SEWPS

SPRU Electronic Working Paper Series

Paper No. 105

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August 2003

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THE DYNAMICS OF EXPORT SPECIALISATION IN THE REGIONS OF THE ITALIAN MEZZOGIORNO: *PERSISTENCE* AND *CHANGE*

Paolo Guerrieri[*] and Simona Iammarino[**]

1. Introduction

In recent years, along with the deep changes stemming from internationalisation and globalisation processes, the Italian southern area as a whole has undergone significant transformation, accompanied by the emergence of different patterns of both socio-economic development and international integration. For the Italian southern regions, these trends confirm and reinforce the hypothesis of "many Mezzogiorni" previously noted by the specialized literature (see, for example, Bottazzi, 1990; Bodo and Viesti, 1997; Viesti, 2000a).

Traditionally considered as a classic example of European *periphery*, the 'many Mezzogiorni', and in particular their trade specialisation patterns, constitute the object of analysis of the present study. The paper is divided into six sections. The following section summarises the main relevant insights of the recent literature on internationalisation and structural changes occurring in the area during the 1990s. Notwithstanding a huge international integration gap, the Italian Mezzogiorno has shown more recently the first significant signs of change and intra-area differentiation, whose interpretation has led to conflicting views and expectations. Section three provides a brief overview of these internationalisation trends in the Italian Mezzogiorno, summarising the performance of southern regions. Section four describes the methodology and data employed in our analysis of the export specialisation patterns of the Italian southern provinces – i.e. the territorial level here chosen to look at structural changes in the area. The results are presented in section five and interpreted on the basis of a geographical and sectoral taxonomy, that is derived from the statistical methodology.

In general terms, the significant differentiation which has characterised the development paths of the southern regions finds further support in the export specialisation patterns of each province during the period 1985-2000. This period corresponds to a crucial phase of the European Union (EU), which has moved from the completion of the European internal market to the adoption

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The authors are very grateful to Peter Hart and Andrés Rodríguez-Pose for their valuable comments to an earlier draft of this paper. The usual disclaimer applies.

of the single currency. In these years, the Mezzogiorno export specialisation patterns has changed significantly, showing strong regional territorial specificities and differentials. Section six concludes by providing a first assessment of the geographical and structural transformations occurred in the Italian Mezzogiorno during the ongoing international integration.

2. The Italian Mezzogiorno in the 1990s: internationalisation, structural change and differentiation

During the 1990s, the well known economic gap between the Italian Mezzogiorno and the rest of the country has become wider: the Italian southern regions have gone through a worsening of their economic fundamentals, particularly with regard to income growth and unemployment.

Notwithstanding the delay in participating in the growing international integration, the Mezzogiorno economy has recently shown evident signs of change, along with an increasing intra-area differentiation. The competitive performance in the second half of the 1990s has been outstanding, underlying significant changes in the geographical and production structures.

These developments have raised questions concerning both the actual strength of the development pattern of the Italian south over time, and the degree of novelty of the ongoing structural change relative to the past – and particularly to the traditional export specialisation model of the Mezzogiorno area.

Neither the lively debate that has grown up around such questions – even more intense in the light of the forthcoming enlargement of the EU – nor the evidence provided by many empirical studies have so far been able to reach a consensus about answers and conclusions. On the one hand, the revitalisation of the southern regions since the half of the 1990s - particularly manifest in terms of an export growth higher than the national average - has been interpreted as a sign of a new capacity for endogenous growth at the local level, at present still confined to a few competitive poles (reinforcing the existence of the "many Mezzogiorni"). On the other hand, the export dynamism might set off a virtuous circle for the growth of the entire area: exports boost production capacity, weaken the dependence on public support, favour the birth of new firms and tend to facilitate the effects of agglomeration economies – thus extending the presence of the traditional "industrial district" model to the southern part of the country.

A more cautious reading of the increased competitiveness of the Italian southern regions on European and international markets has instead highlighted both the enduring vulnerability of their production and export structures and the extent of intra-area weakness and divergence. Such a

perspective has emphasised: the low degree of internationalisation of the southern production system, relative to both the rest of the country and to other European peripheries; the still strong concentration of Mezzogiorno exports in relatively "closed" sectors, such as agriculture and energy; the historical structural weaknesses of the southern economy, such as low labour productivity, strong external dependence, high unemployment, inadequate financial and banking system; the substantial lack of infrastructures; the scarce attractiveness towards foreign direct investment - even in comparison to other EU vulnerable regions - which hampers the diffusion of new technological knowledge and organisational and managerial models essential for the integration of the area in the global economy.

In spite of the conflicting views on the sustainability and strength of the new development dynamics shown by the Mezzogiorno, the two sets of interpretation share some common insights. They both acknowledge the structural changes that have recently occurred in the area; the fundamental role played by institutional and social contexts in promoting local economic growth; and, especially, the focus on sound relationships between internationalisation processes and endogenous development capacity.

With reference to the latter aspect, the evolution of export specialisation patterns reveals sharp differentiation at both the regional and provincial level. As emphasised by some recent empirical works[1], whilst some southern regions have converged on the national pattern, experiencing a re-orientation of export specialisation models towards higher value added sectors - such as machinery and equipment, motor-vehicles and other means of transport, textiles and clothing -, other provinces (mainly concentrated in Calabria, Sicily and Sardinia) have shown a strengthening of their traditional specialisation in resource-intensive and slow-growing sectors (such as agricultural and food products, wood, petrochemical, etc.). Furthermore, some areas have registered a strong increase of the ratio exports/value added (for example Abruzzo and Campania), whilst others have shown a worrying stagnation of the same index (i.e. Sicily and Sardinia).

The growing differentiation of the South into "many Mezzogiorni" found support also in a previous empirical study based on various socio-economic indicators and on the classification of the southern provinces through economic, cultural and social variables necessary to grasp, at least roughly, the multidimensional nature of the phenomenon investigated (Guerrieri and Iammarino, 2002). The evidence endorses the most recent southern literature, showing that, between the half of the 1980s and the end of the 1990s, the gap between the most advanced and the backward provinces has indeed become wider. Such an increasing heterogeneity of the Mezzogiorno area in the last

[1] Cf. section 3 for references.

years seem to depend upon a composite set of variables, much broader than what traditionally assumed by the convergence/divergence literature. In particular, the sharper differentiation of the Italian South at the end of the 1990s casts further doubts on the capacity of the conventional indicator of per capita GDP to reflect intra-area evolution paths and to grasp adequately regional imbalances.

The need to use different measures and indicators in order to improve the understanding of the changes occurred in the Italian Mezzogiorno during the 1990s lies among the main motivations of the present work. The export specialisation by southern province, with the greater sectoral breakdown as possible, is here chosen as a proxy of structural change. At the same time, whilst the extent of specialisation is viewed at the intra-provincial level, differentiation refers to the inter-provincial comparison of specialisation models: a related point is the relationship between the dynamics of trade specialisation and that of the competitiveness of the provincial systems considered.

3. Export performance in the Italian Mezzogiorno: recent trends

As mentioned above, one of the most frequent facts pointed out in the current debate on the extent of internationalisation of the Italian Mezzogiorno is the change in export specialisation between the 1980s and the end of the 1990s (see, for example, Conti, 1995; Conti and Menghinello, 1996; D'Antonio and Scarlato, 1997; Bruno and Mazzeo, 1998; Viesti, 1997, 2000). Whilst in 1985 half of total exports of the area was represented by sectors with a strong presence of state-controlled large firms – such as petrochemical, transport, metallurgy and chemicals -, in the second half of the 1990s the incidence of traditional consumer goods and *made in Italy* sectors, dominated by local entrepreneurs, has nearly doubled – as in the case of textiles and clothing, leather products, furniture – along with that of mechanicals, electronics and means of transport (Bruno, 1996). Such average changes actually hid an increasing diversity of regional and provincial trade performances, with much wider gaps than in the past.[2]

[2] Different causes lie behind this growing differentiation of regional performances (for a review see Guerieri and Iammarino, 2002). For instance, as well known, the competitive performance of SMEs in the Italian experience has been outstanding where agglomeration economies have given rise to highly specialised local systems – as is typically the case of the industrial districts located in the North and in the Centre - which represent the core of "made in Italy" in terms of international performance. The relatively recent emergence of local systems verified in the Italian Mezzogiorno – mainly concentrated in Puglia, Campania and Abruzzo – is one of the main factors behind structural transformations (Viesti, 2000a). On the other hand, a progressive decrease of the average firm size has particularly regarded some of the most economically backwards areas of Calabria, Sicily and Sardinia: such a *downsizing* process has constrained the exploitation of increasing returns similar to those achieved in other Italian regions (Giannola, 2000).

