

# DISCUSSION PAPER SERIES

DP11266

## **WHY EAST GERMANY DID NOT BECOME A NEW MEZZOGIORNO**

Andrea Boltho, Wendy Carlin and Pasquale  
Scaramozzino

***MACROECONOMICS AND GROWTH***



# WHY EAST GERMANY DID NOT BECOME A NEW MEZZOGIORNO

*Andrea Boltho, Wendy Carlin and Pasquale Scaramozzino*

Discussion Paper 11266

Published 10 May 2016

Submitted 10 May 2016

Centre for Economic Policy Research  
33 Great Sutton Street, London EC1V 0DX, UK  
Tel: +44 (0)20 7183 8801  
[www.cepr.org](http://www.cepr.org)

This Discussion Paper is issued under the auspices of the Centre's research programme in **MACROECONOMICS AND GROWTH**. Any opinions expressed here are those of the author(s) and not those of the Centre for Economic Policy Research. Research disseminated by CEPR may include views on policy, but the Centre itself takes no institutional policy positions.

The Centre for Economic Policy Research was established in 1983 as an educational charity, to promote independent analysis and public discussion of open economies and the relations among them. It is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions.

These Discussion Papers often represent preliminary or incomplete work, circulated to encourage discussion and comment. Citation and use of such a paper should take account of its provisional character.

Copyright: Andrea Boltho, Wendy Carlin and Pasquale Scaramozzino

# WHY EAST GERMANY DID NOT BECOME A NEW MEZZOGIORNO

## Abstract

In an earlier paper (*Journal of Comparative Economics*, 1997) the authors argued, against the conventional wisdom of the time, that East Germany was unlikely to follow a development path similar to that of the Italian Mezzogiorno. This paper revisits the issue some 25 years after German reunification. Statistical tests show that the absence of income per capita convergence between South and North that has characterized Italy since the war, continued over the last two or more decades. Germany, on the other hand, has, over the same period, seen significant income convergence between East and West. The main explanations that are provided for such contrasting outcomes stress differences between the two countries (and within the two countries) in investment performance, in labour market flexibility, and, in particular, in developments in the tradeable sector whose performance in East Germany has been much superior to that of the Mezzogiorno. These differences, in turn, are linked to very different standards of institutional quality and governance which are almost certainly rooted in the two “poor” regions’ longer-run history.

JEL Classification: O57, R12, R58

Keywords: convergence, tradeables, labour market flexibility, institutional quality

Andrea Boltho - andrea.boltho@magd.ox.ac.uk  
*Magdalen College, University of Oxford*

Wendy Carlin - w.carlin@ucl.ac.uk  
*UCL and CEPR*

Pasquale Scaramozzino - ps6@soas.ac.uk  
*SOAS, University of London and Università degli Studi di Roma Tor Vergata*

### Acknowledgements

The authors are grateful for comments at seminars and conferences at the European University Institute, Florence, Seoul National University, Pescara, Southern Denmark and Budapest.

## WHY EAST GERMANY DID NOT BECOME A NEW *MEZZOGIORNO*

Andrea Boltho, Magdalen College, University of Oxford

Wendy Carlin, University College London and CEPR

Pasquale Scaramozzino, SOAS, University of London  
and Università degli Studi di Roma Tor Vergata

### Abstract

In an earlier paper (*Journal of Comparative Economics*, 1997) the authors argued, against the conventional wisdom of the time, that East Germany was unlikely to follow a development path similar to that of the Italian *Mezzogiorno*. This paper revisits the issue some 25 years after German reunification. Statistical tests show that the absence of income per capita convergence between South and North that has characterized Italy since the war, continued over the last two or more decades. Germany, on the other hand, has, over the same period, seen significant income convergence between East and West. The main explanations that are provided for such contrasting outcomes stress differences between the two countries (and within the two countries) in investment performance, in labour market flexibility, and, in particular, in developments in the tradeable sector whose performance in East Germany has been much superior to that of the *Mezzogiorno*. These differences, in turn, are linked to very different standards of institutional quality and governance which are almost certainly rooted in the two “poor” regions’ longer-run history.

## Introduction

Following German reunification, it was often argued that the economic problems faced by East Germany resembled those that have long plagued Southern Italy (or the *Mezzogiorno*, as it is known in Italian) [e.g.: Barro and Sala-i-Martin, 1991; Sinn and Westermann, 2000; Sinn, 2002; for a dissenting point of view, see Heilemann, 2005]. Many commentators feared that convergence in living standards between the Eastern and Western parts of the country might be very slow and that East Germany would for decades suffer from above average unemployment and relative poverty. In an earlier paper, which compared post-war developments in Italy with the early experience of unification in Germany, the present authors argued against this view [Boltho *et al.*, 1997].

Three main reasons were at the time given for expecting more favourable developments in Germany than had occurred in Italy. First, public intervention stimulating machinery and equipment investment, which had generated some convergence in the 1960s in Italy, had fallen back in the *Mezzogiorno*. By contrast, early East German experience saw the government actively sustaining investment in the region. Second, the competitiveness of the backward area (endangered by wage equalization across the country as a whole), while changing little, or even worsening, in Southern Italy over several decades, had shown tentative early signs of improvement in Eastern Germany, thanks to greater wage and trade union flexibility at the micro level. Third, social capabilities were arguably very different between the two poorer regions. Southern Italy, partly because of its history, had fallen prey to rent-seeking and corruption in ways which, at the time at least, seemed virtually unknown in East Germany. As the article concluded: “Much of East Germany has had a tradition of relative prosperity, industry and entrepreneurship; much of the *Mezzogiorno* has had one of poverty, backward agriculture, and lack of civic involvement on the part of its population. In the end history may matter just as much as the design of economic policies and the working of market forces” [*ibid.*, p.261].

The present paper revisits this issue to see how the two regions have fared since the early-mid-1990s. Section 1 looks at the macroeconomic picture and examines whether GDP per capita convergence has occurred or not in the two areas over the last two decades. Section 2 considers, in turn, the three variables mentioned above: trends in productive investment, the evolution of competitiveness (including an assessment of the importance of the tradeable sector in the two economies), and the evolution (or lack thereof) in social capabilities. The conclusions draw the results together, broadly vindicating the authors’ earlier judgment.

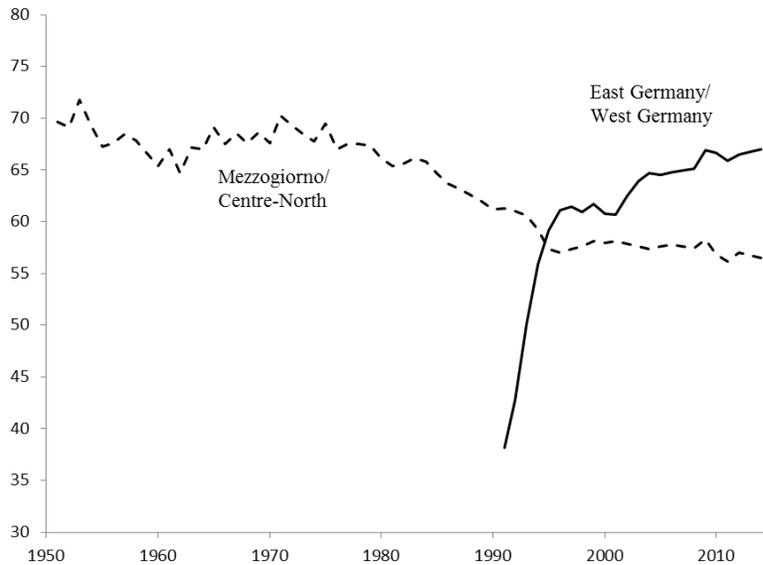
### I. Has East Germany Converged ?

