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Openness and Income Disparities: Does Trade Explain the 'Mezzogiorno' Effect?

Claudia M. Buch[+] and Paola Monti[°]

Abstract

Many theoretical models show that trade openness has positive welfare implications. Yet, openness might affect different social groups and regions asymmetrically, even within a given country. We use Italian regional data to answer the question whether trade openness affects within-country income differentials. In Italy, the more affluent regions are internationally more open than poorer ones not only with respect to trade in goods, but also with respect to FDI and international migration. *Prima facie*, there is a positive correlation between openness and per capita income. Studying this relationship empirically requires taking into account the endogenous component of openness. We apply panel cointegration and instrumental variables techniques to account for the endogeneity of trade. Our results show a positive link between trade openness and the level of income per capita.

Keywords: Openness, growth, regional income disparities, Italian regions

JEL-classification: F2, F43

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1 Introduction*

There is a growing concern in the population and among policymakers that the increasing integration of the world economy could lead to increased income disparities. International integration may lead to income disparities across different skill groups and across different countries. But how does increased openness affect income differentials within a specific country? We use Italian regional data to answer this question. Our focus is on the impact of trade openness on regional income disparities.

Historically, periods of high growth in the world economy have been associated with a rapid expansion of international trade (Helpman 2004). From a theoretical point of view, improved utilization of scarce resources, improvements in technologies, and the exploitation of economies of scale can explain a causal effect of trade on growth.

In principle, the link between openness and the level of income at the regional level should not differ much from the link at the national level. Yet, empirical literature has discussed the causal links between the degree of trade integration and growth mainly using country-level data. Whether trade causes growth – or rather the reverse – has been a long disputed topic in international economics. (See, e.g., Baldwin (2003) and Rodriguez (2006). Estimating the relationship is problematic since growth and trade are endogenously determined. On the one hand, high trade shares might spur higher growth. On the other hand, regions whose incomes are high for reasons unrelated to trade may trade more.

In this paper, we use panel cointegration techniques as well as the instrumental variables estimator proposed by Frankel and Romer (1999, in short: F&R) to account for the endogeneity of trade. This estimator instruments trade with a measure of its geographic component. In addition to geography – which is time-invariant – we use foreign GDP as a time-varying exogenous component of foreign trade.

Using regional data for one country has two advantages. First, differences in institutions are less pronounced within than between countries. Hence, we address the concern that differences in institutions across countries might affect both, per capita income and the degree of trade openness. Second, it has been argued that the model by F&R might be mis-specified because of its implicit assumption that countries are in their respective steady state

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(Felbermayr 2005). Even if this concern might be less relevant for regions within a given country, we take into account this argument by cross checking the results of the F&R methodology with those obtained with panel cointegration techniques.

The paper is organized as follows. Section Two presents stylized facts on openness and the macroeconomic environment for Italian regions. Section Four presents our results concerning the openness-and-growth nexus. In a first step, an openness equation is estimated. Results for Italy indicate that geography has a significant impact on trade openness and that the Southern Italian regions are significantly less integrated internationally than the regions in the Centre-North. In a second step, the estimated openness equation is used to generate predicted values of trade that serve to as instrumental variables for actual trade in the growth equation. Results indicate that there is a positive link between openness and GDP per capita. This effect is quite sizeable, even when we add other factors affecting growth or variables like the capital stock. Section Four presents the results of panel cointegration techniques to account for possible common trends in trade openness and per capita income. We find similar elasticities of income per capita with regard to trade as using the instrumental variables estimator. Section Five concludes.

2 Stylized Facts

The richest Italian regions in terms of per capita income also tend to show the highest levels of openness. This holds for different measures of openness such as foreign trade in goods, FDI flows, or the presence of foreign migrants. *Prima facie*, this suggests that there might be a positive relationship between openness and per capita income. Moreover, while Italy has become more open over time, these general patterns in the data have persisted. In this section, we describe these developments in more detail.[1]

2.1 Foreign Trade

Table 1 shows trade shares, i.e. exports plus imports in percent of GDP, by Italian region. On average, over the 1991-2005 period, Southern Italy's trade share has been equal to 18%, while Center-Northern Italy's share stood at 46%. The 'gap' in the trade performance between the

[1] In this paper, openness is defined in a de facto sense. We take the actual level of trade or FDI as revealed measures of openness in terms of freedom, willingness, or ability to interact with foreign partners.

South and the Center-North decreased slightly over time, and the dispersion of trade shares has decreased slightly also in the South.[2]

The structure of trade across industries in the Center North and the South has not changed much between 1991 and 2005. The South represents between 10 to 15% of Italy's total external trade, showing a marked export specialization in petroleum products and transport equipment. Imports of raw materials, in particular oil, dominate the import structure in the South. The most relevant sectors in Centre-Northern exports are mechanical machinery and transport equipment, but also metals and metal products, chemical products and textile and clothing. Exports of products in which Italy records revealed international comparative advantages tend to concentrate in Centre-Northern regions.

Figure 1a shows that Centre-Northern Italy's higher trade share is a rather widespread phenomenon, although far from being uniform. Lombardy and Veneto tend to drive the better performance of the Centre-North versus the South. In the case of Lombardy, the high trade share reflects to a large extent an above-average import ratio.

In the South, Calabria is an outlier, with a trade share close to only 3%, while Abruzzo, Sardegna, and Sicily have recorded trade shares close to those of the average performers of the Centre-North in recent years. In the case of Sardegna and Sicily, this is partly due to the high oil prices given that Italy's oil refinery industry clusters in these two regions.

2.2 Foreign Direct Investment

Northern and Southern Italy differ also in terms of factor endowments. Data on total national capital stocks have recently been released by the Italian statistical office (ISTAT). Allocating total capital stock by region using yearly regional shares in total fixed investment, we find that the gap in the capital intensity per employee (at constant 2000 prices) has widened between the Centre-North and the South in the first half of the 1990s (Table 2). In particular, while in 1991 the ratio was slightly higher in the South than in the North, in 1995 Southern capital stock per employee was 80% of that in the Centre-North; by 2000 it went back to 89%.

One would expect that these differences in the capital intensity of production might trigger capital inflows into the South in the form of foreign direct investment. Evidence for the years 1997-2005 shows, however, that FDI has been quite concentrated in Northern Italian regions. According to balance of payments data, FDI inflows and outflows relative to GDP have

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[2] Trade data include only trade flows that have been regionally allocated by ISTAT.

persistently been higher in the regions of the North and the Center (Figure 1b). In cumulative terms, about 90% of total FDI inflows went to only 5 regions representing 59.2% of Italy's GDP (Lombardy, Piedmont, Lazio, Veneto, and Emilia Romagna). About 94% of FDI outflows originated from the same regions.

There are many reasons why capital flows into a particular area might be lower than expected. Apart from more fundamental economic reasons arising from difficulties in measuring expected returns, statistical mis-measurement might be an issue. More specifically, balance of payments data on FDI could provide a distorted picture of the actual in- and out-flows by region because they measure flows to and from firm headquarters rather than plants. However, alternative evidence on multinational enterprises operating in and from Italy (for example by REPRINT data base[3], ICE- Politecnico di Milano) tends to support the picture described by balance of payments data.

2.3 Migration

Data on migration flows and on the presence of foreigners in total population are further indicators of international integration and a channel of convergence of incomes. Generally, the Southern regions have not been very attractive destinations of migrants into Italy, and this is likely to hold even if one acknowledges that illegal immigration could be a more important phenomenon in the South than in the Centre-North. In 1993, the share of foreigners in total population was, on average, around 0.8% in the South, as compared to 2% in Italy as a whole. In 2005, the share was respectively 1.5 and 4.2% for the South and Italy as a whole; in regions like Lombardy, Veneto, Emilia Romagna and Umbria the value ranged between 6 and 6.5% (see Figure 1b). Over the last 15 years, most Southern regions (in particular Campania, Molise, Puglia, Basilicata and Calabria) have constantly recorded net migration outflows (to a large extent migrations to other Italian regions) in the range of 0.2-0.5% of a region's population per year (Figure 1b).

2.4 Macroeconomic Convergence

As far as the growth performance is concerned, the Centre-Northern regions have on average recorded a slightly better performance than those of the South over the sample period (Figure 2). Yet, regional comparisons by macro regions mask important differences in growth *within* the North and the South. Regions in the North-West (Liguria, Lombardy, Piedmont and

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3 See Banca dati REPRINT, ICE-Politecnico di Milano, www.ice.it.

Val d'Aosta) on average recorded lower real GDP growth than Italy as a whole. Some Southern regions (for example Basilicata) showed relatively high growth in a few years.

Persistence of differences in labor market performance has been another characteristic of the macroeconomic environment. Unemployment has been persistently above average in the South. As for the rest of the country, there has been a trend decline in recent years. As far as participation rates are concerned, the Centre-North/South differential is of more that 10 percentage points, starting from low levels in absolute terms (54.3% South's participation rate in 2004).

The gap between the Centre-North and the South in income per capita has been persistent, measured in constant or current prices (Table 3). After having widened significantly between 1991 and 1995, the gap has fluctuated around a year average of about 8,700 euros in constant prices, while, in nominal terms, it has continued to grow. Nevertheless, measures of β and σ convergence over the whole 1991-2005 period signal a slow tendency towards convergence.

In sum, results of this section show a quite dichotomous picture of a higher degree of international integration of Northern compared to Southern Italian regions. This holds for different measures of integration such as trade, FDI, and migration. At the same time, the catch up in per capita incomes has been fairly slow. In the next sections, we turn to a more systematic assessment of the determinants of regional openness and the link between openness and per capita income.

3 Openness and Growth at the Regional Level

Northern and Southern Italy differ quite considerably in terms of openness for trade, capital flows, and migration. Income differentials between the two regions have been quite persistent. Are these observations linked? Assessing the impact of openness on growth or income per capita is complicated by the fact that trade might be endogenous to income. Regions that trade more might enjoy higher income – but they may also trade more precisely because their incomes are higher.

We use two methods to empirically study the link between openness and growth. The first is an instrumental variables estimator proposed by Frankel and Romer (1999). The second are panel cointegration techniques which deal with regressor endogeneity.

3.1 The Frankel and Romer methodology

In this section, we apply the methodology which has been proposed by F&R's and that consists of measuring the causal impact of trade on growth by employing instrumental variable regressions and by using the geographic component in bilateral trade as a proxy for total trade. We depart from the original international cross-section model by applying the framework to a panel of regional data.

The method requires a two-step estimation procedure. In a first step, a bilateral openness equation is specified. Predicted bilateral openness measures from this equation are then aggregated to obtain a measure of aggregated openness that is related to a set of exogenous variables only. In a second step, predicted aggregated openness is used as an instrument in a regression explaining the impact of openness on GDP per capita.

