.* (2012) is stressed be a negative correlation (-

0.71). $NLDI$ and $NLDI^*$ do not seem measure the development when applied to the Italian situation. The main reason could be that they barely see the development in areas with high electrification rate[6].

Figure 3 – *Italian regions by quartile classes of* $\boldsymbol{NLDI^*}$, $\boldsymbol{HDI}$ *and* $\boldsymbol{QUARS}$ *– environment. Italy, year 2011.*



Higher values of $NLDI^*$ (and of course of $NLDI$) are reached by very hilly regions such as Bolzano, Trento, Aosta Valley, Piedmont, or at least by regions with large uninhabited areas, for instance Sardinia. On the contrary, lower $NLDI^*$ are registered for regions easy to be occupied, that is flat, bordering on the sea and ultimately without environmental barriers. Among these regions there are Campania, Lazio, Emilia-Romagna. In conclusion, $NLDI^*$ is lower for regions in which population is scattered on all the territory, while is higher for regions in which population is gathered around cities that, however, are medium or small in size. In this regard, the $NLDI^*$ seems to be more related to ecological footprint, land consumption or urban sprawl. In fact, the correlation among $NLDI^*$ and the synthetic index on environment of $QUARS$[7] computed a regional level, is quite strong, around 0.7. Furthermore, the two indexes produce very similar rankings. Therefore, it can be assumed that for Italian case study, $NLDI$ and $NLDI^*$ measure the environmental impact of the human activity and more specifically the urban saturation of the territory. Focusing on $NLDI^*$, it possible to state that lower $NLDI^*$ is, higher the environmental impact of the human activity and the urban saturation

[6] The percentage of population with access to electricity. In Italy the electrification rate is equal to 100% (source: World Bank).

[7] The synthetic index on environment of QUARS considers: population density, CO_2 Emissions, Use of fertilizer, protected areas (source: Istat), percentage of recycling (source: Ispra), renewable energy production (Terna Spa), Eco-management (source: Legambiente), organic farming, sustainable mobility (source: Sbilanciamoci!).

is. The differences among the indexes ($NLDI^*$, HDI and $QUARS$ – environment) can be better appreciate looking in Figure 3 the representation of regions in quartile classes.

4.1. Marche region

Marche region is in a high position in the ranking of $NLDI^*$. It means that the environmental impact of the human activity and the urban saturation is high.

Table 3 – *Comparison of Marche region provinces with other Italian provinces. Italy 2011*

Provinces	$NLDI$	$NLDI^*$
Ancona	0.083	0.241
Ascoli	0.077	0.218
Fermo	0.073	0.228
Macerata	0.131	0.349
Pesaro Urbino	0.152	0.380
Marche	0.111	0.296
Cuneo	0.245	0.600
Milan	0.01	0.096
Naples	0.019	0.105
Rome	0.037	0.141
Crotone	0.277	0.625
Italy	0.193	0.423

This could be due to the features of its territory: hills settled a few kilometer from the sea. Therefore, population and cities grew up and scattered along the coast. The $NLDI^*$ for Marche provinces is much closer to the values of big provinces like Rome, Milan and Naples than to the provinces with themselves population sizes.

5. Conclusions and remarks

Elvidge *et al.* (2012) proposed the Night Light Development Index ($NLDI$). This index is computed using nighttime satellite imagery and density population data. They demonstrated that their index, at country level, has a strong negative correlation with the Human Development Index (HDI) and, can help to solve the data collection problems that, for some countries, can affect the HDI.

In this paper is shown that $NLDI$ gives the same value for several scenarios that reasonably refer to different development levels. In sake of simplicity, a linear transformation of $NLDI$ that takes into account the brightness light level has been introduced. The new index, $NLDI^*$, is still defined between 0 and 1.

The two indexes are applied to the Italian case. The values of $NLDI$ and $NLDI^*$ for Italy, geographical areas (NUTS-1), regions (NUTS-2) and some provinces (NUTS-3) have been derived. However, the correlation between $NLDI$ or $NLDI^*$ and HDI at regional level is weak and, moreover, is positive. The two indexes. probably because they have been applied to an area with high electrification rate like Italy, do not seem to measure development. They are more correlated with the synthetic index on environment of $QUARS$ therefore, it can be assumed that, for Italian regions, they measure the environmental impact of the human activity and more specifically the urban saturation of the territory. Focusing on $NLDI^*$, it possible to state that lower $NLDI^*$ is, higher the environmental impact of the human activity and the urban saturation is. However, further studies to better understand the real meaning of the index are needed.

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SUMMARY

Satellite imagery for studying development? The Italian case study

The Human Development Index (HDI) is a well-known measure of development published since the 90s by the United Nation. Among the criticisms of HDI, there are undeniable problems in data collection that can frustrate comparisons between countries. In fact, for some countries old data only are available and few others have not even that. Elvidge *et al.* (2012) proposed the Night Light Development Index ($NLDI$), that can be computed solely from nighttime satellite imagery and population density, therefore without monetary data and with ease in data collection. The $NLDI$, that is a inequality measure of light distribution among inhabitants, has a strong correlation with the HDI at country level.

In this paper we show that $NLDI$ can produce the same values for very different development levels. Therefore, a simple correction ($NLDI^*$) for overcoming this drawback is introduced. The original $NLDI$ and our correction have been computed for the Italian case study, that is, the whole territory, the geographical areas (NUTS-1), regions (NUTS-2) and few provinces (NUTS-3) have been derived. The values obtained have been compared with those of others indexes to better understand the meaning of $NLDI^*$ in a particular context like the Italian one.

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PERCEPTION OF ROAD SAFETY AMONG YOUNG PEOPLE: THE PSSG PROJECT[1]

Pietro Iaquinta, Michelangelo Misuraca

1. A brief international and Italian frame about road safety

Road safety – and in general the culture of security – represents currently a key distinctive feature of socially developed countries.

European Programs 2007-2013 primarily focused on this very important aspect of social living, by including road safety in their agendas as a main target of major impact for the European global society. The COM(2001)-370 directive (*White Paper. European transport policy for 2010: time to decide*) implicitly assumed a duty for the whole Community of reducing the number of road victims. Despite these commitments, the main target of decreasing of 50% the number of fatalities by 2010 has in fact not been achieved, because of the divergences among the different EU members. Nevertheless, the reduction of road traffic mortality in the European countries has been confirmed as one of the priorities also in the programming plans for 2014-2020. The aim is to effectively cut down the average of 40.000 deaths that yearly stain with blood the roads of the whole Europe. The COM(2010)-389 document (*Towards a European road safety area: policy orientations on road safety 2011-2020*) already proposed to halve the number of victims in the EU28 area before 2020, trying to reach the goal of 15.000 victims, with a "zero deaths" target. The UN also decided to support this ambitious program and on May 11th 2011 launched its own 2011-2020 road safety initiative.

At a national level Italy traditionally paid attention to road safety, and promoted a *National Plan for Road Safety* (PNSS) in 1999. The PNSS was a well-defined program that included specific actions and intervention strategies, focusing in particular on the dissemination of road safety culture. With regard to the 2001 EU White Paper's target, Italy reduced the number of deaths by 42,4%. The reduction of overall number of victims – from 7.000 in 2001 to just 3.385 in 2013 – was in line with the EU27 average.

[1] Il presente articolo, pur essendo frutto del lavoro congiunto degli autori, è principalmente attribuibile a Pietro Iaquinta per i paragrafi 1, 2 e 3, e a Michelangelo Misuraca per i paragrafi 4, 5 e 6

Two important aspects, probably not sufficiently highlighted during the years in the several public awareness campaigns about safety, are the devastating effects on accidents' survivors and the impact on public opinion. Injuries are still a problem with massive social consequences. In 1972, the bleakest year for road accident in Italy, an overall number of 268.000 injured was recorded in addition to 11.000 deaths. As recently as 2013 despite a decrease in the number of deaths to 3.385 the number of accidents was 257.421 (ISTAT, 2014). The 2010 EU White Paper discussed the morbidity of road accidents in the EU and proposed to distinguish between *active* and *passive* safety on vehicles.

The data reported above mean around 9 deaths and more than 700 casualties per day, unacceptable figures from both an ethical and economical point of view. This is even more relevant considering that a substantial portion of people involved in accidents has between 20 and 44 years of age. Moreover, road accidents are the first cause of death in Italy in the class of age 15-24. The untimely death of so many young people touches a community not only at a family level but also affects the generational replacement. This is a real concern for countries such as Italy that are already suffering a progressive population aging.

2. Morbidity and mortality of road accidents: a wrong perception of safety?

A key issue about road safety is the erroneous opinions sometime induced by awareness campaigns. These should be in fact promoting the culture of security and preventing fatalities. However, the public perception – especially among youngsters – associates road accidents and the related danger of death only with respect to specific moments. For example, Saturday night is considered particularly dangerous, because of higher probability of assuming huge quantity of alcohol or drugs. In reality, this is not the only circumstance in which accident can occur. Other factors may also affect the abilities of drivers, such as for example the external context (road type and condition) and the actual performances of the vehicle. The Italian National Statistics Institute reported that accidents with casualties have a higher probability to take place on Tuesdays and Wednesdays, when the estimated volumes of traffic are over the average, with a pick of cases between 6 pm and 8 pm of Monday.

As stated above, the high percentage of young people involved into road accidents is due to a "juvenile unconsciousness". A lack of driving experiences can also cause a dramatic decrease in safety conditions. The yearly debate about the structure of the examination required for obtaining a driving license is fuelled by opposite sides. The main controversy is on the need, or not, to adapt the tests (and/or, in any case, the learning step) to driving standards more appropriate to the

current traffic conditions. These are very different from those of the immediate post-war period when the "modern" driving tests have been designed.

Being able to park a car perfectly in line, in reverse, or without bumping the rear wheel on the sidewalk, is certainly an interesting indication of knowledge and mastery of the vehicle. However, the exam does not verify how the driver would manage driving with potential risk factors, such as bad weather or at night time.