Figure 1 presents data on constant price GDP per capita in the *Mezzogiorno* and in East Germany expressed as ratios of the GDP per capita of the two countries’ richer regions (the Centre-North and West Germany respectively). For Italy the series stretches over some six decades, for Germany it covers the years 1991-2014. The visual evidence points to two fairly clear conclusions: Italy has seen virtually no income per capita convergence

between South and North, be this over the period as a whole, or over the last two decades; Germany, by contrast, appears to have witnessed rapid convergence between East and West since unification.

**Figure 1. Germany and Italy: The Regional Problem**

(“poor” region’s GDP per capita in per cent of “rich” region’s GDP per capita; constant prices)



Sources: Statistische Ämter des Bundes und der Länder, *Volkswirtschaftliche Gesamtrechnung der Länder*; ISTAT, *Conti e aggregati economici territoriali*.

These broad-brush conclusions are confirmed by the econometric evidence presented in Table 1. For Italy this table updates the results already shown in the authors’ earlier paper [Boltho *et al.*, 1997], results which fairly conclusively rejected the hypothesis of convergence over the period 1950-90 (with the possible exception of the 1960s), in line with much of the scientific literature on the subject [e.g.: Mauro and Podrecca, 1994; Paci and Pigliaru, 1999]. Over the period 1990-2014 Italy did experience convergence, but only within the geographical areas and not between them. The estimated  $\beta$  coefficient is positive and significant, but the South dummy is negative and also significant, implying divergence of the Southern regions from the Centre-North. This result is entirely driven by the 1990s, when both coefficients were significant and relatively large in size, whilst the 2000s experienced neither within nor between regional convergence.

**Table 1**  
**Regressions for per capita output growth, 1990-2014**

	Germany			Italy		
	1991-2000	2000-14	1991-2014	1990-2000	2000-14	1990-2014
	Dependent variable: $[\ln(Y_{i,t+T}) - \ln(Y_{i,t})]/T$					
Const.	0.053 (0.055)	0.080* (0.030)	0.037 (0.028)	0.431*** (0.105)	-0.140* (0.056)	0.124** (0.036)
$\beta$	-0.006 (0.005)	0.007* (0.003)	0.003 (0.003)	0.052*** (0.017)	-0.012* (0.005)	0.014* (0.005)
East	0.057*** (0.005)	0.004 (0.002)	0.022*** (0.003)			
Centre				-0.003 (0.002)	0.0004 (0.002)	-0.001 (0.002)
South				-0.021** (0.006)	0.006 (0.003)	-0.006** (0.002)
Root MSE	0.0044	0.0027	0.0026	0.0056	0.0024	0.0030
$\bar{R}^2$	0.970	0.635	0.954	0.553	0.277	0.275

*Note:* Heteroskedasticity-robust standard errors in brackets.

Estimated equations:

Germany:

$$\frac{1}{T} \cdot [\ln(y_{i,t+T}) - \ln(y_{i,t})] = A_i - [(1 - e^{-\beta T})/T] \cdot \ln(y_{i,t}) + \gamma \cdot East + u_{i,t,t+T}$$

East: Brandenburg, Mecklenburg-Vorpommern, Saxony, Saxony-Anhalt, Thuringia.

Italy:

$$\frac{1}{T} \cdot [\ln(y_{i,t+T}) - \ln(y_{i,t})] = A_i - [(1 - e^{-\beta T})/T] \cdot \ln(y_{i,t}) + \gamma \cdot Centre + \delta \cdot South + u_{i,t,t+T}$$

Centre: Tuscany, Marche, Umbria, Lazio.

South: Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, Sardinia, Sicily.

\* Significant at 5%.

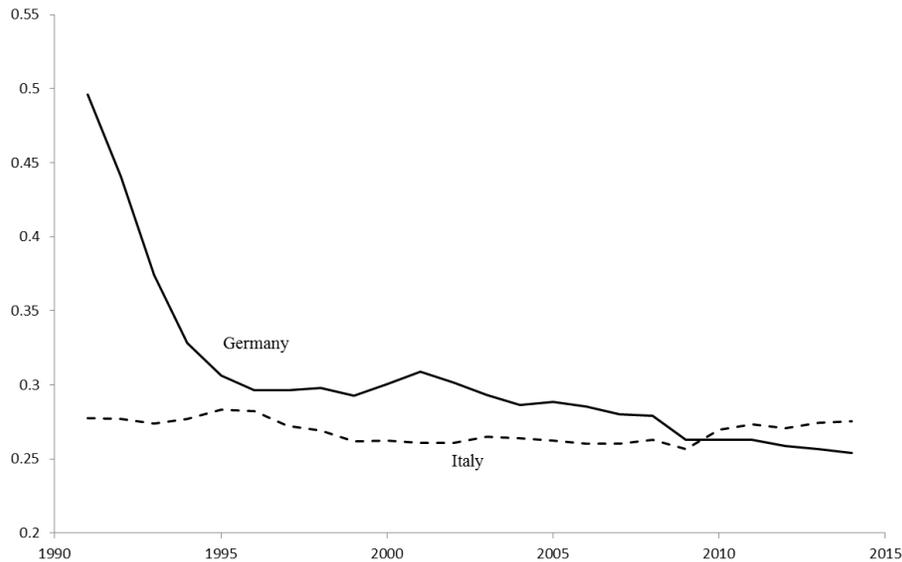
\*\* Significant at 1%.

\*\*\* Significant at 0.1%.

The German picture is quite different. The very small and barely significant values of the  $\beta$  coefficient (negative during the first decade 1991-2000 and positive during 2000-14), suggest that there was no overall convergence in the country. The East dummy, however, is positive throughout the period, and particularly large during the 1990s. The Eastern *Länder* therefore grew faster than the Western ones (by 5½ percentage points per year on average during the 1990s). The subsequent decade or so witnessed, however, much slower catch-up between East and West. Analysis of  $\sigma$  convergence broadly confirms these results. GDP dispersion remained virtually unchanged in Italy since 1990, whereas it fell sharply in Germany during the first half of the 1990s and, following some stabilization over the next decade, resumed a gentle and steady downward trend since then (Figure 2).

**Figure 2. Income Dispersion**

(standard deviation of regional GDP per capita)



Sources: Statistische Ämter des Bundes und der Länder, *Volkswirtschaftliche Gesamtrechnung der Länder*; ISTAT, *Conti e aggregati economici territoriali*.