In F&R the following enriched gravity equation (1) serves as the basis for constructing an instrument for the foreign trade share that is related only to exogenous geographic variables:

$$\tau_{ijt} = a_0 + a_1 X_{ij} + a_2 X_{it} + a_3 X_{jt} + a_4 S + \varepsilon_{ijt} \qquad (1)$$

where τ_{ijt} is a measure of bilateral trade in logs, X_{ij} is a set of time invariant bilateral explanatory variables (log of distance, common state border, log of area, dummy variable for landlocked regions), X_{it} is a set of time-varying explanatory variables for the Italian region *i* (log of population), and X_{jt} is a corresponding set of explanatory variables for the foreign country *j*. Adding a dummy S which equals one for the Southern Italian regions, we can also test whether Southern Italy is significantly less integrated internationally than the rest of the country, as the descriptive statistics suggest. In order to improve the fit of the regression and to exploit all possible information correlated with the geographical determinants of trade, we also include a set of interaction terms between geographic characteristics.

The original approach by Frankel and Romer (1999) does not directly lend itself to a panel context since geographic factors such as distance are time-invariant. In a regional context though, we can additionally use foreign GDP as a time-varying exogenous determinant of bilateral openness. The underlying assumption is that none of the Italian regions is large enough to affect foreign GDP growth through changes in bilateral openness.

Re-writing (1) in matrix form $\tau_{ijt} = \mathbf{a}'\mathbf{X}_{ijt} + \varepsilon_{ijt}$, where $\mathbf{a}$ is the vector of coefficients and $\mathbf{X}_{ijt}$ is the vector of right-hand-side variables, region *i*'s overall predicted trade is given by

$$\hat{\Gamma}_{it} = \sum_{j \neq i} e^{\hat{\mathbf{a}}\mathbf{X}_{ijt}} \,. \qquad (2)$$

The explanatory variables included in (1) are exogenous to economic growth of region *i*. This implies that, if predicted trade and actual trade are sufficiently correlated, predicted trade can be used as an instrument in a growth regression. Equation (1) is estimated using a pooled OLS regression with robust standard errors, including a full set of time fixed effects. The predicted values from this estimation are used to obtain a measure of the geographic component of bilateral openness. The purpose of time fixed effects is to pick up macroeconomic developments affecting all region-country-pairs alike. In order to avoid picking up time-invariant characteristics of particular regions that might also be determinants of GDP per capita, we do not include region fixed effects. We nevertheless perform an estimation of the openness equation including a full set of time and region fixed effects to check the robustness of our results. The predicted trade shares are constructed using a specification including time-varying partner-country fixed effects.

With a proxy for expected aggregated openness at hand, the growth equation is specified as in Frankel and Romer (1999):

$$\ln\left(\frac{Y}{L}\right)_{it} = a + b\Gamma_{it} + c_1 \ln L_{it} + c_2 \ln A_i + u_{it} \qquad (3)$$

where $\left(\frac{Y}{L}\right)_{it}$ is income per capita in state *i*, Γ_i is the actual degree of openness, L_{it} is region's population, and A_i is region's size in km². Following F&R, we estimate equation (3) by using instrumental variables techniques with $\hat{\Gamma}_{it}$ serving as an instrument for Γ_{it}. In particular, we estimate the model both using a IV pooled model with regional dummies and a IV fixed-effects panel regression. In order to have efficient and consistent estimates, we compute robust standard errors accounting for arbitrary heteroskedasticity and autocorrelation in residuals. Our central assumption is that the openness instrument $\hat{\Gamma}$ is exogenous and can be expressed as $E\left(\hat{\Gamma}_i u_i\right) = 0$. We therefore check the IV regression results by looking at first stage small sample statistics and at specification tests of underidentification (Anderson canonical correlation), weak identification (Cragg Donald χ^2 robust), weak-instrument robust inference (Stock-Wright S, Anderson-Rubin F, Anderson Rubin χ^2) and, when using more that one instrument, the Hansen J statistic for overidentification (level and p-values).

3.2 Determinants of Openness Across Italian Regions

What explains differences in openness across Italian regions? To answer this question, we estimate gravity regressions for a region-country panel dataset for Italy for the years 1991-2004. The bilateral openness equation is specified for each combination of Italian regions and foreign countries. Our focus is on international trade since we lack detailed bilateral data for FDI or migration at the regional level.

Tables 4a and 4b report the results for the openness equation obtained by estimating equation (1) as a pooled OLS regression, using standard errors which have been corrected for autocorrelation and heteroskedasticity and clustering observations by partner countries. Tables 4.c report the coefficient estimates for the same model when region fixed effects are not included.

We have a (N x T) data set with N large and T =14. We use the trade share (exports plus imports over GDP in natural logs) as the dependent variable. We use the following explanatory variables (data definitions are given in the Appendix):

- *Geographic distance*: The expected effect is negative since transportation and communication costs increase the costs of trade over longer distances.
- *Population*: We expect a positive impact of population size in the home region and in the partner country. To some extent, population proxies for market size, and trade should increase in market size.
- *Area*: The expected impact of the geographic area of the domestic region and the foreign partner country is negative. In larger regions and countries, the probability of intra-area interactions tends to increase.
- *Partner country GDP*: We include partner country GDP as an additional measure of market size for the partner country. Also, foreign GDP has the advantage of being practically exogenous to a region's bilateral trade.[4] Hence, it can serve as a time-varying instrument for trade. The expected impact is positive since this variables measures external demand facing a region's exports.

[4] We eliminate observations in which the share of bilateral imports or exports relative to partner country GDP exceeds 10%. These are less than 20 observations.

- *Landlocked*: A 0/1 dummy for both region and partner country being landlocked is included to capture the fact that landlocked states typically trade less. The expected sign is negative.
- *Border effects*: Border effects are included in different ways. First, we use a 0/1 dummy for regions with an external border. We consider regions facing the sea as having an external border. Second, we use a 0/1 dummy for regions and partner countries sharing a common border. For both dummies, we expect a positive effect. We also interact the common border dummy with the remaining variables to check whether sharing a common border leads to a non-linear effect of the other determinants of trade.
- *South effects*: We test whether Southern Italian regions are less integrated into international trade by including a 0/1 dummy. To test whether the two regions differ with regard to the determinants of trade, we additionally interact these determinants with the Southern dummy, and we estimate our model separately for the Centre-North and Southern Italy.

Unreported time and region fixed effects are included in all specifications to capture common macroeconomic developments and time invariant characteristics of particular regions. Table 4a reports the estimates for the baseline model, Table 4b those for a more general version of the model, including non linear interaction terms of two geographical variables (sharing a common border and being located in the Southern part of Italy). Testing for the possibility to reduce Table 4b model to Table 4a's, we reject the hypothesis that the coefficients of the non linear interactions of the common border effect and those of the south (Table 4b) are jointly null or linearly dependent. This is also the reason why the estimate of the predicted values of the trade share to be used as instrumental variable is based on an even more general specification, in which we include partner country dummies that vary over time.

Our results for the openness equation have four main findings. First, for the pooled data set, the openness equation explains 75% of the cross-sectional variation in bilateral trade shares. The explanatory power is somewhat higher for the panel including only regions of the Centre-North, while it decreases when the import share is considered (61%).

Second, most of the coefficient estimates are consistent across specifications and have to a large extent the expected signs. They are also in line with results reported in Frankel and Romer (1999) and close to those obtained by Buch and Toubal (2007) for Germany. The distance coefficient for the trade share (-0.83, see Table 4b) is very close to the results

obtained by Frankel and Romer (1999) for the world (-0.85) but somewhat larger than the value obtained for Germany (-0.66) by Buch and Toubal (2007). Both, the region's population and area are significant and have the expected signs, while corresponding size measures for partner countries turn out not to be significant. Their effect is probably taken up mainly by partner countries' GDP (elasticity of 1.03).

Third, border effects are not estimated with a great degree of precision for the total trade share in a model that does not allow for interactions with other explanatory variables, as shown by a comparison of Tables 4a and 4b. This is due to the fact that border effects matter for Centre-Northern trade only. When border effects are introduced in the pooled model with interaction terms between the common border dummy and the other relevant variables of the model, we find that the common border effect is sizeable and has the expected positive sign. Sharing a border also has an impact on the size of the elasticity response of the trade share to region's and partners' area and population. Contrary to expectations, having an external border has a negative level effect. The coefficient for both region and partner being landlocked shows a value not significantly different from zero when the total trade share or the import share are considered, while it has the expected negative value when the export share is considered.[5]

Fourth, our results show significant difference between the South and the Centre-North. According to the pooled estimates in Table 4a, belonging to the South has a negative level effect on trade and export shares. Table 4b shows a stronger negative effect of distance on Southern Italy's trade. Furthermore, results referring to the Southern regions' panel confirm that the openness regression has a lower explanatory power for these regions' external trade than for the country as a whole or the Centre-North: 67% of the cross-sectional variation for the trade and export share, 54% for the import share. Fewer explanatory variables, namely distance and partner countries' GDP, are relevant.

We take our predicted values for the trade share from a specification of the gravity equation which includes only a full set of partner country-year fixed effects (besides the main gravity variables like distance, population, area, and dummies for an external regional border and a common border with a partner country). This partially takes into account potential methodological problems of estimating gravity-type regressions, as pointed out by Baldwin and Taglioni (2006). Omitted variables in gravity regressions which are correlated with trade costs might be correlated with the error term. To account for the resulting omitted variable

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[5] It is worth noticing that the estimation of the openness equation without including region fixed effects (Table 4c) returns coefficient estimates for the border effects that are more in line with expectations.

bias, Anderson and Van Wincoop (2003) suggest including time-varying country fixed effects. These fixed effects account for so-called 'multilateral resistance'. This has two effects for our estimation. On the one hand, including a full set of region-year and partner country-year fixed effects would have further improved our estimates. On the other hand, it could have potentially flawed the exogeneity of our measure because region specific effects might also be determinants of GDP. To check the robustness of our results, we also compute an alternative set of predicted trade shares, based on a general version of an openness equation including time-varying partner-country and region dummies; we will use them to cross-check the results we obtain for the growth equation that includes the preferred IV measure of the trade share.

The correlation between the actual level of the openness variables (including actual FDI and migration shares) and the predicted values of the trade, export and import shares is acceptable (0.4-0.5, see Table 4). Nevertheless, it is significantly lower than the correlation with predicted shares obtained from an openness equation including region and partner-country time-varying effects (between 0.4 and 0.9) .