Furthermore, road accidents have also astonishing economic and social costs. Social security and insurance providers estimate in more than 1,6 million € per capita the overall cost of a death by accident. This includes factor such as the loss of productivity of the victim and the direct/indirect costs related to the fatality itself. In any case, depending on the used methods, values oscillate between 2% and 4% of the GDP, almost close on the levels usually considered on average for an extraordinary government budget.

The analysis of these data, also available from the Italian *National Institute for Insurance against Accidents at Work* (INAIL), provides a clear picture of the pressing need to study the dynamics of the events and, above all, the perception that the new generations have about the issue of road safety and prevention.

3. The PSSG project

Official statistics, both at an international (Eurostat, Euro NCAP) and national (Istat) level, as well as survey conducted by independent organisations, confirm that the majority of road accidents are essentially caused by a lack of knowledge about vehicle's behaviour. Moreover, there is often a non-compliance with the most basic traffic rules. The leading cause of accident in Italy in 2013 has been distracted driving, together with unsure and improper practices.

The *Perception of Road Safety among Young People* project (PSSG) was launched considering that a deeper knowledge about drivers' behaviours and their driving style can contribute in increasing the culture of road safety. Formerly agreed by INAIL and the *Community of Mediterranean Universities* (CUM), a non-governmental organisation recognised by UNESCO, the project has been designed considering that young people will be the main users of the road system on average for the next 60 years. Therefore the perceptions of youngsters about safety are fundamental to change traffic rules in the future. The project was also supported by the Traffic section of the Italian Police, the University of Calabria and the Provincial Government of Cosenza.

The project aimed at assessing the adequacy of the current driving course and the related examination procedures. The PSSG consists of four steps:

1) a CAWI survey is conducted, aiming at collecting data about the different driving behaviours and attitudes of 18-35 years old individuals;
2) among the respondents which have completed the questionnaire a sample of 200 units is selected, and a new questionnaire is administered in order to deeply measure the perception about road safety.
3) this sample participate in a practical training course of safe driving; the course is delivered by professional instructors selected by the Traffic section of the Italian Police and the Sport Committee of the Italian Automobile Club;
4) the sample is followed up, at least 3-4 months after the safe driving training, and the perception about safety is measured again with a questionnaire.

This paper discusses the first step of the study. The questionnaire administered in the starting step considers socio-demographic characteristics, behaviours and opinions about road safety. It consists of 29 closed-ended questions with multiple choices. Data are collected online with the support of a Computer Assisted Web Interviewing system. Technically the questionnaire is drawn with *Survey Monkey*, a well known survey platform that allows also a real-time supervision of the collection process.

At the present more than 1.000 questionnaire have been collected, and the subsequent steps are still in progress. Only data acquired before May 2015 are considered hereby. The interpretation of the results will be however useful for understanding road safety, having an exploratory standpoint on the phenomenon.

4. An integrated strategy for analysing and classifying questionnaire data

The analysis of complex systems of data – with both a huge number of observations and a considerable number of features – often implies substantial critical states. We are interested in how strongly and in which way the different variables are interrelated. This aim can require hundreds if not thousands cross-tabulations, and makes really challenging the study of a multifaceted phenomenon.

Sample surveys, where typically data are collected with questionnaires, are a very typical case. In this context, it becomes necessary to carry out a statistical treatment of data, aiming at extracting the maximum amount of information and highlighting the key aspects of the observed phenomena. The statistical techniques for analysing contingency tables do not lend themselves to the required level of detail, because they often leave unused most of the inherent (and significant) information. At the same time, it is necessary to consider a strategy that achieves a general assessment of the questionnaire without *a priori* choices, in an exploratory fashion, offering new working hypothesis and viewpoints.

A suitable approach that fulfil these latter research needs is the well-known *Multiple Correspondence Analysis* (MCA), originally developed by Benzécri (1973) and Lebart et al. (1984) in the frame of the so called French School of Data Analysis. This method – far from being merely a generalisation of *Correspondence Analysis* – is able to perform an appropriate reduction of dimensionality onto a $n \times p$ table, where n is the number of observations (e.g., the respondents) and p a set of categorical variables (e.g., the questions). The original variables are then replaced by linear combinations of themselves known as *latent variables* or *factors*. The functional connections between the quantities are transformed into geometric relations, providing in this way a planar representation that allows an overall view and an immediate visualisation, of both features and units.

The factors and the factorial maps can be read in terms of percentage of explained inertia, a measure of variability that expresses the amount of original information represented in the reduced space obtained by MCA.

The parameters of MCA are estimated by pooling the data across units, under the implicit assumption that all the observations come from a single, homogenous group. However, it seems more realistic to assume that units come from heterogeneous groups, so that they are different with respect to their attitudes and behaviours, and the other characteristics of interest. The presence of groups depends clearly on the association structure over the data, but often MCA visualisations are not really intuitive and easy to read. It is not uncommon that the low-dimensional data are often difficult to interpret so that the resultant segments become difficult to characterise.

To cope with these issues, the French School proposed a two-step sequential approach sometime called *tandem analysis* (Arabie et al., 1996): after performing a factorial method for reducing the original variables, a clustering method onto the new variables is carried out. This strategy has the advantage of working on variables that are orthogonal and ordered with respect to the borrowed information.

Nevertheless, the choice of the factorial method is an important and critical phase because it may affect the final results, but taking into account this caveat an improvement of the overall quality of clustering will be achieved.

A satisfying way for obtaining non-overlapping clusters, is to consider a hierarchical CA, in which different levels of aggregation are investigated at the same time (Gordon, 1999). In practical applications, the agglomerative methods are the most used as they allow to construct a hierarchy of partitions with a significantly reduced computational cost. A partition with a higher aggregation index means that the distance between the two closest clusters is large, so they are well separated. Cutting the tree at a level corresponding to a significant "jump" in the index level leads to a good partition.

5. Data structure and main results

The online questionnaire used in the first step of the PSSG project was published on the website <http://www.liberastatistica.it> between the end of March and June 2015, and advertised both on the official website of University of Calabria and on the main social networks, aiming at reaching mainly young people.

The collected data have been pre-treated. By recoding the original variables, 21 new ones have been considered (Table 1). Even if the language used in the survey was Italian here in the follow the labels have been translated in English.

Table 1 – *Active variables.*

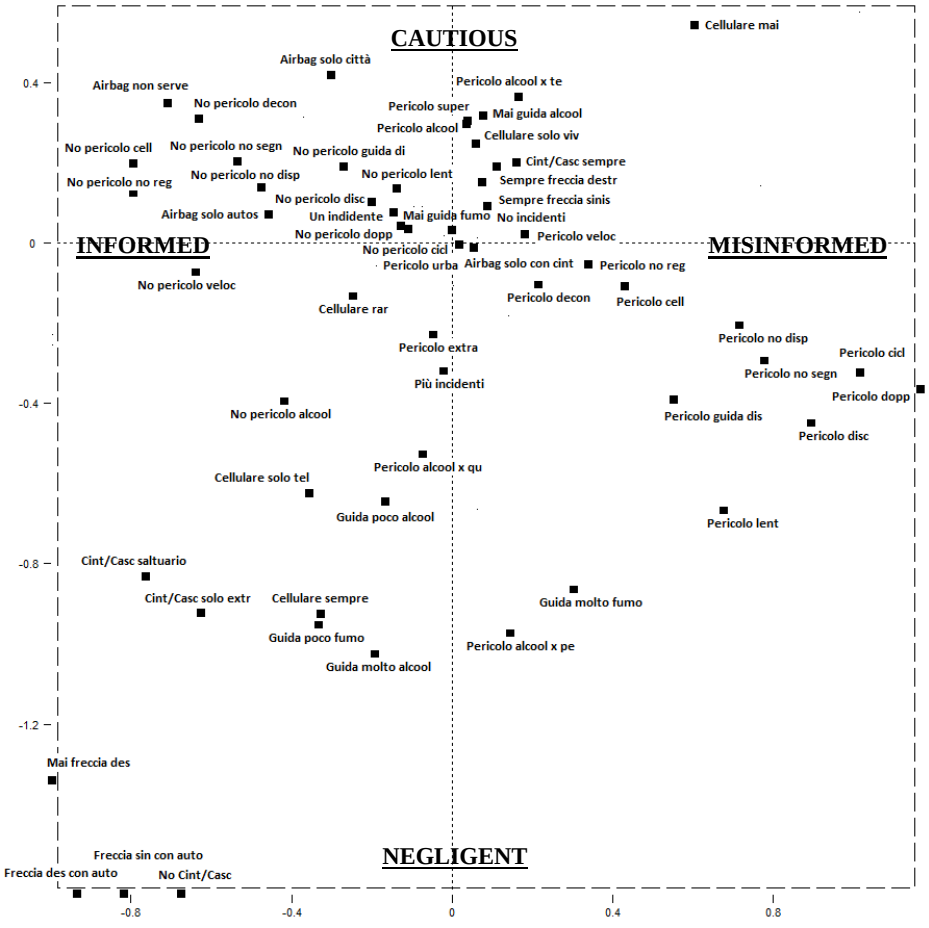
ID	Variable	No. of features
D_08	Use of seatbelt/helmet	4
D_09	Usefulness of Airbag	4
D_10	Use of signal on left turn	3
D_11	Use of signal on right turn	3
D_12	Use of mobile phone	5
D_13a	Driving after drinking	3
D_13b	Driving after smoking marijuana	3
D_14	Involvement in accidents	3
D_15	Danger of roads	3
D_16a	Danger in exceeding speed limit	2
D_16b	Danger of slow driving	2
D_16c	Danger in not being focused on driving	2
D_16d	Danger of double/triple parking	2
D_16e	Danger of using mobile and drive	2
D_16f	Danger of discussing with passengers	2
D_16g	Danger in not using vehicle lighting system	2
D_16h	Danger in not using vehicle security devices	2
D_16i	Danger in not respecting traffic rules	2
D_16m	Danger of a sly drive style	2
D_16n	Danger of cyclists	2
D_17	Danger in assuming alcohol before driving	5

The total number of questionnaires collected at the end of April was 606 in all, but only 465 complete questionnaire has been selected for the analysis. Socio-demographic variables have been used as supplementary ones. In this sample, around one in three respondents are male (37,85%), and there is a majority of people in the class of age 24-29 (41,51%). Moreover, more than a half travels on average up to 1.000 Km per month (58,50%), and four in five (82,37%) has only a driving license for driving cars.