## II. The German Success

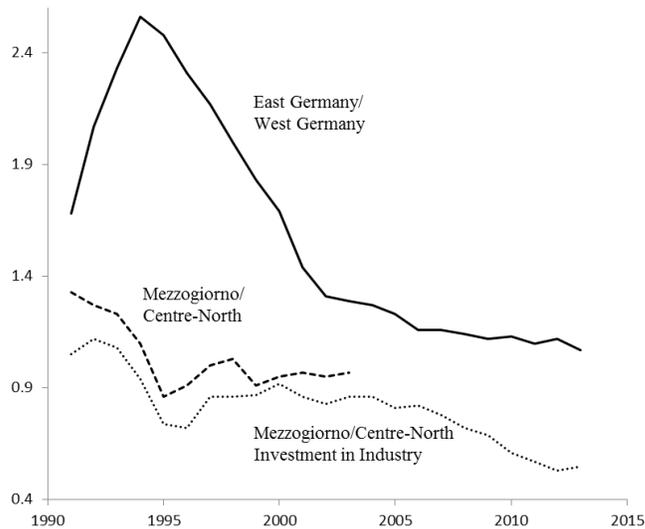
Clearly, no single variable can explain why Italy failed in its attempts to close the North-South gap, while Germany broadly succeeded in significantly reducing its huge initial West-East gap. In what follows, emphasis will be put on the three variables that were found to have shed some light on the failures of the Italian experience [Boltho *et al.*, 1997]: an insufficient investment effort in the laggard region, the absence, in the same region, of a large and competitive tradeable sector, and the huge gaps in social capital between South and Centre-North, gaps with profound roots in the two areas' histories.

## Investment

Italy's post-war experience suggests that high levels of investment in machinery and equipment in the *Mezzogiorno* relative to the Centre-North were an important reason for the short-lived convergence that the country experienced in the 1960s, and that subsequent subdued productive investment trends in the South share much of the blame for the lack of convergence in the 1970s and 1980s [Boltho *et al.*, 1997]. The same story seems to apply in more recent times. Relative to the North of the country, investment in machinery and equipment weakened further in the 1990s and in the early 2000s [Figure 3]. Since 2003 data on this variable are no longer available, but use of an imperfect proxy (fixed investment in the manufacturing sector) suggests that relative decline has, if anything, accelerated over the last decade or so.

**Figure 3. Germany and Italy: Investment in Machinery and Equipment**

(ratio of shares in GDP; constant prices)



Sources: Statistische Ämter des Bundes und der Länder, *Volkswirtschaftliche Gesamtrechnung der Länder*; ISTAT, *Conti e aggregati economici territoriali*.

The evidence available for East Germany shows a somewhat different evolution. In the early years of unification (1991-2000), when the West poured resources into the East of the country primarily in infrastructure provisions, the ratio of investment in machinery and equipment to GDP was, in East Germany, well above that of West Germany [Figure 3]. These happened to be years of extremely rapid GDP per capita convergence. Since then, as investment subsidies were phased out and the quality of East Germany's infrastructure reached best practice levels, the difference in investment performance between the two regions has gradually diminished (and convergence has also slowed down).

Over the last twenty years, the contrast between Italy and Germany in this area is striking and fits well with the contrast in convergence shown in Figure 1. And the picture fits also with what is known about public involvement in this area. The Italian government actively promoted investment in the South in the 1960s, both directly through State-owned enterprises and indirectly via help to the private sector, but then gradually abandoned such efforts in subsequent decades, shifting the focus of aid policies towards the creation of public sector jobs and income maintenance transfers. German experience is not that dissimilar, with most public efforts to sustain machinery and equipment investment concentrated in the early years of unification and more recent times seeing a shift towards social welfare transfer payments. That this, however, has not translated into a halt to the income convergence process between East and West, as happened in Italy, is almost certainly linked to the much more successful performance of the East German private sector and, in particular, of its tradeable industries.

### ***Competitiveness and the Tradeable Sector***

As was rightly argued [Sinn and Westermann, 2000], one of the main obstacles that Italy has had to face in its attempts to develop the South has been the near equalization of wage levels between richer and poorer areas of the country despite the continuing existence of significant gaps in productivity levels. This has had predictable consequences on the competitiveness of the backward regions and, as was argued in the authors' earlier paper, clearly held back Southern Italian growth [Boltho *et al.*, 1997]. For Germany, a similar danger was feared in the light of early proposals to transfer West Germany's wage bargaining structures and welfare system to the East, with an aim of raising Eastern wage levels to 85 per cent of those in the West. Indeed, for the crucial engineering sector, wage parity was expected to occur as early as in 1994. In the event, these dangers have not materialized. Already in the early years of unification the available evidence was suggesting that wage level convergence was much slower and less widespread than had been feared at the outset.

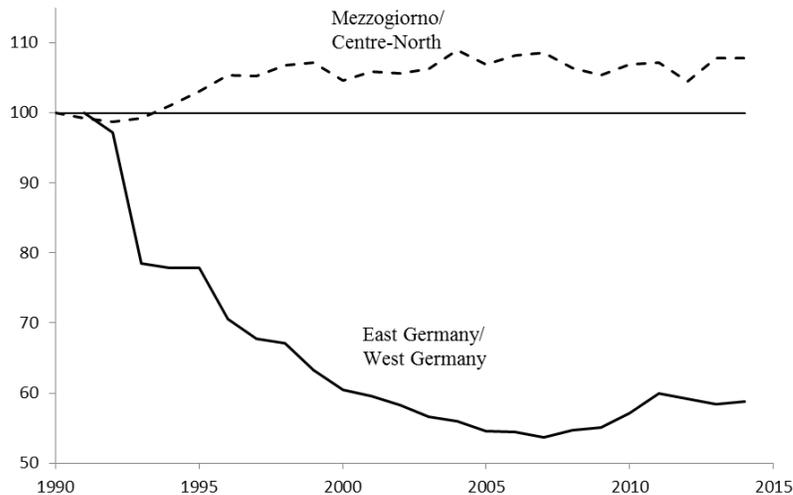
Developments in Germany since then have broadly confirmed that the East German labour market has adapted with a surprising degree of flexibility to unification, a flexibility that has, so far at least, escaped the labour market of Southern Italy. It is true that compensation levels have not risen in either region relative to their richer counterparts. Throughout the last two decades they stood at some 80 per cent of the Centre-North level in the *Mezzogiorno*, and, from the mid-1990s, at some 70 per cent, of the West's level in East Germany. But productivity levels in industry fell in Southern Italy relative to the Centre-North, while they rose very rapidly in East Germany from the low point of 1991, reaching virtual parity already by 2004.

These developments are combined into a measure of unit labour costs in manufacturing shown in Figure 4. The chart speaks for itself. Italy's South has, over the last two decades, had a real exchange rate that seems too high. Admittedly, the gap between North and South is not huge (and, if a proper allowance could be made for underground economic activities, which are much more widespread in the *Mezzogiorno*, the gap might even disappear altogether). But German developments are of a different order of

magnitude. Over the last twenty years unit labour costs have nearly halved in East Germany compared to what was happening in West Germany. No doubt, East Germany's real exchange rate in 1991 must have been hopelessly uncompetitive, but this no longer seems to be the case today. This being said, the last few years have seen a halt to the downward trend in the East's real exchange rate as productivity growth recovered more slowly in the new *Länder* after the "Great Recession" than it did in West Germany.