3.3 Openness and Growth: Regression Results

We use GDP per capita as the dependent variable to estimate trade effects on income. A branch of the empirical growth literature uses GDP growth instead (see, e.g., Barro and Sala-i-Martin 2004). Yet, Henry (2006) and others have argued that the neoclassical growth model predicts a one-time shift income following international integration rather than a permanent growth effect. Hence, our preferred specification is the model using GDP per capita as the dependent variable.

We enrich the baseline growth equation of F&R (1999) by adding the regions' capital stock and a linear time trend. To capture long term income differentials between Centre-Northern and Southern regions and the effects of the Southern regions' growth gap in the early 1990s, we also add a 0/1 South dummy and a 0/1 South dummy for the 1991-1995 period. After the 1992 currency crisis, up to the mid-1990s, Southern Italy experienced a crisis of its banking sector, and investment subsidies were phased out. [6] Regarding the capital stock, we use measures of physical and human capital. Physical capital is total fixed capital (entered both as total capital stock or capital stock per employee), as defined by the national accounts; human

[6] See, e.g., Bank of Italy, *Relazione Annuale*, various issues, in particular those on 1994, 1995 and 1996.

capital is proxied by the average number of years of schooling. We also control for the state of technology by including expenditures in research and development.

We present different specifications for our growth equations that differ with regard to explanatory and instrumental variables and with regard to the estimation method. The dependent variable is always the natural log of regional income per person at constant prices. In Tables 6a and 6b, we report results of an instrumental variables (IV) pooled OLS estimation, including regional dummies. Table 6a and 6b also includes results of a fixed effects IV panel model. Table 6a enters physical capital as the log of total capital stock, Table 6b uses the log of total capital stock per employee. Generally, we correct for heteroskedasticity and autocorrelation and check the results with small sample statistics. In Table 6c, we report results of a pooled OLS estimation, including regional dummies and using actual openness indicators.

Our results suggest that predicted trade shares are valid instruments for actual trade. Results for export and import shares confirm this. At the same time, the exact specification of the instruments and of the model matters. As far as instruments are concerned, in Table 6a and 6b, we use time-varying 0/1 Southern dummies as additional instruments, thus accounting for the differences in the determinants of trade between Southern Italy and the rest of the country. Unreported regressions using predicted trade shares only provide very similar coefficients and test statistics. Regression results are also robust across the different specifications reported in Table 6a and Table 6b (pooled OLS versus fixed effects panel).

The model does not pass the specification tests when a time trend is included, both when it is estimated as a pooled OLS or a fixed effects panel. For instance, including a linear time trend (which is highly significant) as in specification (IV1) of Table 6a and 6b, the model does not pass the Hansen *J* over-identification test.[7] When no 0/1 Southern dummies are used as additional instruments, specifications including a linear time trend do not pass the underidentification and weak identification tests (Anderson canonical correlation and the Cragg Donald χ^2). Similarly, specifications (IV5), (IV7) and (IV9) are not accepted because of the results of the Stock-Wright test. For similar reasons, including human capital and the intensity of research of developments are rejected by the test statistics. With reference to the years of schooling, this might be due to a relatively high correlation with the trade and export shares (slightly over 0.5).

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[7] This holds also for unreported models of export and import shares including a linear time trend.

Test statistics also lead us to prefer specifications including the capital stock per employee rather than the total capital stock (Table 4b rather then Table 4a), in particular specifications (IV2) to (IV4) and (IV6), (IV8), (IV10) of Table 4b.

The even numbered specifications of Table 4b (plus IV3) indicate quite robustly that higher trade as well as higher imports and exports are associated with higher GDP per capita. Regions endowed with a higher capital stock per employee have a higher GDP per capita. The impact of size (population and area) is not statistically different from zero, while that of being located in the South turns out having had an effect significantly different from zero (and negative) during the first half of the 1990s only. These results are partially in line with those of F&R (1999). In their baseline model, they find a positive impact of trade on GDP per capita, a negative impact of country size (area) and a positive impact of population size. To check the robustness of the results, we have also used predicted trade, export and import shares derived from an openness equation including a full set of region and partner country time-varying dummies. The unreported results are very similar to those described above and presented in Tables 4a and 4b. Also in this case we would prefer the model of Table 4b and would not accept the inclusion of a time trend. Qualitatively, the fixed effects regression results are very much in line for the two sets of instruments. Quantitatively, when the alternative instruments are used, the openness coefficients turn out slightly smaller, and those of the capital stock become larger. As far as the pooled OLS regressions are concerned, similar consideration hold regarding the size of the openness and of the fixed capital coefficients. Differently from results in Table 4b, the coefficients of the size measures and of the south dummy are significantly different from zero (negative for population and the south dummy, positive for area).

For robustness check and comparison with F&R results, Table 6c presents the coefficients estimates derived from pooled-OLS-robust regressions (including regional fixed effects) of per capita income on actual trade, export, and import shares as well as other measures of openness like FDI and the shares of migrants.[8] As in F&R (1999), the impact on per capita income of the import share is estimated to be somewhat higher than that of the export share, both when the IV or the actual shares are used. Another results which is consistent with F&R is that the IV coefficient estimates of the openness measures exceed the OLS estimates. However, this could reflect a mis-specification of the model (Felbermayr 2005). Results using

[8] Due to data availability, specifications using FDI and migration shares are estimated respectively over the 1997-2005 and 1992-2005 period.

FDI or migration shares also show a positive link between the degree of openness and the level of per capita income.

In sum, results in this section provide evidence for a positive impact of trade on GDP per capita. Taken together with the results from the gravity regressions – that being located in Southern Italy has a negative impact of trade shares – this could be an indication that lower trade is one reason for the persistent differences in GDP per capita across Italian regions. In addition, lower endowments with capital explain differences in per capita incomes. However, results have also shown that there might be a role played by a time trend in GDP per capita. Hence, in the following section, we test additionally whether the relationship between trade and GDP per capita might be spurious.

4 Panel cointegration

When using GDP per capita as a dependent variable, the potential non-stationarity of the data becomes an issue. Our model is a fairly typical macro-panel with a similar dimension of the cross-section $N = 20$ and the time series $T = 14$ (1991-2004). Ignoring non-stationarity may thus lead to spurious regressions, as in time series data.

We run panel unit root tests to check whether our variables might be non-stationary. The results of these tests, which are reported in Table 7 provide evidence for GDP per capita to be non-stationary. For some other variables, the results are less clear cut and depend on the specific unit root test chosen.

Since our main interest is in the long-run effects of trade openness on income per capita, we test for the presence of a long-run cointegration relationship among our variables of interest by estimating a cointegrated panel model (Breitung 2005). The cointegration estimator requires a balanced panel, and we drop all regions which have incomplete time series for the main variables of interest. This leaves us with our sample of $T = 14$ and $N = 20$. Table 8 provides the results of cointegration tests. These results support the presence of cointegration relationships among the variables of interest.

In Table 9, we present estimates for the long-run cointegration coefficients using three different specifications: a fully modified OLS regression (FMOLS), a dynamic OLS regression (DOLS), and the Two-Step estimator proposed in Breitung (2005). Both, the FMOLS and the DOLS estimator, address serial correlation and endogeneity of the regressors. The FMOLS estimator corrects the OLS estimator non-parametrically, while the DOLS estimator uses information from past and future leads and lags of all variables. The Two-Step

estimator proposed by Breitung (2005) performs a correction for endogeneity at the second stage as well (Breitung and Pesaran 2005). Moreover, it creates a smaller estimation bias in small samples such as ours compared to the DOLS- and the FMOLS-estimator.

Estimates of the long-run cointegration vectors show that higher trade, a higher capital stock, and a smaller population increase GDP per capita. All effects are highly statistical significant. The estimated elasticities are plausible: a 1% increase in trade or the capital stock increases income per capita by about 0.25%. The elasticity with regard to population size is about –1%. Breaking total trade (exports plus imports) up into export and import shares gives very similar results.

5 Summary and Conclusions

In this paper, we have analyzed whether differences in income per capita between Southern Italy and the North-Centre regions are due a different degree of international openness. Our particular focus has been on international trade openness. According to measures of de facto openness, Southern Italian regions are less integrated with the rest of the world than the Centre-Northern ones. They trade less with the rest of the world, they host less foreign residents, and they are the destination and source of lower FDI flows than the Centre-North regions.

We have used two empirical models to assess the impact of trade on growth in the presence of endogenous regressors: an instrumental variables estimators following Frankel and Romer's (1999) as well as panel cointegration methods. Our paper has four main findings.

First, we estimate a gravity equation – the openness equation – to derive an instrument for actual trade. The openness equation performs quite well on Italian regional data. Regional geographic characteristics explain a significant share of the variance of regional external trade and provide us with fairly reliable instruments of openness that we can use to explain differences in growth performance across regions.

Second, distance has a strong negative impact on Southern regions' bilateral trade links. In this sense, geography is likely to explain a good deal of the higher degree of openness observed in the Centre-Northern regions. Also, foreign partners' GDP is the main explanatory variable of the Southern regions' bilateral external trade

Third, using predicted values for bilateral trade as a proxy for the aggregated openness across regions, we find evidence for a positive link between openness and GDP per capita. This

effect remains significant even if we include other variables affecting growth such as the capital stock or the size of regions.

Fourth, we use panel cointegration tests to confirm that these results are not spurious.

Overall, our results provide robust evidence for Italy that higher trade and a higher capital stock increase GDP per capita. Increasing trade and the capital stock by 1% leads to an increase in income per capita by about 0.2% and 0.3%, respectively. Hence, policy measures favoring both, an increase of openness and the capital accumulation, can be conducive to growth.

6 References

Anderson, J., van Wincoop, E., 2003, Gravity with Gravitas: a solution to the border puzzle. *American Economic Review* 93 (1): 170-192.

Aghion, P., and P. Howitt (2005). Appropriate Growth Policy: A Unifying Framework. Harvard University and Brown University. Mimeo.

Baldwin, R.E. (2003). Openness and Growth: What's the Empirical Relationship?. National Bureau of Economic Research. NBER Working Paper 9578. Cambridge MA.

Baldwin, R., and D. Taglioni, 2006, Gravity for Dummies and Dummies for Gravity Equations. National Bureau of Economic Research. NBER Working Paper 12516. Cambridge MA.

Banerjee, A., M. Marcellino, and C. Osbat (2005). Testing for PPP: Should we use panel methods? *Empirical Economics* 30: 77-91.

Barro, R.J., and X. Sala-i-Martin (2004). *Economic Growth*. 2nd edition. MIT Press. Cambridge, MA.

Breitung, J. (2000). The Local Power of Some Unit Root Tests for Panel Data, in: B. Baltagi (ed.). *Nonstationary Panels, Panel Cointegration, and Dynamic Panels*. Advances in Econometrics, Vol. 15, JAI: Amsterdam, 161-178.