5.1. Factorial Analysis

In order to analyse and graphically represent the latent association structure, the table cross-tabulating the 465 respondents and the 21 variables were considered. The first factorial plane (Figure 1) explains about the 67% of the total inertia. On this map is it possible to see on the first axis – from left to right – an opposition between the misinformed respondents and the informed ones (e.g., with respect to the traffic rules and the safest driving practices). On the second axis, it is possible to see instead – from the bottom to the top side – an opposition between respondents with a negligent and a cautious driving approach.

Figure 1 – *MCA: most significant active features on the first factorial plane.*

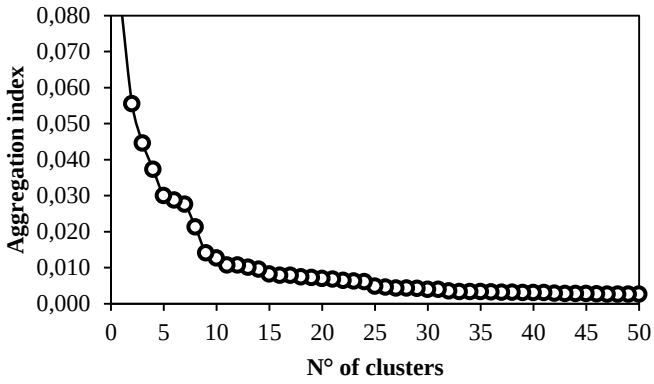


It would be possible to read the map in terms of quadrants, but in the frame of tandem analysis, it is more appropriate to perform clustering on the MCA factors.

5.2. Cluster Analysis

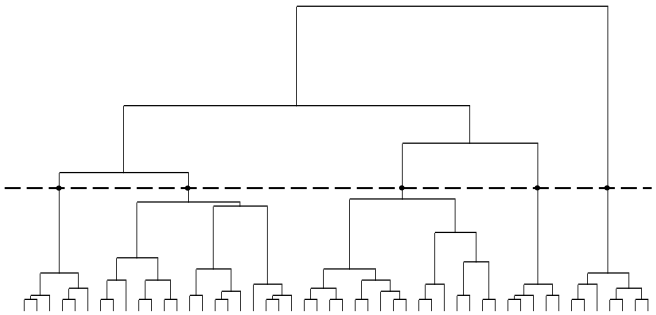
The clustering procedures performed is a hierarchical cluster analysis based on the Ward criterion for aggregating the units at the different steps. At each step of the criterion leads to aggregate together those groups for which there is a lower increase of deviance within the groups or, alternatively, the greatest decrease of deviance between the groups. The algorithm used in the clustering procedure is the nearest-neighbours chain (Benzécri, 1982).

Figure 2 – *Scree-plot with the number of clusters and the aggregation level.*



In this case, a partition with 5 clusters seems to be the optimal solution, as confirmed by the scree-plot (Figure 2). This solution is confirmed looking at the dendrogram (Figure 3)

Figure 3 – *Dendrogram representation with the partition in 5 clusters.*



The five clusters of the chosen partition can be described by considering for each one the most relevant features. To decide if a given feature *j* is a relevant characteristic of a cluster *k*, it is necessary to verify if it is significantly more present in *k* than in the whole sample. To deal with this problem a statistical significance test can be performed: the null hypothesis assumes an equal proportion of *j* in *k* and in the sample (against an unusually high proportion among the individuals in *k* with respect to the sample). By considering a hypergeometric random variable *N*, number of feature *j* observed in *k*, it is possible to calculate:

$$p_k(j) = \mathrm{P}\{N \geq n_{jk} \mid H_0\} \tag{1}$$

The higher is the quantity n_{jk} the lower is the hypergeometric probability, so that the null hypothesis is more doubtfully true. It can be read in an easier way if we consider the value, known as *test-value*, assumed by a Gaussian variable for the same probability $p_k(j)$ of a hypergeometric distribution:

$$test-value = \frac{n_{jk} - n_k \dfrac{n_j}{n}}{\sqrt{n_k \dfrac{n-n_k}{n-1}\dfrac{n_j}{n}\left(1-\dfrac{n_j}{n}\right)}} \tag{2}$$

The higher is the value the more the feature is characteristic. It has empirically shown that |test-value| > 2 suggest relevant features. For a proper reading of the following tables, it is necessary to remember that the different features have to be considered ever in terms of logical disjunctions.

Table 2 – *CLUSTER 1/5: Irresponsible Drivers (rel.: 25,6%).*

Variable	Feature	% of feature in the cluster	% of feature in the sample	Test-value
Danger in using mobile phone and driving	No dangerous	78,15	35,27	11,17
Danger in not using vehicle lighting system	No dangerous	95,80	59,35	10,26
Danger in not using vehicle security devices	No dangerous	94,12	60,22	9,46
Danger in not respecting traffic rules	No dangerous	61,34	30,11	8,26
Danger in not being focused on driving	No dangerous	53,78	25,59	7,73

To the first cluster (Table 2), namely *Irresponsible Drivers*, belongs one-fourth of the respondents. They are characterised by a very low perception about danger. The majority of people in this cluster considers not dangerous the use of mobile

devices (78,15%), as well as they consider safe not following the basic traffic rules (96% thinks is not danger not using lighting system). The age does not characterise particularly this group, because the three class of age are quite equally represented.

Table 3 – *CLUSTER 2/5: Haphazard Drivers (rel.: 15,1%).*

Variable	Feature	% of feature in the cluster	% of feature in the sample	Test-value
Use of mobile phone	Ever	31,43	6,67	7,23
Use of mobile phone	Only for calls	42,86	12,26	7,16
Use of seatbelt/helmet	Only suburban roads	30,00	6,24	7,12
Driving after drinking	After few alcohol	58,57	29,03	5,51
Danger in exceeding the set speed limit	No dangerous	40,00	22,37	3,51

In the second cluster (Table 3), namely *Haphazard Drivers*, falls the 15,1% of the sample. The respondents belonging to this cluster have a subjective perception of safety (30% uses seatbelt only on suburban roads; 58,57% judges possible to drive after drinking small quantities of alcohol). It is interesting to note that around two in three in this group travel on average for more than 500 KM per months.

Table 4 – *CLUSTER 3/5: Cautious Drivers (rel.: 40,4%).*

Variable	Feature	% of feature in the cluster	% of feature in the sample	Test-value
Danger in using mobile phone and driving	Dangerous	89,36	64,73	9,51
Danger in exceeding speed limit	Dangerous	95,21	77,63	7,96
Use of seatbelt/helmet	Ever	96,81	81,72	7,44
Danger in not using vehicle security devices	Dangerous	54,79	39,78	5,35
Use of signal on right turn	Ever	99,47	92,04	5,33

Table 5 – *CLUSTER 4/5: Frightened Drivers (rel.: 12,9%).*

Variable	Feature	% of feature in the cluster	% of feature in the sample	Test-value
Danger in double/triple parking	Dangerous	48,33	7,53	9,96
Danger in not using vehicle lighting system	Dangerous	95,00	40,65	9,46
Danger in arguing with the other passengers	Dangerous	66,67	18,28	8,98
Danger in not using vehicle security devices	Dangerous	81,67	39,78	6,99
Danger for the presence of cyclists	Dangerous	36,67	9,68	6,19

The third cluster observed (Table 4), namely *Cautious Drivers*, consists of 40,4% respondents. These individuals believe that is unsafe to use mobile phones (around 65% of the overall units). At the same time, nearly all of them consider dangerous the speediness (around 95% of people belonging to the cluster), or declare to use ever safety equipment like seatbelt (around 95% of people belonging to this group).

To the fourth cluster (Table 5), namely *Frightened Drivers*, belongs the 12,9% of respondents. These drivers have a high perception and sensitivity to danger. The majority (95%) considers risky not using devices like lights or turn signals, more than a half thinks is dangerous to argue with the other passengers, and one in three consider dangerous also the presence of cyclists on the same roads of cars. A quite high percentage also thinks that double (or triple) parking is dangerous.

Table 6 – *CLUSTER 5/5: Sly Drivers (rel.: 6%).*

Variable	Feature	% of feature in the cluster	% of feature in the sample	Test-value
Use of signal on left turn	Signal on left turn with other vehicles	82,14	4,95	12,18
Use of signal on right turn	Signal on right turn with other vehicles	89,29	7,31	11,47
Use of seatbelt/helmet	Sometime	39,29	11,83	3,71
Danger in assuming alcohol before driving	Dangerous only for some individuals	57,14	31,40	2,72
Danger in not using vehicle lighting system	No danger	82,14	59,35	2,42

The last cluster (Table 6), namely *Sly Drivers*, includes a restricted number of individuals (8%). In the group 4 in 5 admit to use turn signals only if there are other vehicles nearby. More than a half believes that danger in driving after drinking depends only on the quantity assumed. Less than 3% of the women in the sample belongs to this cluster, where among men percentage is slightly over 10%.

6. Remarks and future directions

The clusters obtained from the MCA factors seems to balance between the percentages of responsible and not responsible drivers. Nevertheless, it would be necessary to validate results with a wider sample of young drivers. On the other hand, the well-known problems related to sample representativeness in Web surveys should be considered by re-weighting the collected data, because of the biases related to the self-selection of individuals participating into the survey and

their peculiar characteristics. Overall, the analysis presented in this paper can be seen as a pilot step for the following phases of the PSSG project.

From a statistical point of view the tandem approach is very useful even if it could not be as a black box for solving some difficulties in reading and interpret factorial analysis. The choose of MCA and Cluster Analysis is very common and already used in several fields, but some alternatives can be considered in order to have more robust results, e.g. by using constrained analysis or integrating the two steps of tandem analysis in one simultaneous analysis (e.g., Hwang et al., 2005).

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SUMMARY

Perception of road safety among young people: the PSSG project

The PSSG Project aims at investigating the perception of youth about road safety. From the data obtained by the questionnaire administered at the first stage of the project, we try to profile young drivers on the base of their opinions, in the frame of Multivariate Statistics, with particular reference to Multiple Correspondence Analysis and Cluster Analysis.