**Figure 4. Germany and Italy: Relative Unit Labour Costs in Industry**

(1990 or 1991 = 100)



Sources: Statistische Ämter des Bundes und der Länder, *Volkswirtschaftliche Gesamtrechnung der Länder*; ISTAT, *Conti e aggregati economici territoriali*.

A more rigorous test of the importance of these investment and competitiveness trends for living standards is shown in Table 2 which presents econometric results based on a specification almost identical to the one used in the authors' earlier paper to throw light on developments in the Italian *Mezzogiorno*/Centre-North GDP per capita gap [Boltho *et al.*, 1997].<sup>1</sup> During the estimation process it was found that statistically significant structural breaks could be observed in 2002 in Germany and in 1996 in Italy. Hence a dummy variable from 2002 and 1996 respectively was introduced into the specification. The results for East Germany show that the two variables, investment and competitiveness, are statistically significant and, together, account for a good deal of the variance in the East/West income per capita evolution. The results for Italy are, admittedly, somewhat less robust (only the competitiveness variable remains statistically significant).<sup>2</sup> Even though the specification did work for the period 1953-93, it no longer seems able to shed much light on why the GDP per capita gap hardly changed over the more recent years. One possible (technical) explanation is that there was very little movement in the series for the dependent and independent variables used here. Broadly similar results obtain for both countries if the dummy variable is interacted with the one for investment.

**Table 2**  
**Regressions for evolution of per capita output gap between the “poor”  
and the “rich” region**

	Germany (1992-2014)	Italy (1991-2014)
Dependent variable: GDP per capita (“poor”)/GDP per capita (“rich”) (in const. prices)		
Const.	15.922** (4.835)	40.326 (24.163)
GDPgap <sub>t-1</sub>	0.618*** (0.064)	0.723+ (0.379)
Invgap <sub>t-1</sub>	10.402** (2.909)	1.254 (1.644)
ULC	-0.105+ (0.054)	-0.255** (0.081)
Dummy 2002/1996	4.985*** (0.192)	1.777+ (1.035)
SE of regression	0.763	0.541
$\bar{R}^2$	0.982	0.837

*Note:* Heteroskedasticity-robust standard errors in brackets.

GDPgap = Ratio of “poor” region’s GDP per capita to “rich” region’s GDP per capita.

Invgap = Ratio of investment in machinery and equipment/GDP in “poor” region to  
investment in machinery and equipment/GDP in “rich” region.

ULC = Ratio of manufacturing unit labour costs in “poor” region to manufacturing labour  
costs in “rich” region.

+ Significant at 10%.

\* Significant at 5%.

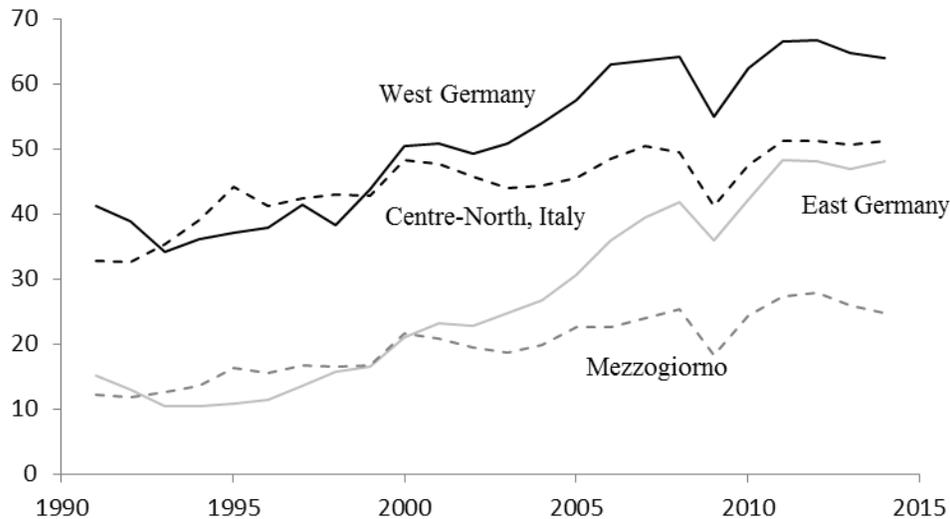
\*\* Significant at 1%.

\*\*\* Significant at 0.1%.

An alternative illustration of diverging competitiveness trends is provided in Figure 5 which shows the evolution of the tradeable sector.<sup>3</sup> The first panel simply looks at the share of trade in output. In both countries, the richer region shows higher tradeable shares than the poorer one, but East Germany exhibits a sharply rising share in recent years and seems to be closing the gap with the West, in contrast to the more modest evolution in the *Mezzogiorno*. A not dissimilar picture is provided in the second panel which looks at the evolution of employment in the tradeable sector. Rather than focusing solely on manufacturing, the chart shows trends for a wider definition of tradeables which encompasses several other activities that are potentially exportable. Employment in “broad” tradeables, as here defined, includes not only the goods-producing sectors (agriculture, mining and manufacturing), but also tourism and a rough estimate of the element of financial services that might potentially be tradeable. To obtain this, it was assumed that a certain share of employment in finance would be devoted to supplying demand internal to the region, while any excess over this minimum level could be considered tradeable employment. The minimum level itself was assumed to be the share achieved by financial service employment in total employment in the German *Land* or Italian region with the lowest such share (usually Brandenburg or Sachsen-Anhalt in Germany and Calabria in Italy).

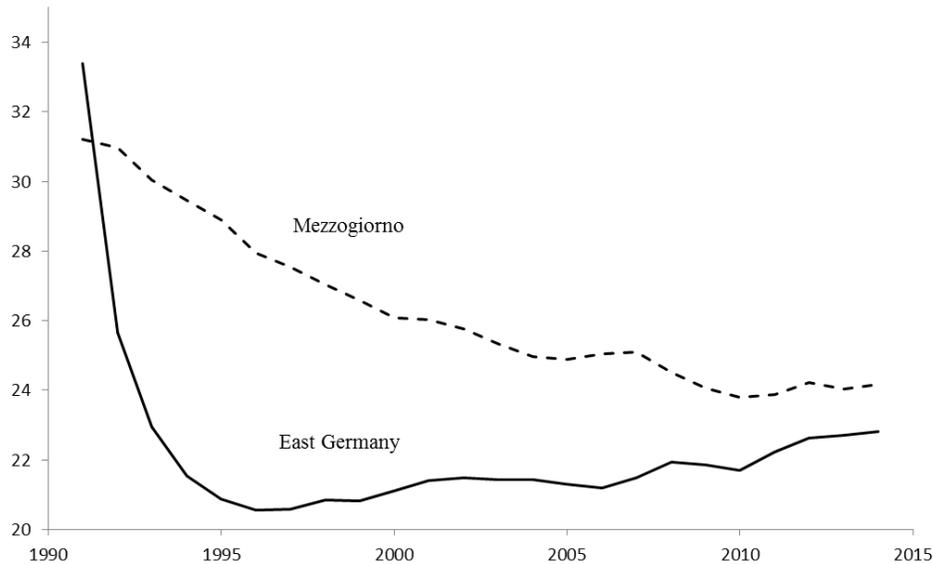
**Figure 5A. Germany and Italy: Foreign Trade Share**

(merchandise exports plus imports in per cent of GDP)



Sources: Statistisches Bundesamt, Aussenhandel, Jahresdaten ab 1970; ISTAT, Commercio estero, serie storiche.