Breitung, J. (2005). A Parametric Approach to the Estimation of Cointegration Vectors in Panel Data. *Econometric Review* 23(2): 151-173.

Breitung, J., and M.H. Pesaran (2005). Unit Roots and Cointegration in Panels. University of Bonn and Cambridge University. Mimeo.

Breitung, J., and S. Das (2005). Panel unit root tests under cross-sectional dependence. *Statistica Neerlandica* 59(4): 414-433.

Bronzini, R. and P.Piselli (2006), Determinants of long-run regional productivity: the role of R&D, human capital and public infrastructure, *Temi di discussione della Banca d'Italia, No. 597*.

Buch, C.M., and F. Toubal (2007). Openness and Growth: The Long Shadow of the Berlin Wall. Institute for Applied Economic Research (IAW). Discussion Paper 31. Tübingen.

Felbermayr, G.J. (2005). Dynamic Panel Data Evidence on the Trade-Income Relation. *Weltwirtschaftliches Archiv* (*Review of World Economics*) 141 (4): 583-611.

Frankel, J.A., and D. Romer (1999). Does Trade Cause Growth? *American Economic Review* 89(3): 379-399.

Helpman, E. (2004). *The Mystery of Economic Growth*. Harvard University Press, Cambridge MA.

Henry, P.B. (2006). Capital Account Liberalization: Theory, Evidence, and Speculation. NBER Working Paper No. 12698. Cambridge MA.

Im, K.S., M. H. Pesaran, and Y. Shin (2003). Testing for Unit Roots in Heterogeneous Panels. *Journal of Econometrics* 115: 53-74.

Kao, C. (1999). Spurious regressions and residual-based tests for cointegration in panel data. *Journal of Econometrics* 90: 1-44.

Levin, A., C. Lin, and C. Chu (2002). Unit Root Tests in Panel Data: Asymptotic and Finite Sample Properties. *Journal of Econometrics* 108: 1-24.

Pedroni, P. (2000). Fully modified OLS for heterogenous cointegrated panels. *Advances in Econometrics*. 15: 93-130.

Rodriguez, F. (2006). Openness and Growth: What Have We Learned? Wesleyan Economics Working Paper 2006-011. Middletown, CT.

7 Appendix

Data Definitions and Sources

Area: Area in Km^2. Sources: *Istat* for Italian regions, World Bank, *World Development Indicators* for foreign partner countries.

Capital stock: The regional capital stock is computed on the basis of the total capital stock for Italy (at 2000 prices) as published by *Istat*; the annual regional real investment share of total national real investment (source: *Istat's* regional accounts) is used as a proxy to allocate regionally the national capital stock.

Centre-North: Italian regions including: Piemonte, Valle d'Aosta, Lomardia, Trentino-Alto Adige, Veneto, Friuli Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio.

Distance: Approximate distance formula applied to the longitude and latitude of the main regional center and of country capitals, in Km. Longitude and latitude data from De Agostini, *Atlante geografico*.

Foreign Direct Investment: The source of the inward and outward FDI flows is Banca d'Italia balance of payments data. Inward flows by region are total FDI flows that originate from partner country "world" and whose destination are enterprises resident in a given region. Similarly FDI outflows are flows originating from enterprises resident in a given region and whose destination is partner country "world". Regional flows do not sum up to total national flows due to the presence of transactions that could not be allocated regionally. The FDI share is computed as regional inflows plus outflows over regional GDP.

Foreign residents: The source of data on foreign residents by region is Istat, in particular the following publications: *Istat* (2000), *Flussi migratori e popolazione straniera (1990-1998)*; Istat (2004), *La presenza straniera in Italia: caratteristiche socio-demografiche (2001-2003)*; and http://demo.istat.it/. For the 1999-2002 period, data for total residents are own estimates based on data on "resident permits" published by *Istat*. The foreign residents' share is computed as a ratio between total foreign residents by region and regional population. The official figures could underestimate the share of immigrants in Southern Italy since illegal immigration from Africa into the South may be above average. However, since migration within Italy is not restricted, legal and illegal immigration can be expected to share similar features in the medium- to long-run.

Foreign trade: Trade in goods (imports and exports) at current prices and exchange rates. Computations based on *Istat* data and taking into account only trade flows regionally allocated by *Istat*.

Human capital: The human capital stock (HC) is constructed following Bronzini and Piselli (2006). In particular, the HC variable for the years 1992-2005 is computed as the average number of years of schooling needed to reach a given qualification, weighted by the share (out of the total) of employees in each region having that qualification. The data source is *Istat's Indagine sulle forze di lavoro*. Qualification levels are transformed into years of schooling in the following way: 0 years of schooling for "no qualification", 5 for completing

lower primary school, 8 for lower secondary school, 10.5 for a professional diploma, 12.5 for completing secondary education, 15.5 for a laurea breve (bachelor degree), 17.5 for a standard graduate degree, 21.5 for a *dottorato*, PhD or other post-graduate degree. No data are available for Valle d'Aosta.

Migration flows: The source of internal and external migration flows is *Istat's* data on "bilancio demografico". The migration share (Fig.1b) is computed as a share of the balance of total registration minus total cancellations over total regional population. A breakdown is also available for internal migrations (registrations from another region minus deregistration to move to another region for internal migrations and registration from abroad minus de-registrations abroad).

Population: *Istat's* demography database for the population of the Italian regions; World Bank, *World Development Indicators* for foreign partner countries.

Real and nominal GDP per capita: For the Italian regions: ratio between regional GDP (at 1995 prices and at current prices) as published by *Istat's* regional accounts and average annual regional population. For partner countries: World Bank, *World Development Indicators*.

Research and development (R&D) capital stock: The R&D capital stock is also computed according to Bronzini and Piselli (2006). Up to 2001 data are Bronzini and Piselli's ones. For the years 2002-2005, the R&D capital stock (SD&R) is computed in the following way: R&D expenditure (R_t) at current prices is first converted into constant (1995) prices, then the perpetual inventory method with a depreciation rate (δ) of 15% is applied to the 2001 capital stock, that is: $SD\&R_t = SD\&R_{t-1}(1- \delta) + R_t$, where $SD\&R_0= SD\&R_{2001}$. In particular R&D nominal expenditure (net of university expenditure) for 2002 and 2003 is the value published by Istat's *La ricerca e sviluppo in Italia (2004-2006)*; for the years 2004-05, the nominal expenditure by region is obtained by applying to 2003 data the growth rate of the national R&D expenditure. The value of the R&D expenditure at constant prices at regional level is then computed using the national deflation index that can be obtained from data on total national expenditure at current and constant prices published by Istat.

South: Italian regions including: Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna

Table 1: Trade in Goods Relative to Regional GDP (%)

Trade is defined as exports plus imports at current prices and exchange rates. Data reported in this table are computed from those obtained from Istat.

	1991-2005		1991	1995	2000	2003	2005
	Standard Deviation	*Mean*					
Piemonte	*3.9*	*48.7*	42.6	56.7	52.1	47.7	50.7
Valle d'Aosta	*4.7*	*18.7*	10.6	24.7	24.2	22.7	22.5
Lombardia	*7.9*	*63.4*	50.6	65.7	71.8	67.3	75.2
Trentino-Alto Adige	*3.2*	*31.1*	25.9	33.9	33.5	33.0	35.5
Veneto	*8.4*	*54.0*	38.2	55.1	61.6	58.4	63.1
Friuli-Venezia Giulia	*6.4*	*42.8*	32.3	43.6	51.1	41.6	48.2
Liguria	*3.6*	*24.6*	20.0	24.6	27.1	27.8	31.9
Emilia-Romagna	*6.5*	*41.8*	31.1	42.0	46.2	45.2	52.7
Toscana	*5.5*	*41.0*	30.2	43.7	48.3	41.1	44.3
Umbria	*4.6*	*21.5*	13.6	23.0	24.8	24.2	28.2
Marche	*6.4*	*33.2*	22.0	33.4	37.0	38.2	42.8
Lazio	*3.0*	*23.0*	21.2	20.6	28.5	24.4	25.4
Abruzzo	*9.2*	*32.5*	18.1	34.1	41.6	37.6	41.1
Molise	*3.9*	*14.1*	5.8	14.7	16.4	14.6	17.2
Campania	*2.2*	*17.0*	13.2	17.2	20.2	17.0	18.3
Puglia	*2.5*	*17.7*	14.6	18.2	19.8	17.4	22.7
Basilicata	*6.1*	*13.6*	5.2	9.9	17.7	21.3	19.4
Calabria	*0.2*	*2.8*	2.7	2.6	3.0	3.0	3.2
Sicilia	*6.1*	*20.1*	13.8	17.2	28.8	22.6	32.8
Sardegna	*4.9*	*21.7*	18.6	20.4	27.9	22.9	34.6
Italy	*5.1*	*38.8*	**30.2**	**40.2**	**44.6**	**40.7**	**45.7**
Standard deviation Italy		*15.4*	*12.8*	*16.7*	*17.0*	*15.7*	*17.2*
South	*3.6*	***18.1***	**13.2**	**17.4**	**22.8**	**19.3**	**24.5**
Standard deviation South		*8.4*	*6.1*	*9.0*	*11.2*	*9.7*	*12.0*
Center-North	*5.6*	***45.6***	**35.9**	**47.4**	**51.7**	**47.8**	**52.6**
Standard deviation Center-North		*14.1*	*11.8*	*14.8*	*15.5*	*14.0*	*15.8*

Table 2: Capital Stock per Employee

The capital stock per employee is given in 1,000 € and in constant 2000 prices. Data reported in this table are computed from data obtained from Istat..