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LA DINAMICA DEL DEBITO PUBBLICO IN ITALIA: UN'ANALISI EMPIRICA (1958-2013)

Cosimo Magazzino, Valerio Intraligi

1. Introduzione

L'esperienza della politica di bilancio nell'Italia del secondo dopoguerra è stata caratterizzata dall'applicazione impropria e perversa delle politiche economiche tradizionali ispirate alla finanza funzionale keynesiana, una circostanza le cui responsabilità ricadono su una classe politica che, anche ai fini del mantenimento del consenso, ha lasciato che si formassero ampi disavanzi di bilancio strutturali (quindi pro-ciclici) soprattutto a partire dai turbolenti anni Settanta. Malgrado in quel decennio gli alti tassi di inflazione (sostenuti dalla prassi che obbligava la Banca d'Italia a finanziare direttamente i disavanzi del bilancio pubblico) abbiano reso i tassi di interesse reali negativi (costituendo così un importante fattore di contenimento del rapporto debito/PIL), con l'ingresso nello SME (1979) e il cosiddetto "divorzio" tra la Banca d'Italia e il Tesoro (1981), i rendimenti reali sui titoli del debito accumulato sono diventati positivi e, superando i tassi di crescita reale del PIL, hanno provocato una vera e propria impennata del rapporto debito/PIL (che già alla fine degli anni Ottanta aveva superato il 100%).

Dopo aver toccato il picco massimo della seconda metà del XX secolo nel 1994 (122%), l'aumento della pressione fiscale e la crescita favorita dalle svalutazioni competitive hanno consentito alla classe politica di perseguire l'obiettivo di far partecipare l'Italia alla nascita dell'Unione Monetaria Europea in qualità di membro fondatore. Dunque, la politica economica del quadriennio 1992-1996, successivamente accompagnata dalla sensibile discesa dei tassi di interesse (a sua volta sostenuta dalla credibilità mutuata dagli altri partner europei), ha fatto sì che il rapporto debito/PIL invertisse la sua dinamica crescente per la prima volta dopo oltre venti anni. Tuttavia, come osservato da Romagnoli (2012), l'inadeguatezza della politica economica italiana dei primi anni Duemila e la decisione di perseverare nel vecchio modo di gestire la politica di bilancio, nonostante la perdita del controllo della moneta, si sono rivelate esiziali per il lento processo di rientro iniziato dieci anni prima. In questo modo, con la ripresa della crescita del rapporto debito/PIL, si è lasciato che il paese restasse particolarmente esposto – in presenza di alta mobilità dei capitali – alle turbolenze dei mercati finanziari internazionali e

al rischio di instabilità finanziaria. Alla luce delle peculiarità dell'esperienza italiana, l'analisi empirica svolta in questo lavoro si propone di studiare, utilizzando serie storiche annuali per il periodo 1958-2013, le relazioni esistenti in Italia tra il rapporto debito/PIL e le sue determinanti macroeconomiche, quali il saldo primario di bilancio (in rapporto al PIL), il tasso di crescita del PIL reale, il tasso di inflazione e il tasso di interesse nominale medio sui titoli del Tesoro.

Il saggio è organizzato come segue. Dopo questa breve introduzione, nella sezione 2 viene presentata la rassegna della letteratura. Nella successiva sezione si discutono i dati impiegati nell'analisi empirica, mentre la sezione 4 ne presenta i risultati. Infine, la sezione 5 contiene le conclusioni e le indicazioni di *policy*.

2. Rassegna della letteratura

In questo lavoro, al fine di stimare le relazioni reciproche tra il rapporto debito/PIL e le sue determinanti macroeconomiche in Italia negli anni 1958-2013, viene effettuata un'analisi di serie temporali, analogamente a quanto fatto per il caso degli Stati Uniti da Cherif e Hasanov (2012).

Nella letteratura recente, numerose analisi hanno investigato la relazione tra la dinamica del rapporto debito/PIL e le sue determinanti. Ad esempio, per il caso degli Stati Uniti si segnalano i contributi di Hall e Sargent (2010) e di Aizenman e Marion (2009), i quali riscontrano evidenze che confermano l'importante ruolo giocato dal tasso di inflazione nella riduzione del rapporto debito/PIL.

Al fine di studiare la risposta delle politiche di bilancio alla dinamica del debito pubblico, molti lavori empirici seguono l'approccio proposto da Bohn (1998), incorporando in una singola regressione il *tax smoothing model* di Barro (1979). Piergallini e Postigliola (2012) hanno utilizzato la serie storica del rapporto debito/PIL dell'Italia post-unitaria (1861-2011). I risultati mostrano come la dinamica di lungo periodo del rapporto debito/PIL sia stata influenzata da una risposta degli avanzi primari alla dinamica crescente del debito pubblico. Inoltre, Piergallini e Postigliola (2013) trovano che la risposta degli avanzi primari alla dinamica del debito si innesca significativamente quando il rapporto supera il 110% del PIL. Ancora con riferimento alla serie storica del rapporto debito/PIL nell'Italia unitaria, altri studi approfondiscono maggiormente la questione della sostenibilità del debito pubblico. Bartoletto *et al.* (2012), seguendo l'approccio delle serie storiche di Trehan e Walsh (1988, 1991)[1], testando per diversi periodi la

[1] Gli autori dimostrano che se il debito è stazionario nelle differenze, il rispetto del vincolo di bilancio intertemporale è confermato se la serie del disavanzo al lordo degli interessi è stazionario.

sostenibilità del debito pubblico per il periodo 1861-2010. I risultati di questo lavoro suggeriscono che la dinamica del debito è sostanzialmente sostenibile, trovando che il deficit al lordo degli interessi è stazionario mentre il debito presenta un trend stocastico. Allo stesso proposito, Bartoletto *et al.* (2013), oltre l'approccio proposto da Bohn (1998), impiegano quello proposto da Doi *et al.* (2011), che permette loro di tenere conto degli aggiustamenti del saldo primario con un modello AR(1). I risultati del lavoro sembrano confermare la sostenibilità del debito per l'intero periodo 1861-2011, con evidenze di un contesto macroeconomico favorevole per una politica fiscale sostenibile nella fase del boom economico (1946-1970).

Altri lavori hanno invece usato il rapporto debito/PIL come variabile esplicativa al fine di stimarne l'influenza su altre variabili macroeconomiche, come ad esempio il tasso di crescita. Oltre al noto lavoro di Reinhart e Rogoff (2010), in questo filone si sono avuti numerosi contribuiti. Ad esempio, l'analisi di Kumar e Woo (2010), prendendo in considerazione 38 paesi tra economie avanzate ed emergenti per il periodo 1970-2010, suggerisce una relazione inversa tra il debito iniziale e la crescita successiva, riscontrando che in media a un aumento del rapporto debito/PIL del 10% corrisponde una diminuzione del tasso di crescita reale pro capite di 0,2 punti percentuali annui, sebbene con impatto meno pronunciato nelle economie avanzate. Similmente, Kourtellos *et al.* (2012), considerando 68 paesi per il periodo 1980-2009 e, avvalendosi di un indicatore relativo alla qualità delle istituzioni democratiche, trovano evidenze di effetti negativi del debito pubblico sul tasso di crescita nei paesi con istituzioni a bassa qualità e di una neutralità del debito in quelli con istituzioni ad alta qualità. Teles e Mussolini (2011), con dati relativi a 74 paesi (esclusa l'Italia) per il periodo 1972-2004, trovano invece evidenze significative di un impatto negativo del debito pubblico sulla capacità della spesa produttiva di aumentare il tasso di crescita.

Recentemente, Carlucci (2012) ha mostrato che una crescita sostenuta sembra essere la condizione necessaria (ma non sufficiente) perché non si producano tensioni sociali nel Paese. Ipotizzando una crescita media del PIL pari a circa l'1,5% annuo in una situazione d'inflazione dell'1,5-2,0% e in presenza di un costo medio del servizio del debito anche del solo 3,5%, l'avanzo primario medio occorrente si situerebbe al di sopra del 3% annuo. Baum e Checherita (2013) hanno stimato l'effetto del debito sulla crescita in 12 paesi dell'Eurozona, trovando nella soglia del 95% il livello del rapporto debito/PIL oltre il quale il debito ha un impatto negativo sulla crescita[2]. Infine, utilizzando i dati di 24 economie avanzate (tra cui l'Italia) per diversi periodi di tempo, non trovano alcuna evidenza di una soglia oltre la quale il debito è da considerarsi negativo per la crescita. Tuttavia, gli

[2] Per una rassegna più ampia di questa letteratura si rimanda a Panizza e Presbitero (2013).

autori hanno trovato che i paesi con un rapporto debito/PIL dalla traiettoria discendente hanno sperimentato tassi di crescita sostanzialmente uguali a quelli con un contenuto rapporto debito/PIL, mentre emerge una relazione positiva tra il rapporto debito/PIL e la volatilità del tasso di crescita[3].

3. Dati

Nell'analisi empirica sono stati utilizzati dati annuali per il rapporto saldo primario di bilancio pubblico/PIL, il PIL reale, il tasso di inflazione, il tasso di interesse nominale sui titoli del Tesoro e il rapporto debito pubblico/PIL in Italia per il periodo 1958-2013. I dati sul tasso di crescita, il tasso di interesse e il tasso di inflazione sono stati raccolti dal database FRED (della Federal Reserve Bank of St. Louis). Per i due indicatori di finanza pubblica (il rapporto saldo primario/PIL e il rapporto debito pubblico/PIL), le difficoltà incontrate nel reperire serie storiche omogenee ci hanno portato a utilizzare rispettivamente, per il periodo 1958-1980, i dati di Artoni e Biancini (2004) e di Forte (2009), mentre dal 1980 al 2013 entrambe le serie sono state raccolte dal database AMECO della Commissione Europea. Si fa notare, inoltre, che la scelta del periodo iniziale è stata vincolata dalla disponibilità dei dati sul tasso di interesse sui titoli di Stato.