In order to investigate the extent of intra-area differentiation in the development of export specialisation patterns, the province (NUTS 3 level) was chosen as the geographical unit of reference (see Appendix 1). The indicators used as a measure of export performance (or international competitiveness) are exports per capita and export shares on the Mezzogiorno total: the latter – for the eight southern regions in both 1985 and 2000 - are shown in Figure 1, which highlights the increases in the contributions of Abruzzo, Basilicata, Campania and Molise to total area exports and, conversely, the declining shares of Sicily, Sardinia, Puglia and Calabria.

[Figure 1 here]

The sub-regional level explains the regional results obtained by several empirical studies (Table 1): between 1985 and 2000 the ranking of the top-10 exporting provinces records three "new entries" - L'Aquila, Caserta, and Avellino - confirming the greater relevance of Abruzzo and Campania at the expense of Puglia, which by 2000 lost three provinces previously in the top-10 (namely Taranto, Lecce and Foggia). It is interesting to note that some regions have consistently recorded gains (Abruzzo, Molise, Basilicata) or losses (Sardinia and Calabria) of export shares. That is, all provinces within each of these regions have followed similar trends in trade performance over the time span considered. By contrast, the other southern regions have been highly differentiated within their own boundaries. In Campania - as is apparent from Table 1 - the main province of Naples, though at the top of the ranking in 2000, is the only one which shows a slight reduction of its share of overall southern exports, whilst the rest of the region (in spite of heterogeneous provincial export growth rates) has definitely improved its export share.[3] Performances of the provinces in Sicily and Puglia are highly scattered, the first registering serious losses particularly in Siracusa (from 21% in 1985 to 10% in 2000, due to the dramatic drop of petrochemical exports), whilst the second region has been pulled down essentially by the fall of Taranto (from almost 10% to little more than 3%, mainly due to the crisis of iron metallurgy). In general, cumulative export shares indicate a remarkable decline of the concentration of export capacity at the geographical level. In 1985 the first 10 exporting provinces accounted for a cumulative share of almost 80% of the Mezzogiorno total, whilst in 2000 they represented less than 71% of total southern exports.[4]

[Table 1 here]

Such a picture is borne out by the annual average compound rate of growth of provincial exports relative to the Mezzogiorno average, which, between 1985 and 2000, is around 7.5%,

[3] However, there is a sharp gap in Campania between Benevento, with a poor export propensity and among the lowest shares of Mezzogiorno exports, and the other four provinces, all included in the top-10 of export shares in 2000.
[4] See also Bruno (1996).

slightly below the national growth rate of 8.1%.[5] Figure 2 shows that the trend of southern exports – particularly positive and higher than the national average in the latest years - is by and large the outcome of positive growth rates in the majority of provinces: the only negative figures are found in just two cases, namely Enna and Nuoro. Indeed, the most outstanding export performances are regionally concentrated in Basilicata (Matera and, especially, Potenza), Molise (Isernia) and Abruzzo (L'Aquila, Teramo and Chieti).

[Figure 2 here]

Relevant changes between 1985 and 2000 emerge also with reference to provincial per capita exports relative to both the national and the area average (Table 2). First of all, it should be noted that, in spite of the relative dynamism of the Mezzogiorno trade performance in the most recent years, export per capita levels are still well below the national average, confirming the insufficient degree of internationalisation of the South *vis à vis* the rest of the country. The only two exceptions in 2000 are Chieti and Siracusa. However, while in the first case the export dynamic has been extremely positive, in the second case the still strong position is underlined by a dramatic fall of the indicator between the initial and the final year. Taranto represents a similar case: largely above the Italian average in 1985, but dropping drastically over time and ending well below in 2000. The most striking increases of per capita exports are displayed by L'Aquila, Teramo, Isernia, Potenza, Matera and Avellino, all below the Mezzogiorno average in 1985 but far above it at the end of the period observed. By contrast, among the provinces with the lowest levels, dramatic drops over time occur in all Sardinian provinces and in some parts of Sicily, whilst the three provinces of Calabria[6] record very poor levels of exports per inhabitant in both years without showing any substantial variation through time. Not surprisingly, the export performance of southern Italian provinces turns out to be consistent with previous results on the growing intra-area socio-economic differentiation, suggesting that the presence of an actual "local system" is a primary condition for internationalisation and competitiveness.[7]

[Table 2 here]

[5] It should be remembered that southern exports have been growing basically since the early 1990s, in coincidence with the ERM turmoil and the devaluation of the Italian lira in 1992-93. By subdividing the period into 1985-1992 and 1993-2000 it turns out that the average growth of Mezzogiorno exports is just 1.3% in the first sub-period (versus a national average of 5.2%), whilst in 1993-2000 it reaches 11.8%, against 8.3% of the country as a whole.

[6] The eight regions of the Italian Mezzogiorno are currently subdivided into 36 provinces (corresponding to the level 3 of the NUTS classification), two of which received the status of province only in the late 1990s: therefore, Vibo Valentia and Crotone (both in the region of Calabria) are considered together with the province of Catanzaro, in which they were included before the administrative change.

[7] Interestingly, in terms of both export growth and export per capita, the provincial distribution is closely related to our clustering of southern provinces performed elsewhere on the basis of various socio-economic indicators (Guerrieri and Iammarino, 2002).

By taking into account both levels and growth rates of the previously reported indicators, with reference to the period 1985-2000, our provinces can be roughly subdivided into four groups:

Strongly increased competitiveness: AQ, AV, BA, CE, CH, IS, MT, PZ, TE

Moderately increased competitiveness: BN, BR, CB, CL, CT, PA, PE, ME, RG, SA, TP

Moderately decreased competitiveness: CS, FG, NA, LE

Strongly decreased competitiveness: AG, CA, CZ, EN, NU, OR, SS, RC, SR, TA

These groups are consistent with the findings of a number of studies carried out on trade performance at a detailed geographical level (see References) and are used to compare export performances with the development of specialisation patterns outlined in the following sections.

4. Export specialisation and structural change: data and methodology

The principal issue at stake here is thus the structure of the comparative advantages held by the Mezzogiorno provinces and the steadiness of that structure over time. As is well known, the theoretical explanation suggests that trade specialisation has a cumulative nature because each location continues to do what it did in the past due to the tacit knowledge accumulated in production and technology, which is hardly transferable and gives rise to increasing returns to scale at the industry level (among others Krugman, 1987). Thus, the hypothesis of persistence is examined by testing the extent of continuity in the sectoral composition of export specialisation profiles by province, against the alternative hypothesis that changes of specialisation patterns follow a random course in which the relative points of strength are likely to switch between industrial sectors.[8]

However, comparative advantage structures can also be expected to evolve progressively and incrementally over time. The provincial trade specialisation pattern is likely to be transformed due to the adaptation to changes in the external environment, the diversification processes brought about by new technical knowledge, the creation of inter-firm linkages, the upgrading and acquisition of competences, the alterations in the institutional and cultural support to economic activities, etc. This leads to new specialisations, which are complementary, or even unrelated, to the initially advantaged industrial sectors, influencing firms' performance in international markets (Fagerberg, 1988; Dalum, 1992; Verspagen, 1993; Fagerberg et al., 1994, Storper, 1995).

[8] It should be noted that the hypothesis of persistence of trade specialisation here refers to the sectoral composition of exports rather than to its overall rate or rapidity for each province.

In order to examine statistically the combined significance of persistence and gradual change in export specialisation models, an index of comparative advantage is calculated over a period of 16 years (1985-2000), i.e. the Revealed Comparative Advantage index (RCA) familiar to the empirical literature on international trade. The RCA index of a province in a particular sector is given by its share of national exports in that sector divided by its share of total national exports. Therefore, the RCA index (used as a measure of relative export structure) is defined as follows:

$$RCA_{ij} = (X_{ij}/X_{ITj})/(\Sigma_j X_{ij}/\Sigma_j X_{ITj}) \qquad \text{where } i = 1,\ldots., 34 \text{ provinces}, \; j = 1,\ldots, 77 \text{ sectors}$$

where X_{ij} are exports of province *i* in sector *j*, and X_{ITj} are Italian exports in the same sector. Since the RCA index varies around one, a value greater than one suggests a comparative advantage (relative specialisation), whilst an RCA below unity indicates a position of comparative disadvantage (relative despecialisation), with respect to the country as a whole. The data used are export data by province and sector provided by the Italian National Institute of Statistics (ISTAT) for the period 1985-2000; the original sectoral classification NACE-CLIO – including 236 industrial product groups – has been rearranged for our purposes in 77 sectors, listed in Appendix 2.