	1992-2005		1992	1995	2000	2003	2005
	Standard deviation	*Mean*					
Piemonte	*9.9*	*184.6*	166.0	183.9	185.4	183.9	202.5
Valle d'Aosta	*14.2*	*215.9*	218.3	239.1	195.4	216.9	218.8
Lombardia	*12.2*	*172.1*	148.7	172.2	182.1	175.4	176.2
Trentino-Alto Adige	*15.6*	*248.5*	200.5	247.7	238.1	254.2	255.0
Veneto	*13.6*	*179.7*	147.8	180.8	180.9	188.6	188.9
Friuli-Venezia Giulia	*15.2*	*169.1*	146.2	159.6	175.8	185.6	186.0
Liguria	*9.6*	*141.0*	147.4	127.0	143.5	165.3	142.2
Emilia-Romagna	*13.5*	*172.0*	143.3	177.7	177.3	177.5	181.4
Toscana	*13.6*	*154.2*	117.9	158.8	147.9	159.1	161.4
Umbria	*7.7*	*160.9*	154.2	157.0	160.9	161.9	148.5
Marche	*15.7*	*156.3*	132.6	142.1	162.6	166.0	178.7
Lazio	*10.1*	*175.4*	158.4	185.3	188.5	182.7	164.6
Abruzzo	*12.1*	*151.1*	140.9	136.3	143.9	160.1	173.4
Molise	*14.1*	*164.0*	157.1	153.0	181.3	150.9	184.8
Campania	*8.6*	*139.1*	161.1	134.1	132.5	141.0	143.5
Puglia	*15.3*	*133.7*	124.6	113.1	139.5	144.8	161.7
Basilicata	*20.8*	*188.3*	169.4	182.4	198.3	191.6	200.1
Calabria	*8.4*	*154.1*	151.0	140.0	146.5	142.9	154.5
Sicilia	*8.1*	*152.9*	163.5	150.4	160.7	148.4	154.3
Sardegna	*15.7*	*174.9*	172.5	153.8	165.6	175.7	200.3
Italy	*6.8*	**166.0**	**150.5**	**163.3**	**169.2**	**170.7**	**174.0**
Standard deviation Italy		***26.7***	***23.2***	***36.3***	***25.3***	***27.1***	***27.7***
South	*6.5*	**148.6**	**153.2**	**137.9**	**148.2**	**149.9**	**160.5**
Standard deviation South		***18.0***	***15.9***	***20.0***	***22.5***	***18.0***	***21.7***
Centre-North	*9.8*	**173.2**	**149.3**	**174.1**	**177.9**	**179.3**	**179.3**
Standard deviation Centre-North		***29.1***	***27.7***	***35.3***	***24.7***	***26.8***	***31.1***

Table 3: GDP per Capita

Data reported in this table are computed from data obtained from Istat. Data are in Euro and at current prices. S.d. = standard deviation.

	1991-2005		1991	1995	2000	2003	2005
	s.d.	*Average*					
Piemonte	*4,034*	*21,419*	14,896	19,059	23,805	25,628	26626
Valle d'Aosta	*3,548*	*24,862*	19,002	23,230	25,882	29,168	29730
Lombardia	*4,201*	*23,998*	17,303	21,392	26,392	28,363	29301
Trentino-Alto Adige	*4,403*	*24,713*	17,879	21,621	27,090	29,643	30788
Veneto	*3,837*	*21,292*	14,818	19,060	23,685	25,266	26055
Friuli-Venezia Giulia	*4,367*	*20,931*	13,922	18,800	22,882	25,943	26998
Liguria	*4,267*	*20,149*	13,925	17,123	22,263	25,148	26182
Emilia-Romagna	*4,357*	*23,335*	16,181	20,746	25,987	28,066	28828
Toscana	*4,006*	*20,342*	14,045	17,724	22,669	24,716	25571
Umbria	*3,296*	*17,996*	12,650	15,948	19,920	21,440	22422
Marche	*3,647*	*18,526*	12,630	16,293	20,484	22,472	23305
Lazio	*4,423*	*21,132*	14,725	17,985	22,998	25,926	28194
Abruzzo	*2,722*	*15,917*	11,844	14,084	17,392	19,127	19701
Molise	*2,879*	*14,451*	9,880	12,586	15,850	17,596	18359
Campania	*2,526*	*12,230*	8,634	10,269	13,343	15,303	15769
Puglia	*2,455*	*12,355*	8,780	10,557	13,600	15,238	15698
Basilicata	*2,777*	*12,778*	8,244	10,942	14,429	15,699	16288
Calabria	*2,496*	*11,526*	7,863	9,788	12,564	14,487	15110
Sicilia	*2,406*	*12,628*	9,412	10,651	13,493	15,512	16735
Sardegna	*2,839*	*14,203*	10,081	12,087	15,259	17,564	18593
Italy	***3,593***	***18,629***	**13,106**	**16,232**	**20,469**	**22,670**	**23555**
Standard deviation Italy		*4,596*	*3,397*	*4,330*	*5,026*	*5,309*	*5459*
South	***2,530***	***12,720***	**9,095**	**10,807**	**13,808**	**15,767**	**16451**
Standard deviation South		*1,458*	*1,271*	*1,436*	*1,589*	*1,588*	*1649*
Center-North	***4,172***	***21,967***	**15,379**	**19,330**	**24,245**	**26,531**	**27463**
Standard deviation Center-North		***2,256***	***2,026***	***2,263***	***2,289***	***2,513***	***2527***

Table 4: The Openness Equations

Trade is the sum of exports and imports. Robust t-statistics are reported in brackets. *** significant at the 1%, ** significant at the 5%, * significant at the 10% level of significance

a) Determinants of Trade Shares (Baseline)

	Ln Trade share			Ln Export share			Ln Import share		
	Total sample	South	Centre-North	Total sample	South	Centre-North	Total sample	South	Centre-North
Ln distance	-0.97***	-1.20***	-0.84***	-1.02***	-1.26***	-0.88***	-1.00***	-1.12***	-0.92***
	(16.03)	(15.55)	(14.25)	(17.00)	(15.68)	(15.89)	(13.39)	(13.92)	(10.65)
Ln region's population	1.91***	3.44	2.95***	2.79***	2.96	4.82***	0.68	-0.16	1.09
	(2.64)	(1.49)	(4.18)	(4.15)	(1.21)	(6.78)	(0.69)	(0.05)	(1.01)
Ln partner's population	-0.08	-0.11	-0.06	-0.15**	-0.18**	-0.14**	0.11	0.03	0.15*
	(1.31)	(1.45)	(1.11)	(2.32)	(2.15)	(2.29)	(1.42)	(0.39)	(1.78)
Ln region's area	-2.95*	-7.73	-5.23***	-4.82***	-3.04	-9.25***	-0.57	0.48	-1.44
	(1.87)	(1.31)	(3.39)	(3.28)	(1.30)	(5.97)	(0.26)	(0.16)	(0.62)
Ln partner's area	0.02	0.08	-0.02	-0.05	-0.02	-0.06	0.07	0.15***	0.03
	(0.30)	(1.15)	(0.47)	(0.94)	(0.23)	(1.45)	(1.27)	(2.87)	(0.43)
Ln GDP partner, co.p.	1.02***	1.03***	1.02***	1.07***	1.10***	1.07***	0.93***	0.89***	0.96***
	(27.88)	(22.82)	(27.74)	(28.51)	(23.78)	(28.11)	(19.38)	(17.48)	(18.09)
both landlocked (1/0)	-0.24	0	-0.19	-0.44***	0	-0.39**	-0.08	0	0.01
	(1.37)	(.)	(1.10)	(2.88)	(.)	(2.55)	(0.30)	(.)	(0.03)
Region with external border (1/0)	-0.15	0	-0.29**	-0.29**	0	-0.55***	0.3	0	-0.61
	(1.23)	(.)	(2.27)	(2.51)	(.)	(4.53)	(1.45)	(.)	(0.65)
Common border region & partner (1/0)	0.26		0.56**	0.17		0.50**	0.62		0.70*
	(0.98)		(2.13)	(0.76)		(2.32)	(1.55)		(1.68)
Southern Italy (1/0)	-1.84***			-2.77***			-0.28		
	(3.25)			(5.13)			(0.16)		
Constant	-5.13	15.83	0.36	0.71	-16.12	12.07***	-13.69**	-10.49	-11.63
	(1.11)	(0.78)	(0.08)	(0.17)	(1.42)	(2.75)	(2.23)	(0.73)	(1.55)
Observations	34146	13049	21097	33100	12241	20859	30441	10987	19454
R-squared	0.75	0.67	0.8	0.76	0.68	0.82	0.61	0.54	0.64
Time and region dummies included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

b) Determinants of Trade Shares (Interaction Terms and Sample Splits)

	Ln Trade share			Ln Export share			Ln Import share		
	Total sample	South	Centre-North	Total sample	South	Centre-North	Total sample	South	Centre-North
Ln distance	-0.83***	-1.20***	-0.84***	-0.88***	-1.26***	-0.88***	-0.92***	-1.12***	-0.91***
	(0.06)	(0.08)	(0.06)	(0.06)	(0.08)	(0.06)	(0.08)	(0.08)	(0.09)
Ln region's population	2.13***	3.44	2.98***	3.49***	2.96	4.85***	0.89	-0.16	1.12
	(0.72)	(2.31)	(0.71)	(0.72)	(2.44)	(0.71)	(1.04)	(3.03)	(1.08)
Ln partner's population	-0.07	-0.11	-0.06	-0.15**	-0.18**	-0.14**	0.17**	0.03	0.15*
	(0.06)	(0.08)	(0.05)	(0.06)	(0.08)	(0.06)	(0.08)	(0.08)	(0.08)
Ln region's area	-3.42**	-7.73	-5.28***	-6.32***	-3.04	-9.30***	-1.03	0.48	-1.5
	(1.58)	(5.90)	(1.54)	(1.56)	(2.35)	(1.55)	(2.26)	(2.89)	(2.34)
Ln partner's area	-0.02	0.08	-0.02	-0.06	-0.02	-0.06	0.03	0.15***	0.03
	(0.04)	(0.07)	(0.04)	(0.04)	(0.07)	(0.04)	(0.06)	(0.05)	(0.06)
Ln GDP partner, co.p.	1.03***	1.03***	1.02***	1.08***	1.10***	1.07***	0.94***	0.89***	0.96***
	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.05	(0.05)	(0.05)
Both landlocked (1/0)	-0.17		-0.18	-0.38**		-0.39**	-0.01		0.02
	(0.18)		(0.17)	(0.16)		0.16)	(0.26)		(0.26)
Region with external border (1/0)	-1.56**		-0.29**	-0.38***		-0.56***	0.28		-0.63
	(0.63)		(0.13)	(0.12)		(0.12)	(0.21)		(0.94)
Common border region & partner (1/0)	17.33***		17.23***	16.20***		16.13***	20.23***		20.57***
	(1.25)		(1.23)	(1.87)		(1.86)	(2.09)		(2.09)
Common border*Ln distance	0.12		0.13	0.01		0.02	0.56**		0.52**
	(0.15)		(0.15)	(0.20)		(0.20)	(0.22)		(0.22)
Common border*Ln region population	-1.02***		-1.02***	-0.96***		-0.96***	-0.78***		-0.78***
	(0.21)		(0.22)	(0.18)		(0.18)	(0.21)		(0.21)
Common border*Ln partner population	-2.26***		-2.24***	-1.74***		-1.73***	-3.41***		-3.47***
	(0.26)		(0.26)	(0.25)		(0.24)	(0.40)		(0.40)
Common border *regional area	1.28***		1.28***	0.96**		0.96**	1.46***		1.45***
	(0.44)		(0.44)	(0.37)		(0.37)	(0.40)		(0.40)
Common border*Ln partner area	1.90***		1.88***	1.50***		1.49***	2.67***		2.74***
	(0.31)		(0.31)	(0.30)		(0.30)	(0.43)		(0.43)

Table 4b continues …

Table 4b continued.