**Figure 5B. East Germany and Southern Italy: Employment in the Tradeable Sector**  
(in per cent of total employment)



*Note:* For definition of the tradeable sector, see text.

*Source:* Oxford Economics Data Bank.

The resulting estimates show, not surprisingly perhaps, a decline in this “broad” concept of tradeable employment over the last two decades in both the richer and the poorer regions of the two countries (the results for manufacturing employment only are very similar).<sup>4</sup> The drop is particularly noticeable in East Germany which, in 1991, had inherited an overly developed industrial sector from its Communist past. De-industrialization, aided and abetted by a totally uncompetitive exchange rate and by the often destructive operation of the *Treuhandanstalt* (the organization charged with privatizing Eastern enterprises), was thus extremely rapid in the early years of unification. From the mid-1990s, however, while de-industrialization continued in West Germany, it was slowly reversed in the East, in stark contrast to what was happening in Southern Italy. Here, the already low share of “broad” tradeable employment went on declining, and at a somewhat faster rate than was recorded in the Centre-North of the country. While tradeable employment in West Germany is still higher than it is in East Germany, the latter region has been closing the gap in recent years, no doubt reflecting the trends in relative competitiveness shown in Figure 4 above. In Italy, by contrast, relative de-industrialization has continued.

It is noteworthy that the share in total exports accounted for by the most advanced and complex manufacturing sector (machinery and transport equipment), is very similar in East and West Germany (48 and 52 per cent respectively), while it is much lower in both absolute and relative terms in the *Mezzogiorno* (27 per cent, as against the 39 per cent of the Centre-North). And this share has declined dramatically since the late 1990s, in contrast to the rough stability recorded elsewhere in Italy. Regional commodity trade data for Germany are only available since 1995. Between that date and 2014, this share has

risen somewhat in East Germany (bar the sharp drops experienced in both parts of the country during the “Great Recession” of 2009-10). Indeed, the share of such high-tech industries as pharmaceutical and electronic machinery in total exports has been higher in the East than in the West in every single year since 2002 (the Italian data do not provide a similarly detailed breakdown).

A higher share of tradeables in output or employment (or a higher share of complex products in total exports) in the richer regions of the two countries is, of course, no proof that it is tradeables which drive income since reverse causality is just as plausible. Recent research has, however, shown fairly conclusively that “specializing in some products will bring higher growth than specializing in others” [Hausmann *et al.*, 2007, p.1]. And the goods that are conducive to growth are complex ones (i.e. requiring numerous and diverse capabilities). A rough attempt was made to estimate the “complexity” of the two poorer regions’ export bundles by applying the “product complexity indices” shown in Hausmann *et al.* [2013], to the commodity trade data.<sup>5</sup> In 2014, for instance (but also in 2000) these indices were much higher in East Germany than they were in the *Mezzogiorno* (Table 3). The apparent greater production complexity of East Germany would thus seem to benefit the region (relatively to Southern Italy) in two main ways. First, it is bound to stimulate growth along the lines explored by Hausmann *et al.* [2007]. Second, it suggests that the area enjoys relatively high institutional quality (on which more below), in line with new approaches to international trade that link export performance in complex sectors to a country’s quality of institutions and levels of trust [Levchenko, 2007; Costinot, 2009].<sup>6</sup>

**Table 3**

**Export Complexity Indices**

	Germany	West	East
2010	1.96		
2000	1.87	1.90	1.70
2014	1.70	1.75	1.68
	Italy	Centre-North	<i>Mezzogiorno</i>
2010	1.40		
2000	1.42	1.44	1.26
2014	1.42	1.45	1.27

*Sources:* Hausmann *et al.* (2013) for 2010 data; authors’ calculations for 2000 and 2014. For further detail see text.

The suggestion that trade is a crucial variable for explaining income per capita differences is tested more precisely in Table 4, which shows the results of an econometric exercise correlating income per capita with trade shares in 2012, following an instrumental variables approach (full details are provided in the Statistical Annex). The methodology adopted here was originally developed by Frankel and Romer [1999] who used the geographic network of trade as an exogenous instrument to investigate the issue of causality (and concluded that it was trade which generated high income). The results shown in the Table (which replicates the Frankel and Romer approach) strongly confirm the decisive role of foreign trade in differentiating regional incomes in both Germany and Italy, in line with earlier work along these lines [Buch and Toubal, 2009; Buch and Monti, 2010]. Interestingly, the role of foreign trade seems to be more important in Italy than it is in Germany, as shown by the much larger coefficients on the trade share. This strongly suggests that the *Mezzogiorno's* income per capita is held back by the region's limited involvement in international trade much more so than is the case in East Germany.

Table 5 adds to these regressions a dummy variable for the two “poor” regions.<sup>7</sup> This variable is not significant in the case of East Germany, but is highly significant, in the OLS version, and marginally significant in the IV version, for Italy (admittedly, in Italy's case the significance of the regression's other variables shows large drops). One possible (and plausible) interpretation of these results is that East Germany's lower per capita income is almost entirely due to its lower propensity to trade relative to West Germany, while Southern Italy's income gap is due not only to this factor, but also to other unfavourable, and possibly non-economic, features associated with the *Mezzogiorno*.

Having established a causal role for foreign trade at a moment of time, a more elaborate attempt was made to search for a driving role for foreign trade through time. This is presented in Table 6 which shows the results of linking the evolution of the GDP per capita gap over the last decade (data availability limits the time span to the years 2004-13 for Italy and 2004-14 for Germany) to the same geographic network of trade data already used to obtain the results shown in Tables 4 and 5. The model was estimated by panel fixed effects and shows broadly similar results for the two countries: the trade share and population variables both have negative coefficients. Of interest are the coefficients on the variable that interacts the regional dummy with the trade share. In Italy this coefficient is statistically not different from zero. In Germany, on the other hand, it is both positive and highly significant, suggesting that trade has played an important role in driving income per capita growth through time in the East of the country, contrary to what happened in the *Mezzogiorno*. Panel estimates by random correlated effects<sup>8</sup> (not shown separately, but available from the authors) show that the regional dummies attract negative and statistically highly significant coefficients for both East Germany and Southern Italy.

**Table 4**  
**Regressions for trade and income per capita - 1**

	Germany		Italy	
	OLS	IV	OLS	IV
Dependent variable: $\ln Y_i$				
Const.	2.459*** (0.277)	2.546*** (0.221)	4.735*** (0.855)	5.594*** (1.345)
Trade share	0.608*** (0.064)	0.531*** (0.111)	1.269*** (0.270)	2.660** (1.012)
Ln population	0.183*** (0.040)	0.187*** (0.037)	-0.020 (0.101)	-0.095 (0.129)
Ln area	-0.100*** (0.015)	-0.107*** (0.019)	-0.196 (0.144)	-0.281 (0.216)
No. obs.	16	16	20	20
Root MSE	0.112	0.098	0.197	0.263
$\bar{R}^2$	0.804	0.798	0.428	...