The hypothesis that specialisation is path dependent suggests that for any given province the sectoral distribution of the RCA index is likely to remain fairly steady over time. This means that if the RCA index is calculated for a province at two different points in time, then these two sectoral distributions of comparative advantage should be positively correlated with one another. Yet, since the nature of specialisation changes gradually over time, the degree of correlation is likely to fall, the further apart are the two periods under consideration.

The relevant statistical methodology is the Galtonian regression model, a statistical technique devised for the analysis of bivariate normal distributions.[9] The correlation between the sectoral distribution of the RCA index at time *t* (here the average RCA for the years 1998-2000) and at the earlier time *t - 1* (here the average RCA for the years 1985-87) is estimated through a simple cross regression of the following form:

$$(1) \qquad RCA_{ijt} = \alpha + \beta \, RCA_{ijt-1} + \varepsilon_{ijt}$$

[9] This approach was pioneered in the field of economics by Hart and Prais (1956) and Hart (1971, 1976, 1995); most recently it was applied to the analysis of cross-sectoral distributions of innovative activity by Cantwell (1989, 1991) and, at the regional level, by Cantwell and Iammarino (2001), and of trade specialisation at the country level by Amendola, Guerrieri and Padoan (1991, 1998).

This is estimated for each province (*i*) over 77 sectors (*j*) at time *t*.[10] Before discussing the results, the interpretation of the regression coefficient must be clarified. The hypothesis of perfect steadiness in the structure of a province's trade advantages corresponds to a regression coefficient equal to one. In other terms:

- where $\beta = 1$, the initially advantaged sectors do not tend on average to become any more advantaged, and the initially disadvantaged sectors do not tend to become any more disadvantaged over time;
- where $\beta > 1$, the initially advantaged sectors in the province tend to become even more advantaged, while the disadvantaged sectors become increasingly disadvantaged: that is, instead of converging, sectors tend to move further away from one another;
- where $\beta < 1$, disadvantaged sectors tend to improve their position, and advantaged fields slip back. This is what has elsewhere been termed "regression towards the mean" (Galton 1889, cited in Hart, 1976): that is, the gap between initial points of strength and weakness decreases over time, giving rise to sectoral convergence;
- where $\beta < 0$, then the general order of sectors would be reversed, contrary to the prediction that initial patterns of trade specialisation, once established, tend to persist through time.

A measure of gradual change is given by what has been termed the "regression effect", expressed by the magnitude of $(1 - \beta)$. This gives a measure of whether the sectors of specialisation are becoming relatively stronger of weaker on average. Thus, there is a strict and inverse relationship between the hypothesis of incremental change and the regression effect.

The expectation that $\beta > 0$, i.e. that the RCA index is positively correlated across two points in time, can be readily tested for each province. The test of whether $\hat{\beta}$ is significantly greater than zero is a test of the null hypothesis that the sectoral composition of specialisation is random. The test of whether persistence outweighs gradual change in the period in question is the t-test that $(1 - \beta)$ is greater than zero, or in other words, the test of whether $\hat{\beta}$ is significantly less than one. Where $\hat{\beta}$ is significantly greater than zero but significantly less than one, then elements of persistence and gradual change are combined in the dynamics of provincial specialisation profiles. What is then

[10] The RCA indices were calculated for all years 1985-2000 and for 34 Italian southern provinces. The standard assumption of this analysis is that the regression is linear and that the error term ε_{ijt} is independent of RCA_{ijt-1}. The use

required to investigate the actual evolution of sectoral strengths and weaknesses is that the regression analysis is supported by a more detailed inspection of the actual movements in the RCA index (Cantwell, 1991, 1993).

A positive regression effect is a necessary but not sufficient condition for trade specialisation to fall or broaden out over time with respect to its initial pattern. The other feature conveniently arising from the regression analysis of the RCA distribution is a simple test of changes in the degree of trade specialisation in a province, which can be measured by the variance of its RCA index (which shows the extent of the dispersion of the distribution around the mean). Taking equation (1) above, if the variance of the RCA index at time *t* is denoted by σ_t^2 then:

$$\sigma_t^2 / \sigma_{t-1}^2 = \beta^2 / \rho^2$$

where ρ is the Pearson correlation coefficient. The estimate of the correlation coefficient is a measure of the mobility of sectors up and down the RCA distribution. A high value of ρ indicates that the relative importance of sectors in the province is little changed, while a low value indicates substantial changes. The magnitude of $(1 - \rho)$ thus measures what is defined as "mobility effect".

Hence, for values of β between 0 and 1, $\hat{\beta}$ can be greater than ρ. It may well be that, even where the regression effect suggests a sectoral broadening of initial specialisation patterns due to a proportional move of sectors towards the average ($0 < \beta < 1$), this is outweighed by the mobility effect, due to changes in the proportional position between sectors, thus $\beta > \rho$ and $\sigma_t > \sigma_{t-1}$.[11]

Following Cantwell (1989, 1991, 1993), another indicator that can be derived from the regression results provides the measure of the relationship between the composition of trade specialisation of the province and its overall rate of exports growth. The link is provided by the extent to which a provincial system is represented in the sectors of fastest (or slowest) growing exports at the national level. For any province *i*, denoting its proportion of exports held in sector *j* by x_{ij} (numerator of the RCA index), its share of total national exports by a_i (denominator of the RCA index) and the mean of the RCA index by μ_i, for *n* industrial sectors we have:

$$RCA_{ij} = x_{ij} / a_i$$

$$\mu_i = \Sigma_j x_{ij} / n a_i$$

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of the index in a linear regression analysis is justified if the cross-sectoral RCA distributions for each province are approximately bivariate normal. On the use of the RCA in linear regression analyses see also Cantwell (1991).

[11] Indeed, a process of gradual change with respect to the initial specialization pattern does occur in both cases, i.e. $\beta > \rho$ or $\beta < \rho$. However, whilst in the latter case sectors tend to converge and a diversifying process in specialisation profiles occurs – moving into new sectors in which the province had made comparatively little effort in the past -, in the

Since the regression equation (1) must pass through the point of means:

$\hat{\mu}_{it} = \hat{\alpha} + \hat{\beta}\ \hat{\mu}_{it-1}$

or

$\Sigma_j x_{ijt} / n a_{it} = \hat{\alpha} + \hat{\beta}\ \Sigma_j x_{ijt-1} / n a_{it-1}$

The lower are the values of $\hat{\alpha}$ and $\hat{\beta}$,[12] the likelier is a rise in the province's share of national exports (a_i) compared with its average share held in sectors at the chosen level of disaggregation ($\Sigma_j x_{ij}/n$). It can be shown that this happens *either* because the province in question is particularly advantaged in the most dynamic sectors at the national level (a favourable pattern of specialisation), *or* because of a particular type of mobility effect (a shift in the structure of the cross-sectoral pattern of RCA from 'smaller' to 'larger' sectors).

5. *Persistence* and *change* of export specialisation patterns in the provinces of the Italian Mezzogiorno

5.1 The dynamics of specialisation by province: a proposed taxonomy

The regression results apparently confirm the remarkable persistence of the initial patterns of export specialisation in the provinces of the Italian Mezzogiorno over the period considered. As shown in Table 3, the hypothesis that $\hat{\beta}$ is significantly greater than zero can be accepted for 28 provinces out of 34.

[Table 3 here]

The test of whether $\hat{\beta}$ is significantly less than one has been carried out for all 34 provinces of the Mezzogiorno. Table 4 displays the results with reference to the provinces for which $\hat{\beta} < 1$, in order to focus in particular on the nature of a change in initial specialisation patterns.

[Table 4 here]

In order to interpret the statistical results, it seemed useful to broadly classify our 34 provinces through a simple taxonomy based on the value of the regression coefficient. The two main dimensions of local specialisation dynamics over time are: 1) **Persistence** of initial specialisation patterns ($\hat{\beta} \geq 1$); 2) **Change** of initial specialisation patterns ($\hat{\beta} < 1$). This scheme,

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case of $\beta > \rho$ some sectors tend to converge, moving closer together, and others tend to diverge by moving further apart, giving rise to a change of the existing specialisation profile due to shifts in the sectoral ranking.

within its limits (see Dalum et al., 1997, for some caveat on the scope of the interpretation), turns out to be rather useful in trying to depict both the geographical and the sectoral features of export specialisation structures. As is illustrated in Exhibit 1, the taxonomy of export specialisation patterns builds strictly upon the statistical methodology reported in the previous section. On the basis of the regression results shown in Tables 3 and 4, each province can be easily attributed either to **Persistence** or to **Change**, each encompassing two categories respectively: 1) ***Stability*** and ***Concentration***; 2) ***Inversion*** and ***Evolution***.