	Ln Trade share			Ln Export share			Ln Import share		
	Total sample	South	Centre-North	Total sample	South	Centre-North	Total sample	South	Centre-North
South * Ln distance	-0.36***			-0.39***			-0.18**		
	(0.06)			(0.06)			(0.08)		
South * Ln region population	-0.92			-3.88			-1.79		
	(2.35)			(2.52)			(3.17)		
South * Ln partner population	-0.03			-0.02			-0.18***		
	(0.05)			(0.05)			(0.06)		
South *Ln region area	1.69			6.12*			2.82		
	(3.37)			(3.63)			(4.55)		
South * Ln partner area	0.09**			0.04			0.13***		
	(0.04)			(0.05)			(0.04)		
South * Ln PDP per capita (partner)	0			0			0		
	(0.00)			(0.00)			(0.00)		
Constant	-3.41	15.83	0.38	3.79	-16.12	12.09***	-13.56**	-10.49	-11.44
	(5.16)	(20.28)	(4.49)	(4.46)	(11.34)	(4.39)	(6.54)	(14.30)	(7.52)
Observations	34146	13049	21097	33100	12241	20859	30441	10987	19454
R-squared	0.7523	0.6667	0.8018	0.7671	0.6771	0.8162	0.6091	0.5362	0.6438
Time and region dummies included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

c) Determinants of Trade Shares (Interaction Terms and Sample Splits)

	Ln Trade share			Ln Export share			Ln Import share		
	Total sample	South	Centre-North	Total sample	South	Centre-North	Total sample	South	Centre-North
Ln distance	-0.88***	-1.19***	-0.84***	-0.96***	-1.24***	-0.89***	-0.95***	-1.11***	-0.92***
	(0.06)	(0.08)	(0.06)	(0.06)	(0.08)	(0.05)	(0.08)	(0.08)	(0.09)
Ln region's population	0.65***	0.65***	0.65***	0.49***	0.66***	0.51***	0.61***	0.50***	0.63***
	(0.04)	(0.06)	(0.04)	(0.04)	(0.06)	(0.04)	(0.06)	(0.07)	(0.06)
Ln partner's population	-0.10*	-0.11	-0.06	-0.21***	-0.17**	-0.14**	0.15*	0.02	0.15*
	(0.06)	(0.08)	(0.05)	(0.06)	(0.08)	(0.06)	(0.08)	(0.08)	(0.08)
Ln region's area	-0.39***	-0.77***	-0.28***	-0.15***	-1.19***	0.06	-0.53***	-0.44***	-0.48***
	(0.06)	(0.12)	(0.06)	(0.06)	(0.13)	(0.05)	(0.09)	(0.16)	(0.10)
Ln partner's area	0	0.08	-0.02	-0.03	-0.02	-0.06	0.03	0.16***	0.03
	(0.04)	(0.07)	(0.04)	(0.04)	(0.07)	(0.04)	(0.06)	(0.05)	(0.06)
Ln GDP partner, co.p.	1.02***	1.02***	1.01***	1.06***	1.07***	1.06***	0.93***	0.87***	0.96***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
Both landlocked (1/0)	-0.33*		-0.32*	-0.54***		-0.53***	-0.1		-0.07
	(0.17)		(0.17)	(0.14)		(0.15)	(0.25)		(0.25)
Region with external border (1/0)	0.10***		0.13***	0.06**		0.10***	0.25***		0.26***
	(0.04)		(0.04)	(0.03)		(0.03)	(0.06)		(0.07)
Common border region & partner (1/0)	17.44***		19.31***	14.60***		18.30***	19.05***		20.51***
	(1.20)		(1.18)	(1.67)		(1.64)	(1.73)		(1.76)
Common border*Ln distance	-0.24		-0.28*	-0.41**		-0.49***	0.19		0.13
	(0.16)		(0.17)	(0.18)		(0.18)	(0.21)		(0.21)
Common border*Ln region population	-0.78***		-0.79***	-0.72***		-0.73***	-0.56***		-0.57***
	(0.13)		(0.13)	(0.08)		(0.08)	(0.18)		(0.18)
Common border*Ln partner population	-2.55***		-2.58***	-2.01***		-2.09***	-3.30***		-3.39***
	(0.26)		(0.26)	(0.28)		(0.28)	(0.38)		(0.37)
Common border *regional area	1.12***		1.01***	0.91***		0.70***	1.17***		1.12***
	(0.27)		(0.27)	(0.19)		(0.19)	(0.34)		(0.33)

Table 4c continues …

Table 4c continued.

	Ln Trade share			Ln Export share			Ln Import share		
	Total sample	South	Centre-North	Total sample	South	Centre-North	Total sample	South	Centre-North
Common border*Ln partner area	2.31***		2.31***	1.93***		1.97***	2.73***		2.83***
	(0.28)		(0.27)	(0.30)		(0.30)	(0.39)		(0.39)
South * Ln distance	-0.25***			-0.17***			-0.13		
	(0.05)			(0.06)			(0.08)		
South * Ln region population	0.03			0.21***			-0.08		
	(0.06)			(0.06)			(0.09)		
South * Ln partner population	0.06			0.16***			-0.13**		
	(0.05)			(0.05)			(0.05)		
South *Ln region area	-0.15			-0.58***			0.21		
	(0.12)			(0.13)			(0.17)		
South * Ln partner area	0.06			-0.02			0.12**		
	(0.04)			(0.05)			(0.05)		
South * Ln PDP per capita (partner)	0			0			-0.00*		
	(0.00)			(0.00)			(0.00)		
Constant	-11.13***	-7.29***	-13.09***	-9.65***	-2.47**	-13.37***	-13.81***	-11.24***	-14.88***
	(0.76)	(1.14)	(0.73)	(0.71)	(1.10)	(0.69)	(1.02)	(1.47)	(1.08)
Observations	34146	13049	21097	33100	12241	20859	30441	10987	19454
R-squared	0.7186	0.6222	0.7781	0.7188	0.6203	0.7845	0.5895	0.5067	0.6301
Time dummies included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Correlation Between Openness Indicators and Predicted Values for Trade

This Table presents correlation coefficient between actual and predicted trade shares. The predicted trade shares are obtained from a regression using a full set of partner country*year dummy variables, as explained in the text. A star indicates significance at the 1% level.

	Predicted shares		
	Trade share	Export share	Import share
Actual shares			
Trade share	0.4521*	0.4029*	0.4815*
Export share	0.4231*	0.4061*	0.4011*
Import share	0.4130*	0.3304*	0.5042*
FDI share	0.3321*	0.3191*	0.3066*
Migration share	0.3191*	0.4322*	0.1664*
Predicted shares			
Trade share	1		
Export share	0.9778*	1	
Import share	0.9449*	0.8587*	1

Table 6: GDP per Capita and Openness

Panels (a) and (b) report the results of the instrumental variable regressions, using predicted trade shares as instrument of actual trade. The dependent variable in the regressions is the natural log of real GDP per capita. *Trend* is a linear time trend, *South* is 0/1 dummy for Southern regions, *South 1991-95* is an interaction term between a 0/1 dummy for Southern regions and the pre-1996 period. The pooled OLS panel includes a full set of regional dummies. Table c) report pooled OLS estimates for actual trade shares. ***, **, * = significant at the 1%, 5%, 10%-level.

a) Predicted Trade Shares, Pooled OLS and Fixed Effects

	Pooled OLS, including region fixed effects				Fixed effects panel regression					
	(IV1)	(IV2)	(IV3)	(IV4)	(IV5)	(IV6)	(IV7)	(IV8)	(IV9)	(IV10)
Ln trade share	0.016	0.226***			0.011	0.217***				
	(0.018)	(0.025)			(0.018)	(0.025)				
Ln export share			0.152***				0.007	0.149***		
			(0.022)				(0.015)	[0.022]		
Ln import share				0.226***					0.046**	0.256***
				(0.029)					(0.018)	(0.031)
Ln region's population	-0.251*	-0.321***	-0.787**	-0.328***	-1.168***	-0.616**	-1.223***	-0.523	-1.177***	-0.778***
	(0.139)	(0.027)	(0.368)	(0.025)	(0.139)	(0.301)	(0.143)	(0.368)	(0.134)	(0.250)
Ln region's area	1.295	1.117***	7.801	1.156***						
	(2.389)	(0.017)	(6.161)	(0.020)						
Ln capital stock	0.108***	0.253***	0.369***	0.239***	0.096***	0.259***	0.095***	0.362***	0.082***	0.233***
	(0.021)	(0.034)	(0.030)	(0.032)	(0.020)	(0.032)	(0.019)	(0.030)	(0.021)	(0.034)
South	-0.971	-0.789***	-3.427	-0.811***						
	(0.961)	(0.019)	(2.470)	(0.023)						
South 1991-95	-0.014***	-0.029***	-0.040***	-0.052***	-0.008*	-0.033***	-0.008*	-0.041***	-0.006	-0.044***
	(0.004)	(0.005)	(0.006)	(0.007)	(0.004)	(0.005)	(0.004)	(0.006)	(0.004)	(0.007)
Trend	0.014***				0.014***		0.015***		0.014***	
	(0.001)				(0.001)		(0.001)		(0.001)	
Constant	-0.425	0	-59.07	0						
	(21.135)	(0.000)	(54.544)	(0.000)						
Observations	271	271	261	267	271	271	261	261	267	267
R-squared	0.992	0.981	0.98	0.982	0.902	0.685	0.902	0.651	0.905	0.666
1st stage F-statistics	5.69***	9.36***	19.29***	10.95***	5.56***	9.44***	15.62***	19.28***	7.71***	10.94***
Stock-Wright S, p value	0.02	0.06	0.07	0.08	0.27	0.10	0.33	0.11	0.35	0.09
Anderson canonical correlation LR, p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cragg Donald robust χ^2 , p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anderson-Rubin χ^2 , p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anderson-Rubin F , p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hansen overidentification test	54.19	14.56	14.81	12.79	15.50	10.79	14.80	12.44	12.70	11.35
(p-value)	0.00	0.27	0.25	0.39	0.22	0.55	0.25	0.41	0.39	0.50