In primo luogo, si riportano alcune statistiche descrittive nella tabella 1. Ad eccezione dei saldi primari, tutte le variabili hanno una media positiva, mentre il tasso di inflazione è l'unica variabile a presentare un grado di asimmetria >1.

Tabella 1 – *Analisi esplorativa dei dati*

Var.	Media	Mediana	Dev. Std.	Asimmetria	Curtosi	Pseudo Dev. Std.	RIQ	Media Trim 10
SP	-0,5870	-0,6500	3,2378	0,1292	2,3889	3,238	5,161	-0,6733
g	13,8474	13,9800	0,4727	-0,8289	2,4783	0,527	0,711	13,9100
p	6,2013	4,5730	5,5013	1,2749	3,4035	3,415	4,607	5,2830
i	8,8814	7,1717	4,3508	0,7806	2,6649	5,418	7,308	8,3990
B	77,1908	82,1866	34,6549	- 0,1031	1,4916	46,340	62,510	77,5500

Diversamente da quanto osservabile per le altre variabili e in accordo con l'analisi del range inter-quartilico, il sensibile scostamento della media dalla media trim nel caso dell'inflazione suggerisce la presenza di outliers (tutti sulla parte destra della distribuzione).

[3] La volatilità del tasso di crescita è stata misurata sottraendo la media della volatilità della crescita per l'intero periodo coperto da ogni campione alla volatilità della crescita nei sotto-periodi in cui si registrano alti livelli del rapporto debito/PIL.

Le variabili utilizzate presentano diversi gradi di correlazione, alcuni dei quali risultano statisticamente significativi. Coefficienti di correlazione particolarmente bassi si registrano tra il tasso di inflazione e il tasso di crescita reale (-0,07) e tra il tasso di crescita reale e il tasso di interesse (0,03). Diversamente, emerge una non sorprendente, forte e significativa correlazione positiva tra gli interessi e l'inflazione (0,79) e una forte e altrettanto significativa correlazione positiva tra il rapporto debito/PIL e il PIL reale (0,92)[4]. Inoltre, significativa, ma negativa, è la correlazione tra il tasso di inflazione e il saldo primario (-0,66)[5], come anche quella tra interessi e saldo primario (-0,54). Se la correlazione negativa tra il debito e l'inflazione (-0,14) è facilmente intuibile e spiegabile (un aumento del tasso di inflazione riduce il rapporto debito/PIL), la correlazione significativa e positiva tra il saldo primario e rapporto debito/PIL potrebbe suggerire, come rilevato in Piergallini e Postigliola (2012), un rapporto di causalità che va dal debito al saldo primario, ovvero una risposta della politica di bilancio alla crescita del debito/PIL.

4. Risultati empirici

In accordo ai diversi metodi in serie storica impiegati per verificare stazionarietà e processi con radice unitaria, le serie da noi utilizzate soddisfano i requisiti di stazionarietà solo se espresse in differenze prime (rifiutiamo l'ipotesi nulla di non stazionarietà a un livello di significatività dell'1%), risultando tutte integrate di ordine uno, o *I(1)* (tabella 2).

Similmente ai diversi test eseguiti, il test di Zivot e Andrews (tabella 3) non ci permette di rifiutare l'ipotesi di non stazionarietà delle serie nei livelli. Inoltre, il test individua diverse rotture strutturali (ad esempio, per il tasso di crescita reale è evidente la recessione degli anni Settanta, oppure l'inversione della dinamica del rapporto debito/PIL negli anni Novanta) anche se l'ipotesi nulla viene rifiutata quando si testano le differenze prime di ogni serie.

Dal momento che il focus del saggio è sui nessi di causalità esistenti tra le variabili, si passa quindi a stimare un modello VAR. La scelta dell'ordine dei ritardi da inserire nel modello è stata effettuata in accordo al Final Prediction Error (FPE), al criterio informativo di Akaike (AIC), al criterio informativo bayesiano di Schwarz (SBIC), e al criterio informativo di Hannan e Quinn (HQIC). Confronti tra modelli alternativi fanno selezionare un modello con il secondo ritardo.

[4] In effetti, nel periodo di riferimento la crescita del prodotto interno lordo si è accompagnata alla crescita del rapporto debito/PIL.

[5] Questa correlazione negativa potrebbe essere spiegata dalla compresenza di saldi primari di bilancio negativi e alti tassi di inflazione durante gli anni Settanta e dal graduale miglioramento dei saldi primari in un contesto di riduzione dell'inflazione tra gli anni Ottanta e gli anni Novanta.

Tabella 2 – *Risultati dei test di radice unitaria e stazionarietà*

Variabile	Test di radice unitaria e stazionarietà				
	Componente deterministica	**ADF**	**DF-GLS**	**PP**	**KPSS**
SP	costante	-1,569 (-2,926)	-1,300 (-2,235)	-1,477 (-2,926)	1,33*** (0,463)
g	costante, trend	-0,761 (-3,495)	-0,092 (-3,150)	-0,758 (-3,495)	0,649*** (0,146)
p	costante	-1,526 (-2,926)	-1,715 (-2,226)	-1,618 (-2,926)	0,735*** (0,463)
i	costante	-1,692 (-2,927)	-1,601 (-2,235)	-1,203 (-2,926)	0,728** (0,463)
B	costante, trend	-1,458 (-3,498)	-1,551 (-3,155)	-1,050 (-3,495)	0,545*** (0,146)
ΔSP	costante	-8,487*** (-2,927)	-6,482*** (-2,240)	-8.509*** (-2,938)	0,101 (0,463)
Δg	costante, trend	-7,276*** (-3,496)	-5,988*** (-3,160)	-7,276*** (-3,496)	0,050 (0,146)
Δp	costante	-6,702*** (-2,927)	-2,361** (-2,219)	-6,697*** (-2,927)	0,212 (0,463)
Δi	costante	-4,703*** (-2,927)	-3,382*** (-2,219)	-4,731*** (-2,927)	0,231 (0,463)
ΔB	costante	-4,883*** (-2,927)	-3,917*** (-2,240)	-4,857*** (-2,927)	0,201 (0,463)

*Note: ADF, DF-GLS, PP, e KPSS si riferiscono rispettivamente al test Dickey-Fuller aumentato, al test GLS di Elliot, Rothenberg, e Stock, il test di Phillips-Perron, e il test di Kwiatkowski, Phillips, Schmidt, e Shin. Quando richiesto, la lunghezza del ritardo è scelta in accordo allo SBIC. Valori critici al 5% tra parentesi. ***p<0.01, **p<0.05, *p<0.10.*

Tabella 3 – *Risultati dei test di radice unitaria con break strutturale (intercetta o trend)*

Variabile	Intercetta			Trend		
	T_b	k	t_{min}	T_b	k	t_{min}
SP	1990	0	-3,755 (-4,80)	1972	0	-2,783 (-4,42)
g	1967	0	-1,870 (-4,80)	2002	0	-1,939 (-4,42)
p	1973	0	-3,584 (-4,80)	1975	0	-3,270 (-4,42)
i	1974	1	-4,025 (-4,80)	1982	1	-4,389* (-4,42)
B	2000	1	-3,610 (-4,80)	1993	1	-4,463** (-4,42)
ΔSP	1998	0	-9,371*** (-4,80)	1993	0	-8,645*** (-4,42)
Δg	1975	0	-7,558*** (-4,80)	2005	0	-7,319*** (-4,42)
Δp	1981	0	-7,706***(-4,80)	1986	0	-6,981*** (-4,42)
Δi	1983	1	-6,355*** (-4,80)	1998	1	-5,175***(-4,42)
ΔB	1995	0	-5,767*** (-4,80)	1967	0	-6,237***(-4,42)

*Note: T_b è il break endogenamente scelto. t_{min} è la statistica-t minima. k riporta la lunghezza del ritardo. I valori critici al 5% sono riportati in parentesi. ***p<0.01, **p<0.05, *p<0.10.*

Dai test diagnostici sul modello VAR(2) stimato emerge l'assenza di problemi di autocorrelazione dei residui per entrambi i ritardi, mentre la significatività delle variabili endogene per ogni ritardo è confermata dalla statistica di Wald sull'esclusione dei ritardi. Inoltre, gli ulteriori test condotti suggeriscono l'assenza

di problemi generali nel VAR(2) stimato essendo soddisfatta, in particolare, la condizione di stabilità.

Nell'ambito della stima del VAR(2), il tasso di crescita, oltre viene spiegato positivamente da entrambi i propri ritardi, dai due ritardi del saldo primario (con coefficiente negativo per entrambi), dal primo ritardo dell'inflazione (coefficiente negativo)[6] e dal secondo ritardo del debito pubblico (coefficiente positivo).