*Note:* Estimation methods: ordinary least square (OLS) for Columns 1 and 3; instrumental variables (IV) for Columns 2 and 4. Endogeneous variable: trade share. Heteroskedasticity-robust standard errors in brackets.

\*\* Significant at 1%.

\*\*\* Significant at 0.1%.

Table 5

## Regressions for trade and income per capita - 2

	Germany		Italy	
	OLS	IV	OLS	IV
Dependent variable: lnYi				
Const.	2.677*** (0.370)	2.751*** (0.282)	3.474*** (0.855)	4.375*** (0.822)
Trade share	0.570*** (0.074)	0.522*** (0.108)	0.360 (0.222)	1.315* (0.550)
Ln population	0.147* (0.062)	0.145*** (0.051)	-0.066 (0.035)	-0.075 (0.056)
Ln area	-0.086** (0.026)	-0.089*** (0.025)	0.027 (0.064)	-0.106 (0.140)
Dummy for poor region	-0.083 (0.085)	-0.092 (0.070)	-0.417*** (0.081)	-0.231 (0.131)
No. obs.	16	16	20	20
Root MSE	0.111	0.093	0.109	0.139
$\bar{R}^2$	0.857	0.855	0.862	0.701

*Note:* Estimation methods: ordinary least square (OLS) for Columns 1 and 3; instrumental variables (IV) for Columns 2 and 4. Endogeneous variable: trade share. Heteroskedasticity-robust standard errors in brackets.

\* Significant at 5%.

\*\* Significant at 1%.

\*\*\* Significant at 0.1%.

**Table 6****Regressions for evolution of GDP per capita – Panel data**

	Germany (2004-2014)	Italy (2004-2013)
Dependent variable: $\ln Y_i$		
Const.	5.232*** (0.208)	3.514*** (0.238)
Trade share	-0.00004*** (0.00001)	0.000 (0.000)
Ln population	-0.516*** (0.025)	-0.054+ (0.031)
East/South x trade share	0.00006*** (0.00002)	-0.000 (0.000)
Time dummies	Yes***	Yes***
No. obs.	17105	20000
Wald test	150.61***	1.62

*Note:* Estimation by fixed effects; Heteroskedasticity-robust standard errors in brackets.

+ Significant at 10%.

\* Significant at 5%.

\*\* Significant at 1%.

\*\*\* Significant at 0.1%.

The overall conclusions of this sub-section are clear: tradeables seem to be a crucial variable in explaining regional income differences. In East Germany the share of tradeables in output is higher than it is in the *Mezzogiorno*; it has also risen much more rapidly and the export bundle the region sells on world markets is made up of much more complex products than those sold by Southern Italy. There are numerous reasons for these differences, some of which (e.g., investment efforts or labour market flexibility) have been discussed above. One further reason may well lie in the different historical and institutional backgrounds that characterize the two regions.

### *Social Capital and the Importance of History*

Much of the literature that has looked at the economic problems of Southern Italy has stressed the importance of social and historical factors in holding back the *Mezzogiorno*'s development, and, in particular, the relative absence of trust and of civic capital when compared to the situation of the Centre-North. The origins of these gaps have, in turn, been traced back to differences in the longer-run evolution of political institutions [Tabellini, 2010] and to the contrast between the existence for several centuries of relatively free city states in the North and of absolutist regimes in the South [Putnam, 1993; Guiso *et al.*, 2008]. The latter authors, in particular, estimate that up to 50 per cent of the gap in social capital between the North and the South of Italy could be attributed to the early independent city state experience of Central-Northern Italy.

There is no similar literature on Germany possibly because there was no similar contrast in the country's historical development (barring the important interlude of the forty plus years of Communist rule in the East). While Germany was subdivided for centuries into countless small states, many run in absolutist ways [De Long and Shleifer, 1993], there seem to have been relatively few large differences between what are today the West and the East of the country.<sup>9</sup> So-called "free and imperial cities" existed in both areas [Jacob, 2010]. The Hanseatic League was just as active in Hamburg and Bremen as it was in Rostock and Magdeburg. The grid of fluvial and land routes that criss-crossed Germany covered the whole country from the early Middle Ages onwards [Deutsch, 1953] and Leipzig was the seat of a renowned fair since roughly the same time [Bairoch, 1985]. Looking at early human capital formation, while by 1500 Central-Northern Italy had at least a dozen universities, as against the *Mezzogiorno*'s three, what is today Eastern Germany boasted five universities, as against the seven of the much larger West [Verger, 1996]. Turning to more recent times, Germany's industrialization was spearheaded by Saxony. Rough estimates of the share of employment accounted for by industry suggest that in 1861 this stood at perhaps 35 per cent in what is today East Germany, as against some 20 per cent in the Western part of the country. By 1907, these shares had reached 51 and 34 per cent respectively [Tipton, 1976]. In Italy, by contrast, the *Mezzogiorno*'s industrial employment in 1911 stood at 9 per cent of the total population, as against the Centre-North's 13 per cent [Ciccarelli and Missiaia, 2013]. And incomes per capita were almost certainly higher at the end of the 19<sup>th</sup> century in what is today East Germany than they were in the West [Borchardt, 1966]; the most recent Italian estimates indicate, conversely, that at the same time Central-Northern Italians were some 10 to 20 per cent richer than their Southern counterparts [SVIMEZ, 2011].

All this strongly suggests that East Germany's pre-communist social and economic history has been less unfavourable to economic development than that of the *Mezzogiorno*, particularly if seen in relation to the rest of the country. None of it, however, conclusively proves that trust and social capital are today more evenly distributed across Germany than they are across Italy. Indeed, there have been suggestions that the forty years of Communist rule in the East might well have destroyed much of the area's pre-existing social capital [Howard, 2003]. In particular, the hugely oppressive presence of the former GDR's security and spying apparatus could have been

expected to have significantly reduced trust within the region. This seems confirmed by empirical investigations: the more state surveillance any particular East German district had suffered from in GDR days, the lower were, in the mid-2000s, its electoral participation, sports club membership and organ donations, all indicators often deemed to represent the presence, or absence, of trust [Jacob and Tyrell, 2010]. And this absence may well be a contributory factor to these districts' below average per capita incomes and above average unemployment rates [*ibid.*].

Such results sound (sadly) plausible, and they are confirmed by research exploring the relative presence of trust in East and West Germany. Evidence using survey data shows that East Germans displayed significantly less trusting attitudes than West Germans not only shortly after unification, but also a decade later [Rainer and Siedler, 2009]. And while some convergence with the West is present, it is very slow: "Individuals who experienced the GDR system still [in 2008] show a relatively higher level of social distrust and skepticism" [Heineck and Süßmuth, 2013, p.798]. Nor can trust have been helped by the ruthless way West Germany de facto colonized the Eastern *Länder* [Giacché, 2013].<sup>10</sup> Similarly, evidence based on games played by both Eastern and Western citizens has shown that the former exhibit less solidarity than the latter [Ockenfels and Weimann, 1999; Brosig-Koch, Helbach, Ockenfels and Weimann, 2001] and are also more likely to cheat than their Western compatriots [Ariely *et al.*, 2014].<sup>11</sup> All this may well imply that much of East Germany's earlier historical achievements may matter little today.