b) Predicted Trade Shares, Pooled OLS and Fixed Effects

	Pooled OLS, including region fixed effects				Fixed effects panel regression					
	(IV1)	(IV2)	(IV3)	(IV4)	(IV5)	(IV6)	(IV7)	(IV8)	(IV9)	(IV10)
Ln trade share	-0.019	0.232***			-0.002	0.245***				
	(0.020)	(0.026)			(0.019)	(0.026)				
Ln export share			0.208***				-0.015	0.200***		
			(0.024)				(0.017)	(0.024)		
Ln import share				0.282***					0.043**	0.280***
				(0.030)					(0.017)	(0.030)
Ln region's population	-1.819***	0.005	-0.205	0.088	-1.184***	-0.283	-1.198***	-0.122	-1.169***	-0.435
	(0.173)	(0.385)	(0.483)	(0.272)	(0.153)	(0.363)	(0.163)	(0.464)	(0.144)	(0.268)
Ln region's area	29.395***	-1.121	3.159	-2.896						
	(2.942)	(6.604)	(8.246)	(4.654)						
Ln capital stock per employee	0.070***	0.200***	0.240***	0.157***	0.062***	0.200***	0.066***	0.243***	0.042*	0.158***
	(0.023)	(0.035)	(0.038)	(0.035)	(0.023)	(0.034)	(0.023)	(0.038)	(0.023)	(0.035)
South	-12.301***	0.036	-1.651	0.735						
	(1.183)	(2.650)	(3.310)	(1.867)						
South 1991-95	-0.001	-0.031***	-0.024***	-0.040***	-0.006	-0.026***	-0.008	-0.028***	-0.002	-0.039***
	(0.005)	(0.006)	(0.008)	(0.006)	(0.005)	(0.006)	(0.005)	(0.008)	(0.004)	(0.006)
Trend	0.017***				0.016***		0.016***		0.015***	
	(0.001)				(0.001)		(0.001)		(0.001)	
Constant	-249.222***	18.957	-19.468	35.171						
	(26.023)	(58.522)	(73.012)	(41.196)						
Observations	260	260	260	258	260	260	260	260	258	258
R-squared	0.993	0.977	0.972	0.977	0.894	0.577	0.888	0.502	0.903	0.6
1st stage F-statistics	7.07***	13.32***	9.09***	12.15***	7.1***	13.42***	6.05***	9.11***	9.49***	12.16***
Stock-Wright S, p value	0.03	0.02	0.00	0.01	0.27	0.02	0.26	0.03	0.29	0.03
Anderson canonical correlation LR, p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cragg Donald robust χ^2 , p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anderson-Rubin χ^2 , p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anderson-Rubin F , p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hansen overidentification test	26.03	11.80	13.41	17.42	14.119	10.583	13.92	11.83	12.29	10.87
(p-value)	0.01	0.38	0.27	0.10	0.2265	0.48	0.24	0.38	0.34	0.45

b) Actual Trade Shares, Pooled OLS

	Actual shares, pooled OLS estimates									
	O(1)	O(2)	O(3)	O(4)	O(5)	O(6)	O(7)	O(8)	O(9)	O(10)
Ln trade share	0.034***	0.172***								
	(0.013)	(0.018)								
Ln export share			0.026**	0.125***						
			(0.012)	(0.016)						
Ln import share					0.026**	0.191***				
					(0.013)	(0.017)				
Ln FDI share							0.026**	0.137***		
							(0.010)	(0.006)		
Ln migration share									0.002	0.010***
									(0.001)	(0.003)
Ln region's population	-1.186***	-0.242	-1.199***	-0.158	-1.209***	-0.426**	-1.358***	-1.621***	-1.507***	-0.028
	(0.130)	(0.238)	(0.129)	(0.276)	(0.129)	(0.208)	(0.126)	(0.137)	(0.139)	(0.324)
Ln region's area	2.532***	0.413	1.995***	0.146	2.583***	0.778*	2.919***	2.739***	2.542***	-0.027
	(0.285)	(0.515)	(0.225)	(0.480)	(0.283)	(0.452)	(0.272)	(0.238)	(0.241)	(0.565)
Ln capital stock per employee	0.057**	0.222***	0.058**	0.261***	0.057**	0.193***	0.026	0.016	-0.033	0.108*
	(0.024)	(0.035)	(0.024)	(0.039)	(0.025)	(0.037)	(0.025)	(0.026)	(0.029)	(0.062)
South	0.248**	-0.287	0.059	-0.328**	0.260***	-0.132	-2.833***	-1.692***	-1.708***	-0.383
	(0.097)	(0.186)	(0.059)	(0.133)	(0.096)	(0.163)	(0.211)	(0.118)	(0.120)	(0.279)
South 1991-95	0.001	-0.049***	0.002	-0.058***	-0.003	-0.059***	-0.008*	-0.028***	0	0
	(0.006)	(0.010)	(0.006)	(0.010)	(0.006)	(0.009)	(0.005)	(0.007)	(0.000)	(0.000)
Trend	0.015***		0.015***		0.015***		0.014***		0.015***	
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Constant	2.915***	7.861***	7.441***	9.042***	2.810***	7.313***	2.050***	6.696***	7.134***	10.037***
	(0.775)	(1.433)	(0.330)	(0.739)	(0.778)	(1.265)	(0.727)	(0.356)	(0.386)	(0.909)
Observations	260	260	260	260	260	260	241	241	135	135
R-squared	0.995	0.979	0.994	0.975	0.994	0.98	0.995	0.992	0.997	0.984
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Panel Unit Root Tests

This table reports the test statistics of panel unit root tests based on Levin, Lin, and Chu (2002), Im, Pesaran, and Shin (2003), and Breitung and Das (2005). The tests are based on a maximum number of observations N*T = 260, N = 20. The Null-Hypothesis is that the series contains a unit root. The maximum lag length was set at 8 quarters, basing the automatic lag selection on the SIC criterion. Newey-West bandwidth selection uses a Bartlett kernel. All variables are in logs. *, **, *** = significant at the 10%, 5%, 1%-level.

Variable	Levin, Lin, Chu	Im, Pesaran, Shin	Breitung and Das
Levels			
Ln GDP per capita	–0.69	1.76	2.11
Ln trade share	–3.84***	0.64	0.98
Ln import share	–6.81***	–1.87**	–1.71*
Ln export share	–4.51***	–0.42	2.08
Ln population	7.43	10.47	7.13
Ln capital stock	–6.60***	–2.90***	–1.08
First Differences			
Ln GDP per capita	–12.23***	–5.20***	–4.92***
Ln trade share	–13.43***	–8.01***	–8.73***
Ln import share	–13.98***	–8.02***	–9.31***
Ln export share	–12.24***	–8.34***	–7.77***
Ln population	8.67	9.11	10.02
Ln capital stock	–12.65***	–5.48***	–7.66***

Table 8: Panel Cointegration Tests

This table presents results of the panel cointegration tests proposed by Kao (1997) and Pedroni (1995). Kao's (1997) tests DF_ρ and DF_t are based on the assumption of strong exogeneity of the regressors and errors; DF^*_ρ and DF^*_t are based on the assumption of endogeneity of regressors and errors. The H_0 hypothesis is 'no cointegration'. Pedroni's tests allow for heterogeneity in the cointegration relationships and are based on the H_0 of no cointegration as well. In addition to the different trade measures, the regression equations include population and capital stock. *, **, *** = significant at the 10%, 5%, 1%-level.

	Trade	Imports	Exports	Imports and exports
DF_ρ	–2.35***	–3.55***	–1.81**	–2.83***
DF_t	–2.00**	–2.90***	–1.51*	–2.34***
DF^*_ρ	–7.74***	–9.58***	–6.87***	–8.23***
DF^*_t	–3.25***	–3.93***	–2.88***	–3.50***
$t_{\hat{\rho}NT}$	–159.31***	–169.08***	–150.24***	–160.77***
$t_{N1\rho}$	–16.86***	–17.42***	–16.60***	–17.30***
$t_{N2\rho}$	–16.24***	–16.79***	–15.99***	–16.67***

Table 9: Long-Run Cointegration Coefficients

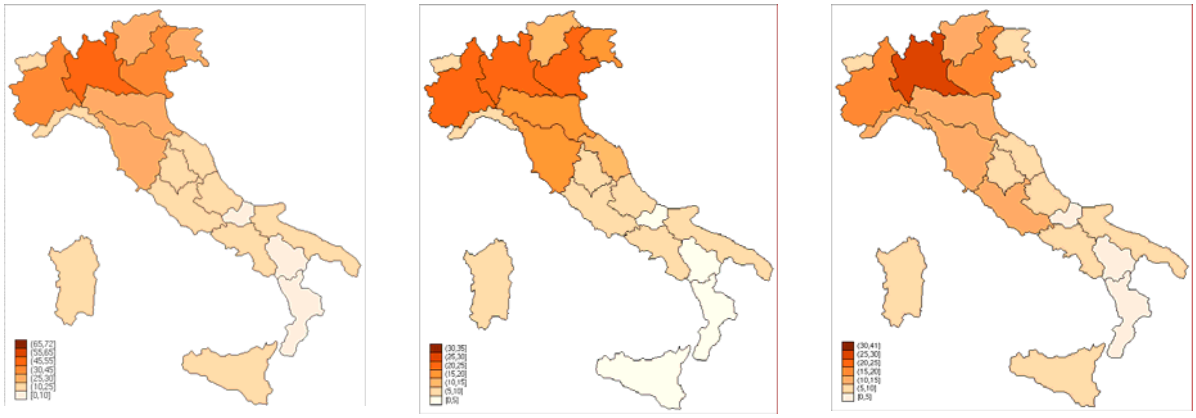
These tables present estimates for the long-run cointegration parameters using a fully modified OLS estimator (FMOLS), a dynamic OLS estimator (DOLS), and the Two-Step estimator proposed by Breitung (2005). All estimates presented are for the years 1991-2003 and are based on a sample with $N = 21$ and $T = 13$. *, **, *** = significant at the 10%, 5%, 1% level.