[Exhibit 1 here]

The classification of individual Mezzogiorno provinces – grouped by the prevailing effect of time on the comparative advantage structures – is reported in Exhibit 2a. As far as **Persistence** is concerned, a few provinces show a remarkable ***Stability*** of specialisation patterns between the middle 1980s and the end of the 1990, namely Agrigento (Sicily), Campobasso (Molise) and half of the Sardinia region (the provinces of Nuoro and Sassari). Other territorial units - grouped under the category ***Concentration*** - have experienced a reinforcement (worsening) of their initial points of strength (weakness), displaying a tendency towards sectoral divergence: Cagliari (Sardinia), three Sicilian provinces (Catania, Siracusa and Trapani), Taranto (Puglia) and Teramo (Abruzzo). Turning to **Change** of initial structures of relative comparative advantage, first of all we find six provinces for which the null hypothesis could not be rejected, that is, the sectoral composition of provincial specialisation seems to have followed a random course over time.[13] The category ***Inversion*** (or radical change) includes part of the Campania region (Benevento and Caserta), the whole Basilicata (Matera and Potenza), Catanzaro in Calabria and Enna in Sicily. Lastly, as expected, the broadest provincial group is that of ***Evolution***, which consists of 18 provinces from all Mezzogiorno regions (but Basilicata).

[Exhibit 2a here]

In order to provide a better understanding of the nature of transformations occurred in provincial specialisation profiles, we focus in particular on those southern provinces which have recorded changes in the structure of sectoral specialisation, thus looking more in detail at which sectors are responsible for the radical change or the evolution of the export patterns of the mid-1980s.[14]

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[12] Or the higher is $(\mu_{it} - \alpha)/(\mu_{it}\beta)$, as shown in the last column of Table 3.

[13] It should be noted that in the case of Benevento the statistical properties of the cross-sectoral distributions do not support a reliable interpretation on the basis of the methodology here applied. Nonetheless, the province has been included in our scheme for the sake of completeness.

[14] Given such a purpose, the following discussion does not focus on the relative advantages/disadvantages but rather on their relevant transformation.

Though, as stated in the previous section, when $\hat{\beta}$ is significantly greater than zero but significantly less than one, then elements of persistence and gradual change are combined together. In order to investigate the actual evolution of sectoral strengths and weaknesses, the regression analysis has been supported by a more detailed inspection of the movements of the RCA index based on the relative strength of the regression *versus* mobility effect, and thus of the estimated values of β and ρ. Hence, Exhibit 2b shows the two sub-categories in which it is possible to distinguish the provinces grouped under ***Evolution*** of the mid-1980s specialisation patterns. The bulk of provinces – those for which, as it turns out from Table 4, the test β_1 is statistically significant and the regression effect outweighs the mobility effect – is grouped under the sub-category ***Diversification***. The degree of sectoral specialisation of all these provinces has fallen (or broadened) over time, displaying a prevailing tendency towards sectoral convergence, with advantaged sectors slipping back from specialisation and disadvantaged sectors catching up with specialisation in the 16 years under observation. Conversely, in the five provinces gathered in the ***Shift*** sub-category, the regression effect is outweighed by the mobility effect, and, due to changes in the proportional position between sectors, sectoral divergence tends to prevail (or, at least, sectoral convergence is balanced out by sectoral divergence) as a consequence of gains and losses in the ranking.

[Exhibit 2b here]

5.2 Change of export structures: results by province and sector

The cross-sectoral RCA indices of the six provinces in the ***Inversion*** category provide interesting insights. The two provinces of Campania – Benevento and Caserta – have a few traits in common: while losing comparative advantage in Other textile products (23), Clothing (24), Articles of fur and leather gloves (25), they both acquire a competitive strength in textiles. During the 1990s both provinces recorded the consolidation of local labour systems in the textile and clothing industry, which probably underlies a more selective choice of niches in international markets with respect to the earlier years. Both provinces are also rather specialised in food and drinks: however, in the case of Benevento this is due to an outstanding growth of the RCA index in Rice, bread and similar products (6), Fish (9) and Olive oil (12), whereas Caserta has actually gained comparative advantages in the industry - outstandingly in Other food products (13) – which did not exist in the middle 1980s. In the case of Caserta, the radical change of initial specialisation patterns can also be attributed to Photo-phono-cinema products (34), where the striking advantage of 1985 disappears completely in the most recent years; to be noted also the impressive rise of Telecommunications (47), where the province is now specialised far above the national average. Conversely, the break in

Benevento patterns of trade is instead more diffused across sectors: it is worth mentioning the general loss in machinery and industrial equipment sectors – particularly in those for food processing, despite the provincial specialisation in food products – and the acquisition of gains, in the most recent years, in Metals and their leagues (36), Clocks, watches and their parts (49), Other machinery and mechanical equipment (61) and Elastic rubber (74).

Both provinces of Basilicata – the only region of the Mezzogiorno which shows a sort of 'internal uniformity' with respect to the dynamics of export specialisation – the narrow sectoral specialisation of Matera is maintained over time: nevertheless, whilst the province was formidably specialised in Artificial and synthetic fibres (22), at the end of the 1990s it has completely lost that comparative advantage, acquiring instead its soundest strength in Railway vehicles (58). A striking increase in the RCA is recorded in Furniture of wood (30), where Matera, together with the province of Bari in Puglia, forms the interprovincial local labour system of the "Murgia furnitures", one of the most spectacular examples of local development recorded in the EU in recent times (Bodo and Viesti, 1997). On the contrary, Potenza showed a relatively wide sectoral spectrum of its own comparative advantages in the middle 1980s: in the broad industry of food and drinks, in Furniture (30) and Metals and their leagues (36), in some industrial machinery and in other sectors such as Parts of motor vehicles (57) and Musical instruments (76). All these relative strengths have disappeared in 1998-00: the province emerges as almost mono-specialised in Motor vehicles (55) – as a result of the Fiat investment in the Melfi plant – preserving at the same time a remarkable RCA (though sharply decreasing over time) in the related and complementary sectors of (46) and (72).

Catanzaro has registered the main inversion of its export pattern in Fish (9), Wines (15), Tool machines (38) and non electrical machines (45), in which at the beginning of the period the province was completely despecialised; conversely, it has lost its considerable strength in Other non-organic chemical products (70). Overall the province seems to have re-oriented its export capacity towards food and drinks and non-electrical machinery. Enna as well has acquired export advantages mainly in a few sectors of the food and drinks industry - (6), (9), (11), (16) - and in the clothing *filière*, as the specialisation in both Knitwear (20) and Textile and clothing machinery and equipment (41) arose only with reference to the most recent years: indeed, the province hosts the only local labour system specialised in clothing of the whole Sicily (see Viesti, 2000). The major break in Enna's RCA distribution – the most striking of the whole sub-category - has occurred in Chemical products for use in agriculture (66), in line with the general disruption of the chemical industry which has interested the region as a whole in the last two decades.

As far as the ***Evolution*** of sectoral advantages/disadvantages is concerned, from the statistical methodology described in section 4 each sector in each geographical unit makes a

measurable contribution to pulling both β above or below one and ρ below one.[15] In Exhibit 3 our taxonomy is extended to cover the sectoral dimension by province, with reference only to the geographical units grouped in the ***Evolution*** category presented in Exhibit 2b.[16]

[Exhibit 3 here]

The provinces for which the impact of the diversifying group of sectors has been comparatively stronger are those where the regression effect is positive and outweighs the mobility effect, giving rise either to a lessening of initial export specialisation and/or to a catching up with leading fields of specialisation: the ranking of sectors is relatively unchanged, but they converge with one another.[17] Three out of four provinces of Abruzzo are in the ***Diversification*** sub-category: whilst in the case of both L'Aquila and Pescara sectoral convergence has often led to the acquisition of advantages, in the case of Chieti the process of catching up has brought about RCAs greater than one in a few sectors (the strongest acquisition being that in [66]). L'Aquila has gradually moved towards electrical sectors - particularly Electricity generators, etc. (46), Office machines (50) and Electric lamps (52) - and Pharmaceuticals (68), registering slips back in all chemical-related sectors. Similarly, Pescara – where the sectors slipping back from specialisation have often turned into comparative disadvantages - has weakened its specialisation particularly in chemicals and acquired a strength in Pharmaceuticals (68); the catching up process has interested also the textiles and clothing industry – where, in a number of sectors, the province has lessened despecialisation or even acquired a relative advantage (as in [20] and [25]) – and some non-electrical equipment. In general, the good export performance recorded in the last decade by these provinces has been accompanied by a broadening of sectoral specialisation patterns either in some *made in Italy* sectors or in high value added or technology-intensive fields.