Yet, more direct (and harder) evidence does not necessarily indicate that trust and cooperation are absent in East Germany, or less present there, relative to the West of the country, than they are in the *Mezzogiorno*, relative to the Centre-North of Italy. A proxy used to look at the presence or absence of social capital is the extent of underground economic activities. The available comparable estimates of the weight of the shadow economy give a picture that suggests that East Germany is a relatively more law-abiding society than is Southern Italy [Tafenau *et al.*, 2010]. In 2004, the last year for which comparable data are available, hidden economic activities were estimated to equal 19 and 25 per cent of the Centre-North's and of the *Mezzogiorno*'s GDPs respectively. In West and East Germany these two ratios stood at 14 and 18 per cent respectively.<sup>12</sup>

Several other trust-related indicators would seem to support the conclusion that trust is more present in relative terms in today's East Germany than it is in Southern Italy. One is the extent of voluntary work that is supplied in the two areas. Survey evidence which looks at the population aged 15-64, showed an incidence of voluntary work in the *Mezzogiorno* equal to some 50 per cent of what was done in the Centre-North over the period 1995-2014 [ISTAT, 2016]. For East Germany the corresponding ratios to West Germany were 78 and 84 per cent in 1999 and 2009 respectively [Bundesministerium für Familie, 2010].<sup>13</sup> Turning to the presence of non-profit organizations per head of the population (measured following uniform international guidelines), in the *Mezzogiorno* these stood at 68 per cent of the corresponding Centre-North level in 2011 [ISTAT, Censimento dell'industria e dei servizi, primi risultati, 2011]. In East Germany, by contrast, the 2008 level, at 105 per cent, was actually above that of the Western part of

the country [Tamm *et al.*, 2011]. And that most untainted indicator of all, often used to proxy social trust, organ donations, shows that these too are more frequent in East Germany than they are in West Germany, in total contrast to the picture for Italy. There, over the years 2000-14, organ donations per million people averaged 26 per year in the Centre-North and only 11 in the *Mezzogiorno* [Centro nazionale trapianti]. In Germany, over the years 2005-14, the equivalent East German figure (including Berlin) was 17.5, the West German one 13.2 [Deutsche Stiftung Organtransplantation].<sup>14</sup>

Further indirect evidence on this issue comes from a large comparative exercise, carried out for the European Commission, which attempts to quantify the quality of government in some 170 regions across Europe [Charron *et al.*, 2012; Charron, 2013]. Government quality in this work encompasses a low level of corruption, presence of the rule of law as well as government effectiveness and accountability in areas such as public education, public health and law enforcement. Indices of quality were derived combining national governance data (coming from the World Bank) with regional evidence obtained from a survey of 34,000 EU citizens. Relative to the European average, overall government quality so defined was well below in Italy and well above in Germany in both 2010 and 2013. This may not be very surprising. What is particularly striking, however, is that at the regional level, the government quality of the *Mezzogiorno* was some three times worse than that of the country's Centre-North, while East Germany's regional governments, by contrast, had a score that in 2010 was, on average, actually superior to that of the West German *Länder*, while in 2013 it was only marginally inferior.

More broadly, it is difficult to find any evidence in East Germany of the widespread corruption and rent-seeking which have been endemic in much of Southern Italy over the last few decades. Nor is there any evidence showing the presence of large criminal organizations, such as the well known *mafia*, *camorra* and *'ndragheta* which have plagued, in particular, Sicily, the Naples area and Calabria. In other words, the legacy of several centuries of relatively advanced institutions and of a relatively successful history (at least in comparison with the *Mezzogiorno*) seems to have left traces in terms of the presence of social capital, trust and institutional quality, despite the destructive experience of four decades of Communism.

This, in turn, is bound to have had significant economic effects. As has convincingly been argued, both trust and social capital are essential elements for the successfully workings of a market economy [Arrow, 1972]. More recent empirical research has also shown that the presence of social capital favours economic prosperity and economic growth [Knack and Keefer, 1997; Horváth, 2013]. It is perhaps no great wonder after all that East Germany has, so far at least, managed a relatively successful convergence path, while Southern Italy has dismally failed.

Indeed, the importance of successful institutions emerges also in the crucial area of foreign trade. Mention was made earlier of the much greater complexity of the foreign trade bundle exported by East Germany in comparison with that of the *Mezzogiorno*. Research has shown that greater complexity (which is bound to involve higher transaction costs), benefits from the presence of better institutions [Costinot, 2009]. A

simple test of this proposition (regressing the 2010 “economic complexity indices” shown in Hausmann et al., [2013] for 128 countries on the World Bank’s “Rule of Law” index, or on Transparency International’s “Perception of Corruption” indices for 2010) results in statistically highly significant coefficients. Controlling for income per capita, whether expressed in current dollars or in purchasing power parities, adds virtually nothing to this result.<sup>15</sup> These findings apply to countries, not regions, but the available evidence strongly suggests that German regions are fairly uniformly endowed with similar levels of both the rule of law and the relative absence of corruption, while this is hardly the case of Italy [Charron, 2013]. Using the survey evidence presented in Charron *et al.*, [2014] on these two indicators, shows the *Mezzogiorno* falling short of Centre-North standards by very large margins in both areas, while East Germany either lags West Germany by relatively small margins (rule of law in 2013 and corruption in 2010), or actually outperforms West Germany (rule of law in 2010 or corruption in 2013).

## Conclusions

This paper has concentrated on the evolution of regional gaps within Germany and Italy since German unification in 1991. Contrary to a widespread view, still popular until recently, East Germany has not become a new *Mezzogiorno*, even if the way unification was initially managed could have led (and did lead) many observers to fear such an outcome. While the area has not fully closed the gap in per capita incomes vis-à-vis the Western part of the country, this gap has shrunk from two-thirds in 1991 to roughly one-third in 2014. In Italy, over the same period, the gap (at over 40 per cent) has remained virtually unchanged.

The present authors argued nearly two decades ago [Boltho *et al.*, 1997] that such an outcome could have been expected given that many features linked to economic policy, to labour market behaviour and, especially, to history, differentiated East Germany from Southern Italy. All of these have almost certainly played a role in the diverging developments of the two regions. German economic policy concentrated on infrastructure provision; Italian policies maintained their emphasis on (often debilitating) transfer payments. Labour market behaviour differed, with East German workers accepting compensation levels below those of their West German counterparts, despite earlier union promises of wage equalization. There was no similar moderation in the *Mezzogiorno*. Most importantly, however, the performance of the two regions tradeable sectors was very different. The rapid rise in the trade/output share of East Germany seems to have been a powerful contributor to the closing the East-West income gap. The *Mezzogiorno*’s tradeable sector, by contrast, has remained both small and underdeveloped.