	FMOLS (1)	DOLS (2)	Two-Step (3)	FMOLS (4)	DOLS (5)	Two-Step (6)
Ln trade share	0.20***	0.21***	0.18***			
	(11.23)	(10.22)	(16.71)			
Ln import share				0.23***	0.22***	0.22***
				(10.69)	(8.71)	(16.07)
Ln population	–0.76***	–0.83***	–1.23***	–1.03***	–1.02***	–1.23***
	(–2.59)	(–2.42)	(–5.49)	(–3.48)	(–2.90)	(–5.39)
Ln capital stock	0.30***	0.29***	0.25***	0.30***	0.23***	0.22***
	(8.00)	(6.53)	(9.25)	(7.74)	(5.00)	(7.78)
Number of groups	20	20	20	20	20	20
Observations	284	284	284	284	284	284
R^2	0.64	0.70		0.62	0.67	

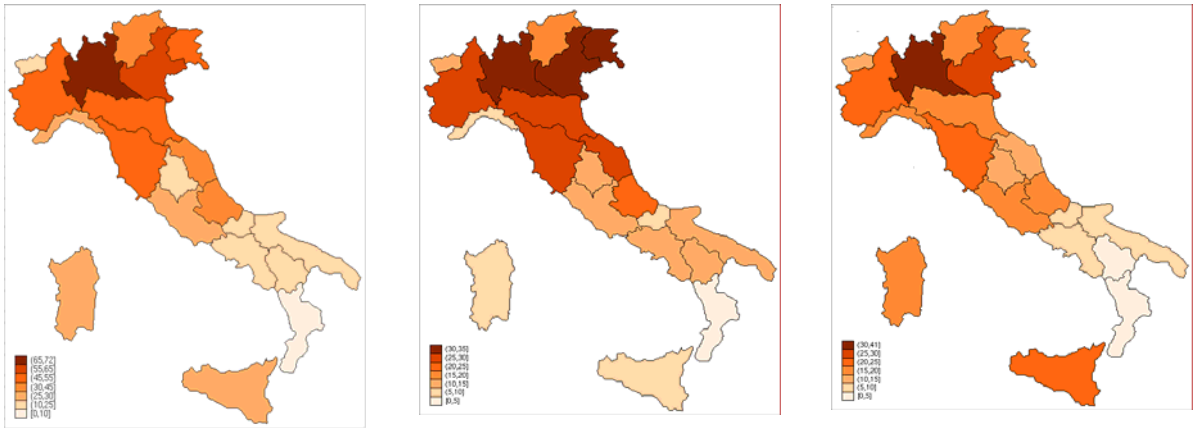
	FMOLS (1)	DOLS (2)	Two-Step (3)	FMOLS (4)	DOLS (5)	Two-Step (6)
Ln import share				0.10***	0.13***	0.14***
				(3.75)	(4.06)	(7.02)
Ln export share	0.16***	0.18***	0.15***	0.10***	0.10***	0.07***
	(10.76)	(9.98)	(14.39)	(5.55)	(4.61)	(5.03)
Ln population	–0.68***	–0.89***	–1.28***	–0.79***	–0.95***	–1.17***
	(–2.22)	(–2.44)	(–5.38)	(–2.84)	(–2.90)	(–5.49)
Ln capital stock	0.32***	0.34***	0.29***	0.29***	0.26***	0.23***
	(8.33)	(7.38)	(10.36)	(7.97)	(5.98)	(8.41)
Number of groups	20	20	20	20	20	20
Observations	284	284	284	284	284	284
R^2	0.61	0.67		0.66	0.71	

Figure 1a: Trade Openness of Italian Regions

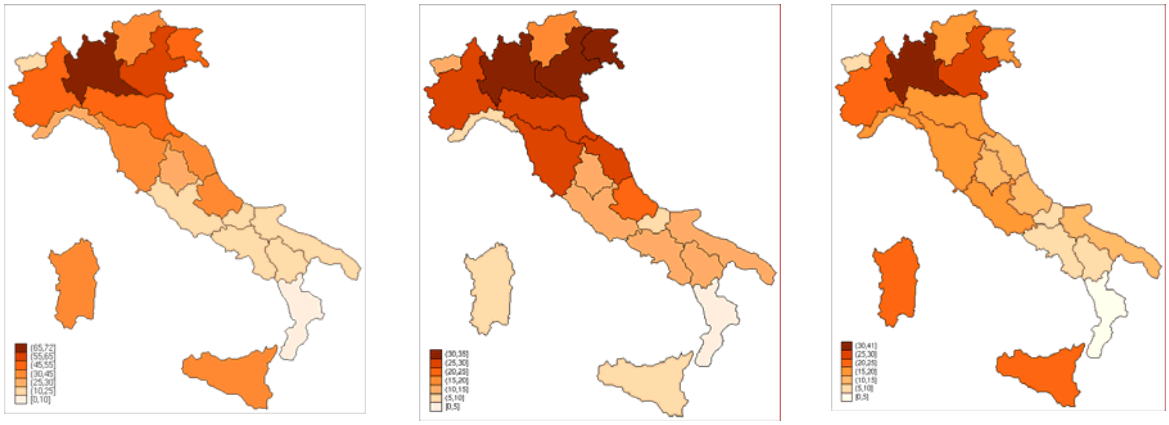
(a) Trade Share (b) Export Share (c) Import Share



1992



2000

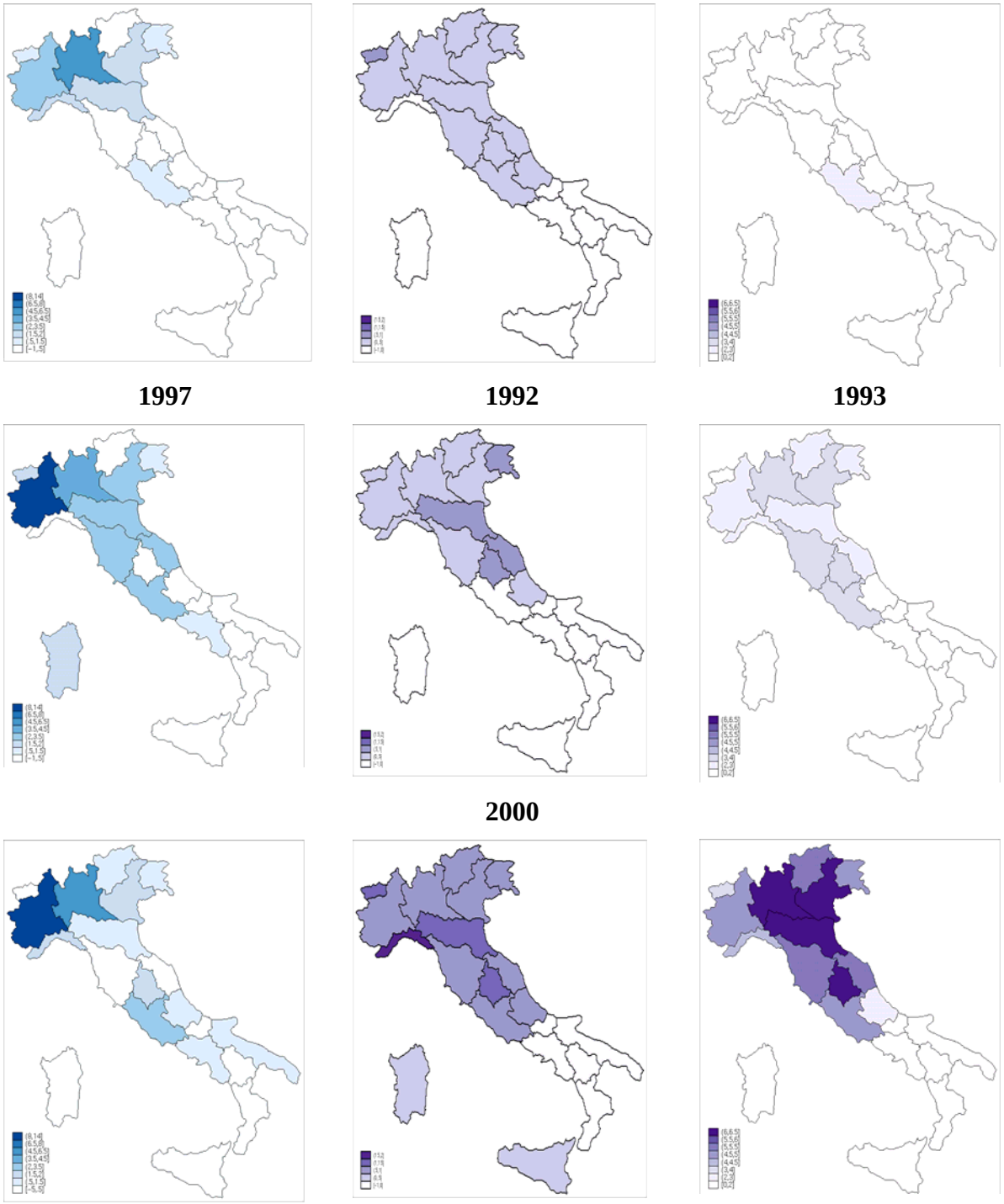


2005

Source: Own elaboration on ISTAT data

Figure 1b: Openness of Italian Regions for FDI and Migration

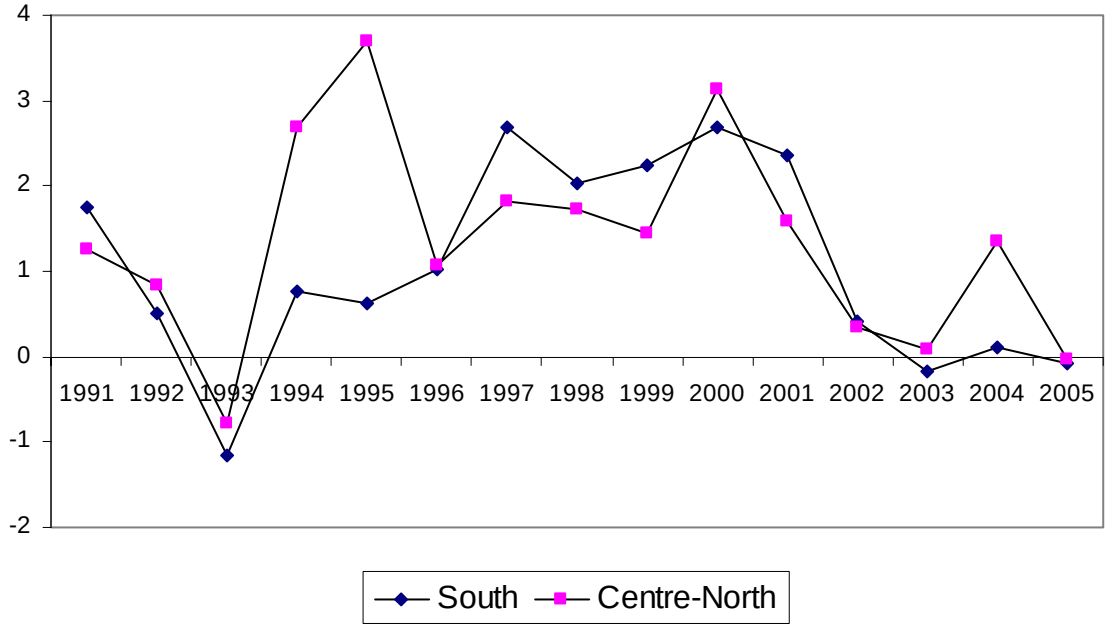
(a) FDI Share (b) Migration Share (c) Foreign resident's Share



Source: Banca d'Italia and own elaboration on ISTAT data

Figure 2: Italy - GDP Growth

Data for the 1991-2001 period refer to GDP at 1995 prices; since 2002 GDP at 2000 prices and chain indexes.



Source: ISTAT (own calculations)

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