[15] Following Cantwell (1991, 1993), the regression effect relates to the extent to which sectors pull β either above or below one; thus, the sectoral contribution to the regression effect is measured by the absolute difference in the RCA value of the sector from the initial period (1985-87) to the end period (1998-2000), minus the difference in the mean value of the RCA distribution across all sectors between the two equivalent periods. The mobility effect instead relates to the extent to which sectors move up and down the rankings for each province; thus, the sectoral contribution to the mobility effect is measured by the values of the regression residuals for each sector (i.e. a positive [negative] residual shows a tendency to move up [fall down] the sectoral rankings in the provincial RCA distribution). See also legend in Exhibit 3.

[16] As stated in Exhibit 1, the established provincial pattern of trade specialisation shows persistence if a combination of weak mobility effect (Stability) and weak (or negative) regression effect (Concentration) occurs; alternatively, it changes if a combination of strong mobility effect (Shift) and strong regression effect (Diversification) takes place. Thus, given the derivation of the taxonomy from the underlying statistical theory, a similar analysis at both geographical and sectoral level – not reported here for the sake of brevity - was conducted also for the provinces which have experienced Persistence, shedding light on which sectors have contributed mostly to concentration and which sectors are responsible for the substantial stability of the specialisation patterns.

[17] It should be noted that for all 13 provinces under the Diversification sub-category the hypothesis that β is significantly less than one is accepted at the 1% level of significance.

A large part of Campania is also found in this category. Naples – the southern province with the largest sectoral spread of exports both in 1985 and in 2000 (i.e. lowest coefficient of variation in both years) – has converged to the national model by gaining advantage in Clothing (24) and Footwear not made of leather (27), where a number of local labour systems of SMEs are active, and in Paper and paper products (32). Important export sectors at the end of the period are also (60), (69) and (76), all disadvantaged in 1985. Conversely, the province has slipped back from specialisation in Leather and skin goods (17), where the production of many local specialised systems is mainly directed to regional and national markets; noteworthy is the loss of comparative advantage in ' Telecommunications (47), in which Naples was much more specialised than the country until the middle 1990s. Both Avellino and Salerno show a diversification process within the broad food and drink industry, where the lessening of despecialisation has occurred in various sectors, even though not all of them have turned into relative comparative advantages; both provinces have moved towards means of transports and chemicals. Whilst Salerno shows a catching up process similar to that of Naples in Paper (32), Avellino has contributed together with Naples to the acquisition of a regional strength in Glass and crystal articles (65). Overall, the two smaller Campania' s provinces included in this category seem to have experienced a process of sectoral converge characterised by a diminishing competitive advantage in initial points of strengths (without losing them over time) and by a rather diffused catching up in sectors of relative weakness in 1985.

Among the three provinces of Puglia the biggest, Bari, showing the highest sectoral spread of exports after Naples, has broaden out export capacity towards textiles, clothing and leather, and means of transports (though slipping back from specialisation in automobiles [55]). The other two provinces have mainly diversified within a sole industrial group of products, namely food and drinks in the case of Foggia – which, at the same time, has generally lost ground in chemicals - and textiles, leather and clothing in the case of Lecce, which has instead moved away from its initial rather spread specialisation in food and drinks. It should be noted that both Bari and Lecce, together with some provinces of Campania, record the highest concentration of the whole Mezzogiorno of local labour systems specialised in *made in Italy* sectors such as clothing and leather products.

In Sicily, the diversification process has mainly implied sectoral convergence without showing major gains or losses in the RCA indices. This is definitely the case of Ragusa, but also that of Palermo, where the only two "jumps" to specialisation with respect to the earlier years have been recorded in various chemicals. The capital province of Sicily has gone through a clear diversification pattern within the food and drinks sector, by sharply decreasing the strengths in (9),

(10), (13) and (16) (all of them still showing RCAs greater than one at the end of the 1990s) and lessening despecialisation in (7), (11) and (12).

The last two provinces in the diversifying group are the Sardinian Oristano and Reggio Calabria, both recording a strong catching up process in Animal products from agriculture (2). The first province has caught up particularly in Textile and clothing machinery (41) - in spite of the utter provincial despecialisation in textiles and clothing in the last years -, in ' Telecommunications (47), with a progressive move also into Other electrical equipment (48), though without reaching a full comparative advantage, and in Other non-organic chemical products (70). The Calabria province has progressively moved into textiles, wood products and Pottery and ceramics (64), at the same time reducing its initial extraordinary strength in food and drinks (in [9], [10], [13] and [14], though only in the first case it has actually lost its comparative advantage).

In the sub-category ***Shift*** we find those provinces where the mobility effect has outweighed the regression effect (though positive), resulting in a shift in the relative position of sectors between the first and the last period and implying a mix of sectoral convergence and divergence. The provinces characterised by such a considerable mobility of RCAs up and down the sectoral distribution are just five. In the case of Brindisi, it is worth to mention in particular the upsurge of Fishery and hunting products (4) and ' Mining products (5) (which have also jumped to specialisation) and that of the broad group of chemicals: whilst Artificial plastic (72) – in which the province has highly and increasingly specialised between 1985 and 2000 – contributes to sectoral divergence, Other chemicals (73) and Elastic rubber (74) display both gains in the ranking and RCAs greater than one in the last years considered. Indeed, Brindisi in the 1990s is indicated as one of the main export poles of the Mezzogiorno in plastics (Bodo and Viesti, 1997).

Caltanissetta and Messina, both in Sicily, show a strong shift in non-manufacturing sectors such as (1), (2) and (4), which have gained positions in the sectoral ranking turning also into remarkable comparative advantages at the end of the period (in Messina, actually, agricultural products were already a point of strength in 1985, slightly lessening over time though remaining a strong provincial advantage). A rather evident withdrawal from chemicals emerges for both provinces, with generalised losses of positions in the sectoral distributions and, in some cases, with actual losses of comparative advantage.

In the case of Isernia – as expected, given the outstanding development of the local cluster in clothing, somehow comparable to that of the Murgia furniture – the gain of ranking has mostly occurred in textiles and clothing - where also sectors of enduring relative disadvantage such as Other clothing products (28) have climbed up the sectoral ladder – and in chemicals. In the latter

industry, the two sectors of Perfumes and soaps (67) and Artificial plastic (72) have turned into comparative strengths, whilst the relative specialisation in Other non-organic chemicals (70) has worsened over time.

In the province of Cosenza the main drivers of sectoral divergence are found in non-manufacturing sectors – as is the case of (1) and (3) – and in Fish (9), Other textiles (23) and Elastic rubber (74), all witnessing a strengthening of the already remarkable advantage of the middle 1980s. On the contrary, sectoral convergence has been led by a number of sectors such as Juices, fruit and vegetables preserves (10) and Clothing (24), which have shifted down the ranking, sharply lessening (without losing) the initial export strength.

More generally, the whole ***Shift*** group, with the exception of Isernia, shows a fairly apparent upsurge of agriculture, fishing and mining products in the structure of relative comparative advantage. At the regional level, this is particularly the case of Calabria, where, independently from the prevailing type of change experienced by the three provinces, the increased weight of non-manufacturing may easily be associated to a deteriorating regional competitiveness.

Finally, it might be worth to complete such a picture of intra-local inter-sectoral export dynamics by going back briefly to two aspects crucial to our analysis of territorial comparisons, i.e. performance and regional differentiation. The first can be further explored by taking account of the indicator that relates the sectoral composition of export specialisation to the overall performance (relative to the country as a whole), reported in the last column of Table 3. First of all, lower values are on average found in the **Persistence** category as compared to that of **Change**. Secondly, among the highest values of $(\hat{\mu}_{1998\text{-}00} - \hat{\alpha})/(\hat{\mu}_{1998\text{-}00}\hat{\beta})$ - which implies a fall in the mean value of the RCA – we found all provinces which have shown a **strongly increased competitiveness** between the 1980s and the end of the 1990s[18]: they appear to have been particularly advantaged in sectors of fastest growing exports at the national level. However, high values of the indicator are also recorded by a few provinces with highly disappointing export performances (i.e. in the case of Enna, included among those with **strongly decreased competitiveness**): yet, these provinces register a strong mobility effect, thus meaning that they are not necessarily focused on sectors of greatest opportunities (fastest growth at the country level) but, rather, that they have experienced large movements of sectors along the distribution.