Tabella 4 – *Risultati del test di causalità di Granger multivariato*

Variabile dipendente	**Variabile indipendente**				
	SP	**g**	**p**	**i**	**B**
SP	–	1,4003 (0,497)	7,0266** (0,030)	3,6665 (0,160)	3,5965 (0,166)
g	14,1840*** (0,001)	–	8,3335** (0,016)	2,5363 (0,281)	5,7733* (0,056)
p	6,3072** (0,043)	4,2678 (0,118)	–	1,6525 (0,438)	1,4945 (0,474)
i	5,6989* (0,058)	1,5018 (0,472)	10,7480*** (0,0059)	–	0,1742 (0,917)
B	8,1766** (0,017)	0,1521 (0,927)	1,6653 (0,435)	7,0794** (0,029)	–

*Note: test di Wald (P-Valori tra parentesi), ***p<0.01, **p<0.05, *p<0.10.*

I risultati del test di causalità di Granger (tabella 4) indicano diverse direzioni di causalità (nel senso di Granger) tra le variabili inserite nel VAR(2) stimato. Le relazioni di causalità maggiormente significative vanno dal saldo primario al tasso di crescita e dal tasso di inflazione al tasso di interesse. Possiamo quindi affermare che la crescita, almeno nel breve periodo, sembra essere guidata maggiormente dal saldo primario (suggerendo una maggiore sensibilità della crescita agli aggiustamenti del bilancio pubblico rispetto alle altre variabili). Tuttavia, oltre a una significativa influenza esercitata dall'inflazione (5%), vi è una debole evidenza (significativa al 10%) che la crescita sia Granger-causata anche dal rapporto debito/PIL, la variabile più endogena nel modello VAR stimato. Inoltre, il test suggerisce che se il livello dell'inflazione è il miglior predittore del tasso di interesse sui titoli del Tesoro (Cassel, 1922), lo stesso non può dirsi per il rapporto di Granger-causalità inversa. Particolarmente significativa è anche la causalità che

[6] Tale risultato potrebbe risultare difficilmente spiegabile in un sistema tributario di tipo progressivo che, come avvenuto in Italia durante gli anni Settanta, in presenza di elevati tassi di inflazione genera fenomeni di drenaggio fiscale.

va dal saldo primario al debito pubblico (5%), risultato che conferma l'influenza dell'andamento del bilancio pubblico sulla dinamica del rapporto debito/PIL (avutasi in particolar modo durante gli anni settanta e, con segno contrario, durante gli anni novanta). Viene inoltre confermato il ruolo degli interessi sulla dinamica del debito (5% di significatività), fenomeno che sappiamo aver avuto un grande impatto durante gli anni ottanta e, in misura minore e di segno contrario, tra la fine degli anni novanta e i primi anni duemila. Infine, se l'evidenza di risposte del mercato dei titoli alle politiche di bilancio risulta debole (forse anche causa delle misure di repressione fiscale vigenti negli anni settanta), il saldo primario predice il tasso di inflazione con un livello di significatività del 5%, cogliendo i potenziali effetti inflattivi (deflattivi) dei disavanzi (avanzi) di bilancio.

Tabella 5 – *Risultati del test di Toda e Yamamoto*

Variabile dipendente	**Variabile indipendente**				
	SP	**g**	**p**	**i**	**B**
SP	–	16,1200*** (0,001)	10,5400** (0,014)	10,3110** (0,016)	18,7450*** (0,000)
g	8,7305** (0,033)	–	7,8978** (0,048)	1,8227 (0,610)	7,0029* (0,072)
p	5,5232 (0,137)	5,8438 (0,119)	–	1,1393 (0,768)	2,3416 (0,505)
i	11,1450** (0,011)	2,4458 (0,485)	11,5230*** (0,009)	–	2,9966 (0,392)
B	10,3570** (0,016)	28,2320*** (0,000)	7,3058* (0,063)	9,7032** (0,021)	–

*Note: test di Wald (P-Valori tra parentesi), ***p<0.01, **p<0.05, *p<0.1.*

I risultati del test di causalità secondo l'approccio di Toda e Yamamoto (tabella 5) confermano solo in parte quelli calcolati dal test di causalità di Granger. Innanzitutto, si registra una causalità significativa che va dall'inflazione verso tutte le variabili, mentre nessuna variabile influenza significativamente il tasso di inflazione. Le direzioni di causalità più significative (1%) sono quelle che vanno dal tasso di crescita ai due indicatori di finanza pubblica, quella che va dal debito pubblico al saldo primario e quella, rilevata anche in precedenza, che va dal tasso di inflazione al tasso di interesse. Nel secondo caso, i risultati del test suggeriscono una certa risposta della politica di bilancio alla dinamica del rapporto debito/Pil, coerentemente con quanto rilevato da Piergallini e Postigliola (2012). Con significatività minore (5%) ma in accordo con la teoria, il saldo primario predice il tasso di crescita, il tasso di interesse e il rapporto debito/PIL, mentre risultano

altrettanto significative le causalità che vanno dagli interessi ai due indicatori di finanza pubblica. Deboli (10%) sono invece i nessi di causalità rilevati tra il debito pubblico e la crescita, e tra l'inflazione e il debito.

Al fine di osservare il contributo di ogni variabile alla devianza degli errori di previsione delle altre variabili, discutiamo la scomposizione della devianza degli errori di previsione per le cinque variabili inserite nel modello. Almeno in questo ordine delle variabili, gli errori di previsione del saldo primario siano dovuti maggiormente agli shock dello stesso saldo primario. Al quindicesimo step, l'ottanta per cento della devianza sia ancora attribuibile agli errori nell'equazione del saldo primario, con un 10% attribuibile all'equazione dell'inflazione.

Nel lungo periodo la devianza degli errori di previsione della crescita è sensibile in misura crescente agli shock dell'inflazione (28% al quindicesimo step) e in misura minore a quelli del saldo primario (dall'8% del primo step al 18% del quindicesimo step). Gli errori di previsione dell'inflazione sono attribuibili in modo crescente sia alla crescita che, in misura maggiore, al saldo primario, i quali congiuntamente determinano il poco meno del 30% della devianza degli errori di previsione al quindicesimo step. Nel caso degli interessi è evidente il crescente contributo dell'inflazione nel lungo periodo (cresciuto fino al 25% al quindicesimo step) mentre il saldo primario esercita un contributo crescente sensibilmente minore (sotto al 9% al quindicesimo step). Infine, la devianza degli errori di previsione del debito pubblico siano progressivamente sensibili al tasso di interesse (che crescono fino al 10%), mentre sono maggiormente sensibili, ma in modo via via decrescente, al saldo primario di bilancio.

5. Conclusioni e indicazioni di politica

In questo saggio, facendo uso delle tecniche di analisi delle serie temporali, si è cercato di studiare le relazioni reciproche esistenti tra il rapporto debito pubblico/PIL e le sue determinanti macroeconomiche (rapporto saldo primario/PIL, tasso di crescita reale, tasso di inflazione e tasso di interesse medio sui titoli di Stato) in Italia nel periodo che va dal 1958 al 2013. I risultati principali mettono in luce una significativa influenza dei saldi primari di bilancio sul tasso di crescita reale dell'economia, come una altrettanto significativa influenza dei tassi di inflazione sui rendimenti nominali dei titoli del debito pubblico. Inoltre, i test di casualità hanno evidenziato un'influenza molto significativa del rapporto debito/PIL sul rapporto saldo primario/PIL (rilevando una certa sensibilità della politica di bilancio italiana alla crescita del rapporto debito/PIL, analogamente a quanto emerso dall'analisi di Piergallini e Postigliola, 2012), ma anche del tasso di crescita reale su entrambi gli indicatori di finanza pubblica qui considerati.

Diversamente da quanto riscontrato in numerosi studi, in questa sede non è emersa alcuna evidenza di un'influenza negativa del rapporto debito/PIL sul tasso di crescita reale del prodotto interno lordo. L'insieme di questi risultati non solo invita a una certa cautela nell'adozione di drastiche misure di consolidamento del bilancio, ma conferma l'importanza della crescita economica sia in termini di miglioramento del bilancio dello Stato che di riduzione del rapporto debito/PIL. Tali evidenze, stante gli impegni assunti dall'Italia nel quadro definito dalla nuova *governance* economica europea, sembrano suggerire una strategia di rientro che faccia maggiormente affidamento su misure tese a stimolare e favorire la crescita economica piuttosto che su misure di mero ed esclusivo riordino dei conti pubblici.

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SUMMARY

The dynamics of public debt in Italy: an empirical analysis (1958-2013)

In this paper time series analyses are shown in order to study the relationships between government debt/GDP and its macroeconomic determinants (such as primary balance/GDP, real GDP, the inflation rate and the average interest rate on Treasury bills) in the period 1958-2013 in Italy. Consistent with the theory, the results reveal a significant causal relationship moving from the primary balance to the real growth rate, as well as a clear influence of the inflation on the interest rate. In contrast, the influence of public debt on growth rate emerges only marginally. Further tests have, however, highlighted a significant influence of public debt on the extent of primary balance, but also a non-negligible effect of growth rate on both public finance's indicators. These empirical evidences can be considered particularly useful for the policies that Italy face in the new European governance, suggesting to proceed with caution in the budgetary consolidation program and giving greater emphasis on growth policies.

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APPLYING SUPPLY CHAIN SUSTAINABILITY TO INTELLECTUAL PROPERTY PROTECTION. A CASE STUDY[1]

Vincenzo Marinello and Mariano Cavataio

Introduction

A growing number of companies have put increased attention on issues related to Responsible Supply Chain (RSC), intangible assets and Intellectual Property Rights (IPR). After all, intellectual property (IP) protection has become fundamental over the last few decades, given that copyrights, patents, trademarks, registered designs and trade secrets are increasingly important in today's knowledge-based economy.

However, the importance of IP is often overlooked by the supply chain. While firms have been adopted a more holistic approach to addressing social, environmental and ethical issues, IP protection is rarely considered as part of this approach at the operational level. From a normative point of view, companies should find value from basing IP protection on more proactive supply chain practices and on embracing a holistic approach to target social, environmental and ethical responsibility throughout the supply chain (Gillai, Rammohan and Lee 2014).

As a consequence, it is not surprising that IPR violations are widespread and their economic and social impact causes many problems for multinational firms in terms of losses and illicit activities that also harm company brands and reputations. In effect, a recent report of the Commission on the Theft of American Intellectual Property estimates the scale of American IP theft reaches over USD 300 billion per year (IP Commission 2013). Within these trends, counterfeiting and piracy represent a relevant threat for IP protection. By making reference to 2008 data, the International Chamber of Commerce estimates the global economic and social impacts of counterfeit and pirated products at about USD 775 billion every year. But they could be reached USD 1.7 trillion by 2015, putting 2.5 million legitimate jobs at risk each year (ICC 2011). As a result, protecting IPR throughout the supply chain has become more and more crucial for companies and their business.

[1] Vincenzo Marinello wrote the Introduction, the Paragraph 3 and the Conclusions; Mariano Cavataio wrote the Paragraph 1 and the Paragraph 2. In any case, this essay is the result of a common commitment by the two Authors.

This essay is based on a case study. We chose to analyze the case of Siemens AG, because it has an advanced vision of RSC into IPR contrary to other European multinational corporations (MNCs). Indeed, its best practices may be a model for other companies.

1. Literature review

There are many academic frameworks on RSC and IPR. However, few academic models are aimed at applying RSC issues to IPR, with the exception of a recent essay by several scholars of "Stanford Initiative for the Study of Supply Chain Responsibility" regarding the Graduate School of Stanford Business (Gillai, Rammohan and Lee 2014).