As far as regional differentiation is concerned, the matrix of co-specialisation (i.e. provincial bilateral specialisation indices, that is, correlation coefficients for 1985-87 and 1998-2000) adds further interesting details at the regional level. More in particular, it turns out that Abruzzo, Molise,

Basilicata and, to a lesser extent, Campania do not display provincial co-specialisation within their boundaries: in other terms, the sectoral pattern of export advantage for each province in each of these regions is distinctive, since in all cases there seems to be little association between the RCA distribution of any two provinces both in the initial and the final years (the co-specialisation of Naples and Salerno in Campania tends to fade away over time). Conversely, in Calabria the co-specialisation between Cosenza and Catanzaro holds through time (significant at 1%), while in Puglia that between Bari and Foggia does emerge in the recent period; in Sicily not only a number of positive correlations is observed in the earlier years, but they are further strengthened in 2000, ending up with a relative uniformity in specialisation profiles within the region; similarly, in Sardinia the co-specialisation between Nuoro and Sassari is reinforced over the 1990s, and the first province becomes also associated with Oristano.

6. Conclusions

This study indeed confirms that there are unambiguous signs of dynamism in the evolutionary process of the productive systems of vulnerable areas such as the Italian Mezzogiorno. Yet, they are not sufficient to ensure new locally endogenous growth poles and internationally integrated firms. They do not even seem to support enduring transformations of local institutions and social fabrics so as to spur their convergence towards the European average, as achieved by other vulnerable regions in the UE (see Rodriguez-Pose, 2001).

The most important finding in our paper is that there is not a one-way relationship between the comparative advantage patterns and export performances of southern provinces. Indeed, in all regions (but Basilicata) we find the coexistence of different specialisation models at provincial level, characterized by very heterogeneous export performances. Provinces which strongly increased their competitiveness in the period 1985-2000 are found in many categories such as ***Concentration*** (i.e., TE), ***Inversion*** (CE, MT, PZ), ***Diversification*** (AQ, AV, BA, CH) and ***Shift*** (IS); but in the same categories there are also provinces with a highly negative export performances during the same period.

These findings – though susceptible of further test in the future – seem to support the hypothesis that there is a weak relationship between export performance and any specific movement in trade specialisation patterns (see also Duranton and Puga, 2000; Morgani and Ricciuti, 2001). This is in line with evolutionary theory formulations that the sectoral specialisation patterns does

[18] Cf. section 3.

not show any deterministic nature but rather interacts in complex ways with competitiveness: one could thus argue that the two aspects *co-evolve* within each economic system.

Furthermore a growing inter-provincial, intra- and inter-regional differentiation is confirmed by export specialisation patterns of southern regions. Therefore, one could point out that European integration and overall internationalisation processes have brought about a "more similar but less equal" trend of overall economic and social development in the Italian periphery (Paci, 1997);

As to the debate about internationalisation and local development policies, scholars have increasingly considered jointly structural and systemic variables, assessing in both directions the causal link between policy and industrial structure (see, above all, Nelson, 1995). In other terms, whilst in the past the focus was almost solely on how policy could affect structure and performances, nowadays the system capability in moulding industrial policies is explicitly acknowledged.

To conclude, despite the recent positive average performance of Italian southern regions in international markets the debate on the vulnerability of the Italian Mezzogiorno and its feasible development path is far from being over.

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Figure 1 - Shares of exports by region (Mezzogiorno = 100), 1985 and 2000

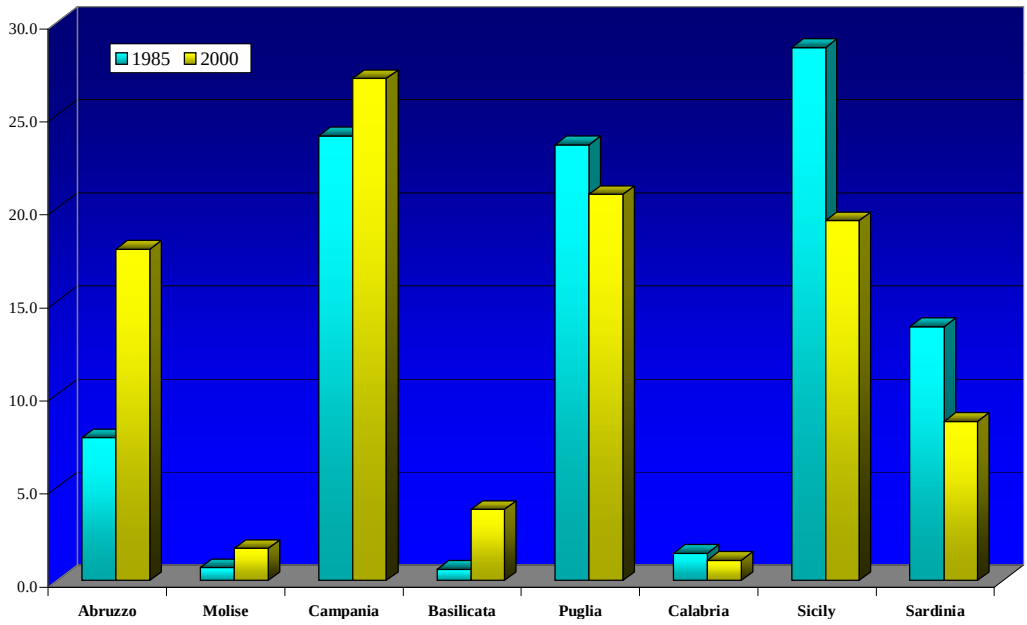

Table 1 - Ranking of the top-10 exporting provinces, 1985 and 2000

Province	1985		Province	2000	
	Share of Mezzogiorno	Cumulative share		Share of Mezzogiorno	Cumulative share
1 SR	20.78	20.78	1 NA	15.41	15.41
2 NA	16.10	36.88	2 BA	10.42	25.83
3 CA	10.39	47.27	3 CH	9.74	35.57
4 TA	9.51	56.79	4 SR	9.68	45.26
5 BA	7.01	63.80	5 CA	7.06	52.32
6 CH	4.95	68.75	6 CE	4.04	56.35
7 SA	3.51	72.26	7 SA	3.97	60.32
8 LE	2.86	75.12	8 AQ	3.62	63.94
9 CT	2.35	77.47	9 CT	3.41	67.35
10 FG	2.20	79.67	10 AV	3.32	70.67

Note: calculations on Istat data

Figure 2 - Export dynamics by province relative to the Mezzogiorno as a whole, 1985-2000
(annual average compound growth rate)

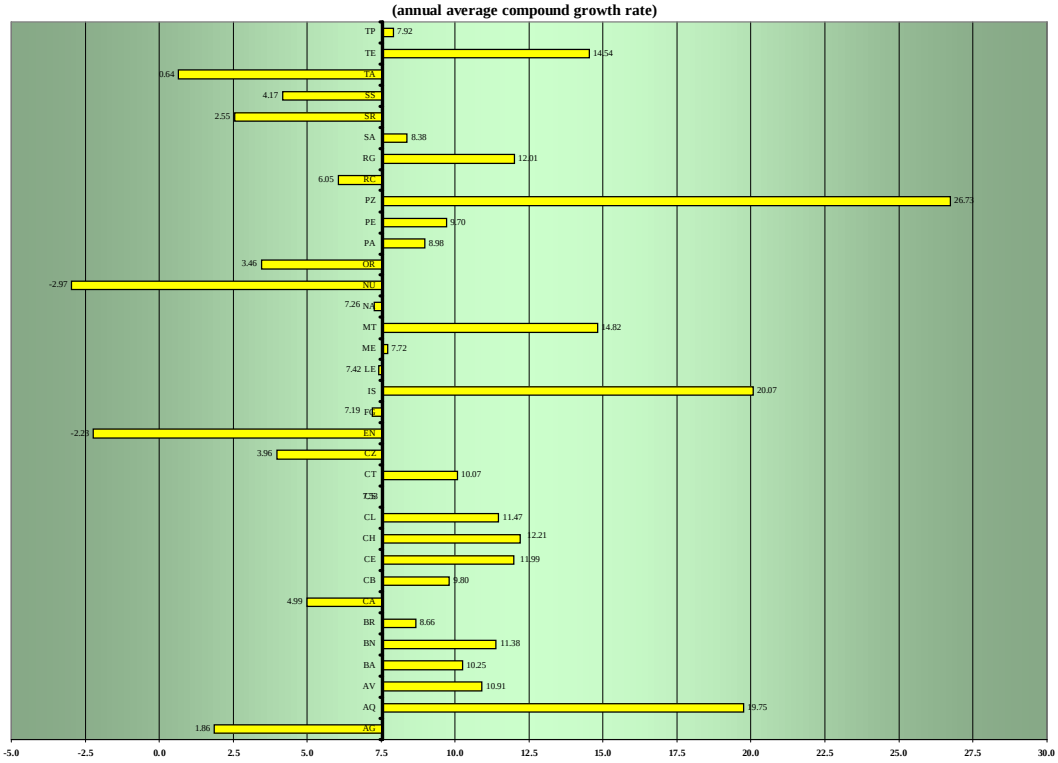

Table 2 - Export per capita in the provinces of the Italian Mezzogiorno, 1985 and 2000

Province*	Export per capita 2000 (Italy=100)	Export per capita 1985 (Italy=100)	Export per capita 2000 (Mezzogiorno=100)	Export per capita 1985 (Mezzogiorno=100)
CH	159.9	88.9	522.2	267.3
SR	152.8	352.6	499.1	1059.8
AQ	76.3	15.0	249.1	45.1
IS	71.0	12.9	232.0	38.8
TE	70.1	28.6	228.8	85.9
CA	58.9	94.0	192.4	282.6
AV	48.2	31.6	157.5	94.9
BA	42.5	31.7	138.7	95.4
PZ	41.4	3.1	135.3	9.4
MT	37.7	14.0	123.0	42.2
TA	35.7	110.2	116.7	331.2
BR	33.3	30.7	108.9	92.4
NA	31.7	36.3	103.6	109.1
CE	30.3	18.3	98.8	54.9
CL	28.2	16.8	92.2	50.5
PE	27.6	21.8	90.2	65.5
SA	23.3	22.9	76.0	68.8
LE	21.9	24.7	71.7	74.2
CT	19.9	15.5	64.9	46.7
FG	19.2	21.5	62.6	64.6
CB	19.1	14.4	62.3	43.4
ME	16.9	18.1	55.3	54.5
SS	15.9	29.1	51.9	87.3
TP	10.6	10.9	34.7	32.7
RG	10.6	6.3	34.6	18.8
PA	8.9	7.8	29.0	23.3
OR	7.2	14.4	23.6	43.2
BN	4.6	2.8	14.9	8.4
NU	4.6	24.6	14.9	74.0
RC	4.1	5.3	13.3	16.1
CZ	3.6	6.4	11.7	19.2
AG	2.7	6.7	8.7	20.1
CS	2.6	2.7	8.4	8.2
EN	1.7	8.0	5.5	23.9

* Provinces are ranked in descending order 2000.
Note: calculations on Istat data

Table 3 - Results of the regression analysis of RCA in 1998-00 on RCA in 1985-87

Provinces	$\hat{\alpha}$	$\hat{\beta}$	$t_{\beta 0}$	$\hat{\rho}$	$(\hat{\mu}_{1998\text{-}00} - \hat{\alpha})/(\hat{\mu}_{1998\text{-}00}\ \hat{\beta})$
AG	0.578	1.061	9.202***	0.731	0.700
AQ	0.705	0.274	5.336***	0.525	1.249
AV	0.414	0.744	31.852***	0.965	1.042
BA	0.312	0.685	8.373***	0.695	0.969
BN	1.851	0.807	1.288	0.147	0.420
BR	0.585	0.628	5.475***	0.534	0.825
CA	-0.214	1.505	20.821***	0.923	0.798
CB	0.289	0.901	22.025***	0.931	0.886
CE	0.932	-0.001	-0.054	-0.006	2.946
CH	0.226	0.605	20.993***	0.924	1.137
CL	0.415	0.763	3.889***	0.410	0.826
CS	0.707	0.837	8.685***	0.708	0.664
CT	0.181	1.225	7.470***	0.653	0.710
CZ	1.270	0.104	1.067	0.122	0.972
EN	0.663	-0.003	-0.344	-0.040	4.196
FG	0.670	0.092	2.078**	0.233	2.024
IS	0.046	0.729	7.113***	0.635	1.273
LE	0.564	0.245	9.168**	0.727	1.574
ME	0.514	0.515	4.580***	0.468	1.094
MT	0.899	0.136	1.602	0.182	1.101
NA	0.420	0.683	8.117***	0.684	0.953
NU	1.382	1.020	12.192***	0.815	0.547
OR	2.605	0.524	5.379***	0.528	0.648
PA	0.323	0.497	7.957***	0.677	1.420
PE	0.390	0.352	6.442***	0.597	1.678
PZ	0.332	0.059	0.541	0.062	2.565
RC	0.293	0.677	11.587***	0.801	1.157
RG	0.893	0.189	4.6201***	0.471	1.620
SA	0.330	0.893	74.646***	0.993	0.853
SR	-0.178	1.820	40.904***	0.978	0.663
SS	0.674	0.905	13.977***	0.850	0.759
TA	0.210	1.145	19.328***	0.913	0.598
TE	-0.092	1.190	10.720***	0.778	0.886
TP	0.097	1.626	10.230***	0.763	0.597

Notes:
***significant at 1%
** significant at 5%
* significant at 10%
No. of observations: 77

Table 4 - Trade specialisation indicators derived from the regression analysis of RCA in 1998-00 on RCA in 1985-87 for the provinces of the category "erosion of initial patterns of specialisation"

Provinces	$t_{\beta 1}$	$\hat{\beta} / \hat{\rho}$	$(1-\hat{\beta})$	$(1-\hat{\rho})$	$\hat{\sigma}_{1998\text{-}00} - \hat{\sigma}_{1985\text{-}87}$
AQ	-14.134***	0.522	0.726	0.475	-2.786
AV	-10.976***	0.771	0.256	0.035	-2.404
BA	-3.847***	0.986	0.315	0.305	-0.029
BN	-0.307	5.487	0.193	0.853	11.781
BR	-3.241***	1.176	0.372	0.466	0.578
CE	-63.956***	0.135	1.001	1.006	-14.640
CH	-13.681***	0.655	0.395	0.076	-0.933
CL	-1.206	1.863	0.237	0.590	2.275
CS	-1.691*	1.182	0.163	0.292	0.651
CZ	-9.151***	0.854	0.896	0.878	-0.830
EN	-122.401***	0.071	1.003	1.040	-20.673
FG	-20.500***	0.394	0.908	0.767	-3.360
IS	-2.640**	1.149	0.271	0.365	0.296
LE	-28.253***	0.337	0.755	0.273	-5.691
ME	-4.318***	1.101	0.485	0.532	0.328
MT	-10.140***	0.750	0.864	0.818	-1.275
NA	-3.765***	0.999	0.317	0.316	-0.002
OR	-4.883***	0.993	0.476	0.472	-0.107
PA	-8.053***	0.735	0.503	0.323	-1.208
PE	-11.857***	0.590	0.648	0.403	-1.346
PZ	-8.646***	0.944	0.941	0.938	-0.137
RC	-5.520***	0.846	0.323	0.199	-0.734
RG	-19.856***	0.401	0.811	0.529	-7.440
SA	-8.940***	0.899	0.107	0.007	-0.662

Notes:
***significant at 1%
** significant at 5%
* significant at 10%
No. of observations: 77

Exhibit 1 - THE CLASSIFICATION OF PROVINCIAL TRADE SPECIALISATION PATTERNS

PERSISTENCE OF INITIAL SPECIALISATION PATTERNS		Combination of weak mobility effect and weak (or negative) regression effect		
Category	**Value of β***	**Sub-category**	**Test β_o**	
STABILITY	$\beta = 1$ $(0.9 < \beta < 1.1)$	none	Significant	
CONCENTRATION	$\beta > 1$ $(\beta > 1.1)$	none	Significant	
CHANGE OF INITIAL SPECIALISATION PATTERNS		Combination of strong mobility effect and strong regression effect		
Category	**Value of β***	**Sub-category**	**Test β_o**	
INVERSION	$\beta \leq 0$	none	Not significant	
EVOLUTION	$\beta < 1$ $(0 < \beta < 0.9)$	DIVERSIFICATION	Significant	**Test β_1** Significant Regression effect (1- β) > Mobility effect (1- ρ) Falling σ
		SHIFT	Significant	Not always significant Mobility effect (1- ρ) > Regression effect (1- β) Rising σ