After all, management and business ethics literature has paid little attention to RSC into IP protection, because most MNCs still overlook this recent matter. Companies generally focus on their IPR using a legal approach. They do not usually manage IP protection in terms of RSC. Thus, IP protection is often managed by the legal department, with most companies failing to take effective strategic and operational action to lower their litigation risk and improve the likelihood of keeping their IP secure. In addition, a serious hurdle limiting the effectiveness of IP protection strategies is the tendency of firms to operate in silos, with different organizational units determining their own IP strategy. On the whole, there is still a lack of corporate confidence in the new approach applying RSC into IPR. Accordingly, this research question is not easy to investigate, because there is a lack of available cases, data and results. Barchi Gillai, Sonali V. Rammohan and Hau L. Lee's (2014) essay is the first academic work that deals with this research problem, although it is still a preliminary study that mainly makes reference to normative analyses.

For all these reasons, Stanford's RSC framework is our key reference to analyze IPR into RSC. Notwithstanding, examining other supplementary approaches may be important in order to enrich and strengthen theoretical arguments concerning this framework. By making reference to Nike case study, Gillai, Rammohan and Lee (2014) propose, therefore, a holistic, collaborative and proactive approach that moves away from sole reliance on audits and compliance in order to focus more on preventive measures and practices aimed at supply chain sustainability. They show how a RSC framework can be applied to IP protection, given that there are similarities between RSC and IP issues. For all these reasons, Stanford scholars suggest RSC practices to decrease and discourage IPR violations throughout the supply chain.

A relevant point to underline is that this academic framework differs from traditional approaches. It is based on incentives by companies to encourage *collaboration* with their suppliers (such as stakeholders) in order to identify root-causes and take corrective actions whenever a violation is identified. In other words, it proposes *proactive* practices aimed at preventing problems before they arise. On the whole, Gillai, Rammohan and Lee's model is *holistic*, because it targets social, environmental and ethical issues (including IPR) in the supply chain. This "sense and response" RSC framework is based on three main categories: management systems, visibility methods and response practices.

According to the three American scholars, the role of *management system* is relevant to implement responsible practices across the supply chain and to develop IP protection into the culture of the company and its business operations. In the main, an advanced management system may help to prevent IP infringements inside the company and its supply chain. As a consequence, the establishment of a centralized corporate IP department may be helpful to coordinate and even out the company's IP policies, procedures and strategies throughout the supply chain. In short, the only work by the legal department of a given company may not be enough to take effective, strategic and operational actions in order to safeguard IPR. Nevertheless, this system does not work without sufficient recourses. Hence, evaluation and assessment of risks by management system are fundamental to improve resource allocation and to increase the overall effectiveness of IP strategies. Budgeting depends on risk prioritization. For all these reasons, Gillai, Rammohan and Lee (2014) recommend for companies to classify their at-risk IP into categories (e.g. high value, medium value and low value) in order to develop different policies for the protection of IP in each category. Predictably, high values IP should require the most solid and costly protection mechanisms.

In addition to the importance of management systems to safeguard IPR in the supply chain, *visibility methods* are another "cornerstone" of Gillai, Rammohan and Lee's framework. As we argued above, budgeting depends on IP risk prioritization. This is also possible thanks to visibility methods which include reactive visibility methods into IP violations after they arise and proactive risk assessments before IP infringements arise on all relevant supply chain members. On the other hand, the Stanford academics recommend for companies to establish due-diligence mechanisms and audits in order to monitor IP protection as part of holistic supplier assessments. Indeed, through reactive and proactive visibility methods, companies can gain an understanding of potential IP risks, determining strategies to improve and strengthen their supply chain.

Finally, *response practices* are the third important aspect of this approach. They include reactive and preventive actions on IP infringements in the supply chain. Especially, Gillai, Rammohan Lee (2014) focus on proactive practices to prevent

IP violations and to decrease risk factors. For this reason, in the context of this RSC framework, collaboration between companies and their supply chain members has a crucial role in improving IP security along the supply chain and in finding appropriate business partners through due diligence mechanisms.

On balance, Stanford's framework is one of the few existing models that applies RSC issues to IPR, using a holistic, proactive and collaborative approach.

A supplementary approach to Stanford's model may be Marina Bouzon, Francielly Hedler Staudt, Carlos M.T. Rodriguez and João C.E. Ferreira's (2012) framework for Sustainable Supply Chain (SSC) management concerning sustainable development. According to this qualitative model based on the triple bottom line for sustainability (society, environment and economy), the SSC offers the means to overcome the pressures imposed by the population, government and other stakeholders on companies in order to pursue sustainability. Furthermore, the integration among all the links is important for the sharing of responsibilities, information and risks. In short, the collaboration between companies and their supply chain is a complementary aspect to Stanford's RSC framework (Gillai, Rammohan and Lee 2014). The two approaches offer a holistic management approach in SSC area. However, contrary to Stanford's model, Bouzon, Hedler Staudt, Rodriguez and Ferreira's approach also draws more attention to importance of governance programs and transparency into relationships between companies and supply chain members.

According to Bin Jiang's (2009) research, collaboration, transparency, pro-active commitment and open communication between companies and their supply chain members are fundamental factors to prevent RSC violations, including IPR protection. For all these reasons, Jiang's model may be supplementary to Stanford's framework.

Clodia Vurro, Angeloantonio Russo and Francesco Perrini (2009) present several studies of mediating processes in which sustainability is integrated and managed along the supply chain. They ascertain that the best performances take place in integrated approaches that are based on long-term cooperation, knowledge sharing and skills development with members both upstream and downstream the supply chain. With regard to this specific aspect, there is a strong similarity between this research and Stanford's framework. In fact, according to Gillai, Rammohan and Lee (2014), the prospect of long-term relationship with the buying company is one way to motivate a supplier to take action in order to minimize IP infringements. It is important to remember that Abud Nabour, Senevi Kiridena and Peter Gibson (2011) propose an agency theory approach applied to supply chain integration and collaboration. They describe a classification of supply chain integration and collaboration that distinguishes the relationship-oriented "collaboration" from structural configuration-oriented "integration". In the multi-

agent supply network, control, transparency and visibility are the key issues to be managed through mitigating risk, building trust between agents and aligning goals. If those factors are managed, the expected benefit will be an improved overall performance. To summarize, Nabour, Kiridena and Gibson's model may be considered supplementary to Stanford's framework (Gillai, Rammohan and Lee 2014). In effect, it is a holistic approach that may be applied to IP protection, albeit it uses a different perspective.

An interesting study is Mark Pagell and Zhaohui Wu's (2009) research that is based on 10 case studies. These scholars sustain that the ability to be innovative by a given company is linked to sustainability. Therefore, an organizational capability to innovate is then a precursor to successful SSC management. Their analysis suggests that being proactive can only be effective if the business model and the environmental and social elements of sustainability are aligned. In turn, sustainability becomes integrated in the organization when the organization has both a managerial orientation towards sustainability and an innovation capability. In other words, sustainability is an integral part of company business. And it is incorporated in every aspect of the supply chain. Finally, supply base continuity, material traceability and price transparency demonstrate a concern for the long-term well-being and social equity of every member of the supply chain. On balance, Pagell and Wu's argument (alignment between financial goals and sustainable goals) may enrich Gillai, Rammohan and Lee's (2014) framework applied to IP protection.

In conclusion, academic and corporate interest in RSC and IPR has risen considerably in recent years. By reviewing management and business ethics literature, there are many academic frameworks on RSC and IPR. However, few academic models are aimed at applying RSC issues to IPR, with the exception of the recent essay by several Stanford scholars (Gillai, Rammohan and Lee 2014). The aim of this paragraph was aimed at describing other RSC academic studies that may be considered complementary and supplementary to Stanford's RSC framework in order to better analyze the case of Siemens.

2. Sustainability and RSC at Siemens

Siemens AG is a globally operating technology company with core activities in the fields of energy, healthcare, industry and infrastructure.

As regards its vision of sustainability, the German company makes reference to the three areas of sustainable development (environment, business and society) that are the "cornerstone" of all its activities. This vision is consistent with the Bouzon,

Hedler Staudt, Rodriguez and Ferreira's (2012) framework based on the triple bottom line for sustainability.

By reviewing its official documents (starting from Business Conduct Guidelines and Code of Conduct), it should be noted that Siemens defines concrete and business-relevant measures in its Sustainability Program in order to contribute to the Company's success in the long term. Contrary to other European companies (such as ABB and Telefónica), the German MNC is, indeed, more aware of Pagell and Wu's (2009) assumption, namely that the company's success depends on sustainable goals and that sustainability is an important part of company business.

After all, a MNC with a good RSC implements better this alignment between business goals and sustainable goals. In effect, Siemens subscribes to Vurro, Russo and Perrini's (2009) argument, namely that sustainability is integrated and managed along the supply chain.

The German MNC sources goods and services from approximately 90,000 suppliers in more than 150 countries (Siemens 2015). It tends to foster collaboration, dialog and open communication with its suppliers at the corporate level and at the local level. This aspect is in line with Jiang's (2009) research and Nabour, Kiridena and Gibson's (2011) model.

Compared to other European MNCs, a relevant innovation introduced by Siemens is the *Supplier Sustainability Toolkit*. The German company, indeed, offers to its stakeholders this *Toolkit* in order to support the implementation of sustainability in their operations and to improve their level of sustainability. The toolbox is divided into 5 modules as part of a sustainability management cycle: inform & motivate, analyze and plan, implement, monitor and improve. Siemens' toolbox provides information, guidance and external resources that can help its suppliers in developing sustainability strategies, implementing sustainability programs and monitoring performance.

On the other hand, Siemens also offers to its supply chain members a systematic approach to proactive and reactive inspection that is in line with main arguments of Stanford's RSC framework (Gillai, Rammohan and Lee 2014). In turn, in order to proactively identify sustainability-related risks in its supply chain, Siemens applies a risk-based approach that is also consistent with Nabour, Kiridena and Gibson's (2011) framework.