**Notes:* cut-off points were imposed to the value of β to facilitate the interpretation of the results

Exhibit 2a - THE DYNAMICS OF TRADE SPECIALISATION IN THE MEZZOGIORNO PROVINCES (1985-2000)

PERSISTENCE OF INITIAL SPECIALISATION PATTERNS	
STABILITY	**CONCENTRATION**
AG, CB, NU, SS	CA, CT, SR, TA, TE, TP
CHANGE OF INITIAL SPECIALISATION PATTERNS	
INVERSION	**EVOLUTION**
BN, CE, CZ, EN, MT, PZ	AQ, AV, BA, BR, CH, CL, CS, FG, IS, LE, ME, NA, OR, PA, PE, RC, RG, SA

Exhibit 2b - THE EVOLUTION OF TRADE SPECIALISATION PATTERNS: SUB-CATEGORIES

EVOLUTION	
DIVERSIFICATION	**SHIFT**
AQ, AV, BA, CH, FG, LE, NA, OR, PA, PE, RC, RG, SA	BR, CL, CS, IS, ME

Exhibit 3 - THE DYNAMICS OF TRADE SPECIALISATION BY SECTOR AND PROVINCE OF THE EVOLUTION CATEGORY (1985-2000)

DIVERSIFICATION

PROVINCES	SLIPPING BACK FROM SPECIALISATION	CATCHING UP WITH SPECIALISATION
AQ	**5, 10, 71**	**7, 31, 34, 46, 50, 52, 63, 64, 68**
AV	**26**	**6, 10, 12, 51, 58, 65, 73**
BA	**2, 8, 15, 24, 51, 55, 62, 64**	**9, 17, 25, 28, 57, 58**
CH	**1, 4, 27, 32**	**15, 44, 66**
FG	**2, 67, 70, 71**	**10, 14, 15, 16, 59**
LE	**10, 16, 58**	**12, 17, 20, 21, 27, 28**
NA	**2, 11, 17, 28, 29, 47, 75**	**4, 7, 24, 27, 32, 49, 60, 65, 69, 76**
OR	**1, 15, 22**	**2, 6, 11, 32, 41, 47, 70**
PA	**1, 3, 22, 67, 70**	**71, 73**
PE	**1, 6, 14, 16, 23, 36, 66, 67, 71, 73, 76**	**4, 7, 20, 25, 32, 44, 45, 64, 68**
RC	**9, 75**	**2, 3, 18, 19, 29, 31, 49, 64**
RG	**(no falls from specialisation)**	**(no jumps to specialisation)**
SA	**53**	**3, 5, 12, 13, 32, 55, 62, 72, 73**

Note: only sectors which have fallen from ($RCA_{t-1} > 1$ and $RCA_t < 1$) or jumped to ($RCA_{t-1} < 1$ and $RCA_t > 1$) specialisation, i.e. excluding those which have lessening specialisation/despecialisation

SHIFT

PROVINCES	GAIN OF RANKING	LOSS OF RANKING
BR	***4, 5*, 9, 12, *45*, 72, *73, 74***	**(50 sectors)** of which: ***38, 68***
CL	***1, 4*, 16, 75**	**(33 sectors)** of which: ***9, 51, 62, 66, 68, 71, 76***
CS	**1, 3, *4, 6, 8*, 9, *11, 12*, 23, 31, *50, 62, 64*, 74**	**(52 sectors)** of which: ***16, 19***
IS	**17, *20*, 24, *25*, 28, *67, 72***	**(14 sectors)** of which: ***7, 10, 16*, 21, 23, *27, 30, 39*, 40, *58*, 61, 63, 70, *76***
ME	**1, *2, 4*, 7, *8*, 10, 35, 64, 71, 75, *77***	**(39 sectors)** of which: ***60, 67, 74***

Note: Italics denote sectors which have also jumped to or fallen from specialisation

LEGEND:

SECTORAL CONTRIBUTION TO REGRESSION EFFECT:
based on $(RCA_{ijt} - RCA_{ijt-1}) - (\mu_{it} - \mu_{it-1}) = X$

DIVERSIFICATION: SLIPPING BACK: $X < 0$ and $RCA_{ijt-1} > \mu_{it-1}$
CATCHING UP: $X > 0$ and $RCA_{ijt-1} < \mu_{it-1}$

SECTORAL CONTRIBUTION TO MOBILITY EFFECT:
based on the regression residuals (RES_{ij})

SHIFT: GAIN OF RANKING: $RES_{ij} > + 0.5$
LOSS OF RANKING: $RES_{ij} < - 0.5$

Appendix 1 - THE REGIONS AND THE PROVINCES OF THE ITALIAN MEZZOGIORNO

REGION (NUTS 2)	PROVINCE (NUTS 3)	ACRONYMS
ABRUZZO	L' Aquila	AQ
	Chieti	CH
	Pescara	PE
	Teramo	TE
MOLISE	Campobasso	CB
	Isernia	IS
CAMPANIA	Avellino	AV
	Benevento	BN
	Caserta	CE
	Napoli	NA
	Salerno	SA
PUGLIA	Bari	BA
	Brindisi	BR
	Foggia	FG
	Lecce	LE
	Taranto	TA
BASILICATA	Matera	MT
	Potenza	PZ
CALABRIA	Cosenza	CS
	Catanzaro	CZ
	Reggio di Calabria	RC
SICILY	Agrigento	AG
	Caltanissetta	CL
	Catania	CT
	Enna	EN
	Messina	ME
	Palermo	PA
	Ragusa	RG
	Siracusa	SR
	Trapani	TP
SARDINIA	Cagliari	CA
	Nuoro	NU
	Oristano	OR
	Sassari	SS

Appendix 2 - Industrial sectors (rearranged from 236 NACE-CLIO)

1	Agricoltural products
2	Animal products from agriculture
3	Forestry products
4	Fishery and hunting products
5	Mining products
Manufacturing:	
6	Rice, flour, food pastes, bread and similar products
7	Sugar, sugar products and sweets, malt and malt products
8	Meat
9	Fish
10	Juices, fruit and vegetables preserves, legumes
11	Butter, cheeses and dairy products
12	Olive oil, other oils and fats for human consumption
13	Other food products
14	Animal feeding stuffs and tobacco products
15	Wines
16	Other beverages
17	Leather and skin goods
18	Natural fibres, cotton, wool, silk
19	Textiles
20	Knitwear
21	Special textiles
22	Artificial and synthetic fibres and derived products
23	Other textile products
24	Clothing and sewed articles
25	Articles of fur and leather gloves
26	Footwear made wholly or partly of leather
27	Footwear not made of leather (except those of elastic rubber)
28	Other products of clothing, household linen and accessories
29	Wood
30	Furniture of wood
31	Other wooden articles
32	Paper and paper products
33	Printing and publishing
34	Photo-phono-cinema products
35	Metal processing and products
36	Common metals and their leagues
37	Silver, gold and platinum
38	Tool machines
39	Agricultural machinery and equipment
40	Mining equipment machinery
41	Textile and clothing machinery and equipment
42	Paper working machinery
43	Machinery and equipment for the food industries
44	Other non electrical machines
45	Spare parts of non electrical machines and equipments
46	Electricity generators, electric motors and their parts
47	Telecommunications equipments and their parts
48	Other equipments for the electricity appliance and their parts
49	Clocks, watches and their parts
50	Office machines
51	Wires and insulated electrical cables
52	Electric lamps and their parts
53	Other products of precision mechanical
54	Cycles, motorcycles and their parts
55	Motor vehicles
56	Tractors
57	Spare parts of motor vehicles
58	Railway vehicles and their parts
59	Aircrafts and their parts
60	Boats and their parts
61	Other machinery and mechanical equipment
62	Stone and marble
63	Building and construction materials made of concrete, cement or plaster
64	Pottery, ceramic and similar products
65	Glass and crystal articles
66	Chemical products for use in agriculture
67	Perfumes and soaps
68	Pharmaceutical products
69	Paints, varnishes, inks, etc.
70	Other non-organic chemical products
71	Other organic chemical products
72	Artificial plastic and synthetic materials