Compliance and integrity are, therefore, the basis of Siemens's sustainable and business strategies. In fact, the *Siemens Compliance System* subscribes to Stanford's model (based on management systems, visibility methods and response practices) that proposes proactive practices aimed at preventing problems before they arise. In effect, the *Siemens Compliance System* is divided into three action levels: Prevent, Detect and Respond. For Siemens, promoting integrity means acting in accordance with its values – responsible, excellent and innovative –

wherever it does business. Thanks to the first action level, Siemens *prevents* compliance violations effectively through a comprehensive set of rules for all employees, suppliers and managers. The second action level of its compliance system targets the seamless *detection* of compliance violations. The third action level of Siemens' compliance program entails *responses* that play an important role in preventing violations from happening in the first place. On this action level, the German company reacts to specific compliance violations, applying the lessons from past cases in order to continuously improve its compliance system. Contrary to other European MNCs (such as ABB and Telefónica), the *Siemens Compliance System* represents an advanced innovation introduced by the Germany company.

On balance, Siemens' vision of sustainability and RSC approach are in line with several theoretical arguments and empirical evidence of management and business ethics literature. For all these reasons, Siemens could be a good reference (in terms of RSC) for other companies.

3. Siemens' IP into RSC

In the age of globalization, knowledge and know-how are the trump cards of the Siemens integrated technology company. The protection, utilization and expansion of the company's IP is vital to its success.

Contrary to other European MNCs (such as ABB and Telefónica), Siemens is one of the best examples of a company that has established a centralized Corporate Intellectual Property into Corporate Technology (CT) department in order to perform key tasks, such as ensuring that the company's R&D successes are safeguarded from competitors. Accordingly, Siemens is one of the few European companies committed to implement Stanford scholars' recommendations concerning RSC into IPR, creating a cross-divisional IP protection team that includes top executives and incorporates responsible IP practices internally and across the supply chain. The German engineering and electronics giant has established, therefore, this central Corporate Intellectual Property department that coordinates the company's IP strategy, policies and protection procedures, and customizes the overarching approach to meet the specific needs of each of the company's 15 business divisions (Lee and Passman 2014).

More specifically, this Siemens' department focuses on IP Services, Regional IP Units, IP Support, Company Name & Trademark Law. In other words, it coordinates the company's IP policies, IP protection measures and IP strategies, while still allowing individual divisions to align their IP strategy to their business plans, environmental factors, as well as the institutional framework in the respective region of activity. It is responsible for providing legal and strategic

counseling on IP issues for the company, including overseeing due diligence and negotiation of IP transactional matters into supply chain.

Therefore, CT strategically handles the IP of Siemens. Around 430 experts help the German company register patents and trademarks, establish them, and put them to profitable use. On the whole, Siemens currently holds approximately 60,000 patents granted worldwide, of which more than 21,000 patents and IPR are related to its Environmental Portfolio (Siemens 2014). However, safeguarding trade secrets is crucial, because trade secrets are an important part of IP. Thus, the German MNC intends to prevent and detect unauthorized use of Siemens intangibles assets, using an open and effective communication between company and suppliers in line with Jiang's (2009) research and Nabour, Kiridena and Gibson's (2011) model.

According to Siemens (2009), given the competitive nature of today's global economy, it is imperative that companies protect their intellectual assets and capabilities, safeguarding corporate IP across a global environment of partners and suppliers. In order to protect their IP, Siemens recommends companies to: a) select compatible partners; b) honor everyone's property interests; c) limit information access on a need-to-know basis; d) institute organizational and technical security provisions; e) tightly restrict full access. In other words, for protecting IP, Siemens suggests that companies should select partners and suppliers that complement their business and sustainable strategy. On the contrary, choosing partners that have competing aspirations is counterproductive over the long term, especially when jointly developing a project's IP. For this reason, suppliers can be encouraged to comply with incentives, such as public recognition (introducing supplier awards) or the promise of a long-term relationship with the company in order to strengthen mutual trust into relationships between companies and their supply chain. These aspects are totally consistent with Vurro, Russo and Perrini's (2009) research, Pagell and Wu's (2009) model and Stanford's framework. In effect, the German MNC has introduced *Siemens Supplier Awards* for a high number of categories in order to promote outstanding suppliers for their excellence (also concerning IP protection). Furthermore, for Siemens (2009), companies can foster partner collaboration by letting their partners and suppliers build their own IP. The best way of mutually protecting everyone's IP is to establish legally binding nondisclosure agreements. Besides, companies should provide their partners and suppliers with access to their IP on a need-to know basis. Partners should only have access to their particular piece of the IP puzzle. Moreover, companies should define keystone portions of their IP and guard it within their own organizational and technological borders. This requires companies to understand what IP is strategically crucial, map it out for special protection and keep it safe. Finally,

Siemens (2014) recommends companies to limit the number of people who are entitled to have full access to their IP.

In the main, as an integrated technology corporation, Siemens focuses on markets for innovation and growth. Important assets are the know-how of its employees – more generally referred to as IP – and its investments in R&D. This is founded on the safeguarding of its R&D investment by means of valuable patent portfolios. Active use of patents – by way of licensing and sale – is furthermore of key significance to Siemens.

Finally, the Siemens License Center provides advice on various ways of utilizing IP, identifying and preparing the patent portfolios, negotiates to ensure that the contracts for utilization contain profitable conditions and supervises the signing of such agreements, ensuring that the property right transactions go ahead for the benefit of all stakeholders.

For all these reasons, Siemens may be considered as a paradigmatic case in excellent managing of IPR into RSC. Its vision of IP protection into RSC is very advanced. Nevertheless, several aspects may be improved. For instance, in Siemens (contrary to ABB) there is not a significant interaction between company and universities regarding these issues (i.e., IPR into RSC). In effect, University Switzerland annually hold the Supplier's training courses (that also regard IP protection) on behalf of ABB. In addition, Siemens has not a communication online channel (such as Telefónica's *Social Networks Policy*) for talking to its suppliers about CSR issues, including IPR protection, in order to detect and prevent promptly several problems.

Conclusions: Siemens as a paradigmatic case

Controlling the social, ethical and environmental responsibility of extended supply chains has become one of the most challenging issues in modern management. Recent history is replete with examples of unethical, incompetent, and even criminal behavior from suppliers, with serious implications that ripple through supply chains and potentially affect dozens of firms (Guo, Lee and Swinney 2015). These problems also regard the IP protection throughout the supply chain.

Losing control of proprietary information can, indeed, have devastating effects on company reputation and profits. In some cases, IP theft can also pose health and safety concerns for consumers.

By making reference to the findings of a recent essay of Stanford University (Gillai, Rammohan and Lee 2014), we suggest that companies can use the same thinking they have applied to protect against social and environmental risk in

supply chains to help protect against IP risk in supply chains. From a normative point of view, MNCs should consider how to supplement the use of contracts and legal remedies with a new business-oriented approach. In other words, instead of being punitive and reactive toward IP violations, companies can achieve more by being proactive and creating incentives for good IP management. After all, according to Gillai, Rammohan and Lee (2014), companies can safeguard their IPR throughout the supply chain thanks to three solutions: first, adopting a management systems approach; second, establishing visibility into IP practices and potential problems; lastly, employing preventive practices and respond to violations (Lee and Passman 2014). This is because there is no safe company without safe supply chain. In turn, there is no safe supply chain without IP protection. The objective of this essay was to describe a case of European MNC, such as Siemens AG, that is very consistent with the findings and the solutions proposed by Stanford academics in order to examine its advanced vision of RSC into IP protection. Our key reference was, indeed, Gillai, Rammohan and Lee's (2014) RSC framework, because it is the first academic work that deals with this research problem.

Siemens' vision of sustainability, RSC and IPR throughout the supply chain is, therefore, in line with Stanford's RSC framework and other theoretical integrations. In effect, Siemens has a holistic, proactive and collaborative approach where the company is answerable for its supply chain members' actions. Besides, the German MNC intends to prevent RSC and IPR risks thanks to integration and collaboration with its supply chain. Pursuing only a punitive and reactive approach for IPR infringements in the supply chain may not be enough.

Its Supplier Sustainability Toolkit, risk-based approach, systematic approach to proactive and reactive inspection, and Compliance System (where "Prevent" is a significant action level) may be considered as best practices for other companies. Moreover, establishing a centralized Corporate Intellectual Property is a good solution to safeguard IPR throughout the supply chain. For all these reasons, Siemens may be considered as a paradigmatic case.

We conclude this work, quoting Horst Fischer, Corporate Vice President at Siemens: «Any company, wishing to prosper in the next millennium, will also have to efficiently manage its IP portfolio… For this reason it has become essential that every manager in the enterprise – not just those working in the corporate legal department – appreciates and understands not only what IP is, but how it can be more effectively exploited throughout the supply chain» (WIPO 2012). Therefore, according to Winfried Büttner, Head of Corporate Property and Functions at Siemens, «in this era of globalization and growing international competition, a company's future depends on its IP. That's much more the case today than ever before. And protecting IPR has several impacts on RSC» (Siemens 2011).

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SUMMARY

Applying Supply Chain Sustainability to Intellectual Property Protection. A case study

Intellectual property protection (IPR) has become fundamental over the last few decades. However, the importance of IPR is often overlooked by the supply chain. As regards academic debate, there are many academic frameworks on Responsible Supply Chain (RSC) and IPR. However, few academic models are aimed at applying RSC issues to IPR, with the exception of a recent essay by several scholars of Graduate School of Stanford Business (Gillai, Rammohan and Lee 2014). Examining other supplementary approaches is important in order to enrich and strengthen theoretical arguments concerning Stanford's RSC framework. Our work is based on a case study. We chose to analyze the case of Siemens AG, because it has an advanced vision of RSC and IPR contrary to other European companies. In fact, this German multinational corporation may be considered as a paradigmatic case in excellent managing of IPR into RSC. With regard to its best practices, the Siemens' Supplier Sustainability Toolkit, Siemens' systematic approach to proactive and reactive inspection, and the Siemens Compliance System may be a model for other companies. Moreover, establishing a centralized Corporate Intellectual Property by Siemens is important to safeguard IPR throughout the supply chain.

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