It is not implausible to think that this differing performance, particularly noticeable in the area of advanced and complex manufactured products is, at least in part, linked to the two regions’ different histories. East Germany seems clearly endowed with higher levels of trust and social capital than the *Mezzogiorno*, and has not fallen prey to the corruption and rent-seeking that characterize that region today. Much of this difference almost certainly reflects the weight of history. And the higher institutional quality this historical legacy has generated is, in turn an input into East Germany’s comparative advantage in

complex products [Costinot, 2009], a comparative advantage that is bound to have facilitated the per capita income convergence the region has seen since unification.

### Footnotes

1. At the time a parallel investigation for West/East Germany could not be done since the time series was too short.
2. Inserting migration flows from the *Mezzogiorno* into the Italian regression did not improve the results. Data on internal migration for Italy were kindly provided by Dr Frank Heins of the Istituto di Ricerche sulla Popolazione e le Politiche Sociali.
3. The crucial importance to regional economic development of a competitive external sector has been a constant of the literature in this area since at least the 1950s [North, 1955].
4. Despite the destruction of East Germany's industrial base after unification, the region's share of manufacturing in total employment in 2014, at some 15¾ per cent, was in Western Europe second only to those of West Germany (17¾ per cent) and Italy (16 per cent).
5. The attempt is rough because the source quoted only shows a limited number of "product complexity" indices, not all of which closely fit the commodity composition of German and Italian exports here used. The overall indices obtained in 2000 and in 2014 (1.87 and 1.74 for Germany, 1.42 and 1.42 for Italy) are not, however, very different from the Hausman *et al.* results for 2010: 1.96 and 1.40 for the two countries respectively. If anything, this suggests that the East German result here shown may well be an underestimate
6. Further evidence corroborating East Germany's greater relative competitiveness compared to that of Southern Italy comes from a very broad estimate of regional competitiveness produced by the European Commission [Annoni and Kozovska, 2010; Annoni and Dijkstra, 2013]. Some 70 indicators were used to construct an index that covers variables ranging from macroeconomics to educational and infrastructure provisions, from innovation to labour market efficiency, etc. In the first year for which this index is available (2010), the *Mezzogiorno* is shown as lagging Central-North Italy by a much wider margin than the lag between Eastern and Western Germany. By 2013, Southern Italy's relative position had worsened further while East Germany's position had improved.
7. Interaction terms between the dummy variable and trade shares were found not to be significant.

8. This approach enables the estimation of the effects of a variable which does not exhibit time variability, such as the dummy for the poorer geographical area (East and South respectively) [Wooldridge, 2010].

9. There were, of course, large differences between East and West before the war because of the presence of the, largely agricultural, territories of Pomerania and East Prussia. These, however, were ceded in 1945 and are no longer part of East Germany.

10. Surprising as it may sound, the de-nazification process of the German civil service after the war was not only very short-lived but also much milder than the fury with which the East German elites were chased from their jobs, whether they had had a Communist past or not, not only in the civil service but also in the scientific, educational and even cultural fields [Giacché, 2013].

11. There is, however, also survey evidence showing that East Germans feel that avoiding taxes is more reprehensible than do West Germans [Torgler, 2003].

12. An earlier estimate of the shadow economy in Germany for 1999 (based, however, solely on survey data) had even come to the conclusion that this represented a smaller component of GDP in the East than in the West [Mummert and Schneider, 2002].

13. German data for 2014 had not yet been made available at the time of writing.

14. As for electoral participation, this is lower in East Germany than in West Germany, but the gap for federal elections is of the order of 3 to 8 percentage points [DIW, 2015], as against a gap between the Centre-North and the *Mezzogiorno* of some of 8 to 12 percentage points in Italian legislative (or *politiche*) elections [Regione Emilia-Romagna, 2013].

15. Inserting a dummy for the 11 observations for the OPEC countries, which have relatively high per capita incomes but very low export complexity indices, does not greatly change these results. The governance indicators remain statistically highly significant. Details are available from the authors. As an example, linking export complexity to the presence of the Rule of Law and to per capita incomes expressed in purchasing power parity in 2010 gives the following result:

$$\text{Export complexity} = -0.19 + 0.52^{***}\text{Rule of Law} + 0.0002\text{GDPper cap.} - 0.77^{***}\text{OPEC}$$

$$(0.14) \quad (0.13) \quad (0.00) \quad (0.23)$$

### Statistical Annex: Instrumental Variables Estimation of Trade and Income per Capita

The instrumental variables estimation of the effects of trade on income per capita closely follows the approach by Frankel and Romer [1999]. In order to capture the geographic component of trade, a gravity model of bilateral trade is separately estimated for Germany and Italy between each region and their main 100 trading partners in the world. The gravity model takes the following form:

$$\begin{aligned} \ln\left(\frac{\tau_{ij}}{GDP_i}\right) = & \alpha_0 + \alpha_1 \ln D_{ij} + \alpha_2 \ln N_i + \alpha_3 \ln A_i + \alpha_4 \ln N_j + \alpha_5 \ln A_j \\ & + \alpha_6 (L_i + L_j) + \alpha_7 B_{ij} + \alpha_8 B_{ij} \ln D_{ij} + \alpha_9 B_{ij} \ln N_i + \alpha_{10} B_{ij} \ln A_i \\ & + \alpha_{11} B_{ij} \ln N_j + \alpha_{12} B_{ij} \ln A_j + \alpha_{13} B_{ij} (L_i + L_j) + \varepsilon_{ij} \quad (A1) \end{aligned}$$

where  $i$  denotes the *Land* ( $i = 1, 2, \dots, 16$ : Germany) or the region ( $i = 1, 2, \dots, 20$ : Italy),  $j = 1, 2, \dots, 100$  is the foreign country,  $\tau_{ij}$  measures the bilateral trade between *Land/region*  $i$  and country  $j$ ,  $GDP_i$  is regional GDP,  $D_{ij}$  is the metric distance between region  $i$  and country  $j$ ,  $N_i$  is the population of region  $i$ ,  $A_i$  is its size in  $\text{km}^2$ ,  $L_i$  is a dummy variable which takes the value 1 if region  $i$  is landlocked,  $L_j$  is a dummy variable which takes the value 1 if country  $j$  is landlocked, and  $B_{ij}$  is a dummy variable which takes the value 1 if there is a common border between region  $i$  and country  $j$ .

Equation (A1) is estimated by OLS separately for Germany and for Italy. Table A1 presents the estimation results. Distance attracts a negative coefficient, even after the interaction with the cross-border dummy is considered: the estimated elasticity of trade with respect to distance between region  $i$  and country  $j$  is about -1 for Germany and -1.1 for Italy. Bilateral trade is increasing in the population of the foreign country and is reduced when either the domestic region or the foreign country is landlocked. The population of the region has a negative coefficient for Germany and positive for Italy, whereas the area of the foreign country is not statistically significant. The dummy for poor regions is negative and significant both for Germany and for Italy.

The fitted values from equation (A1) are used to construct the geographic component of region  $i$ 's trade. Equation (A1) can be expressed compactly in vector form as  $\ln(\tau_{ij}/GDP_i) = \boldsymbol{\alpha}' \cdot \mathbf{x}_{ij} + \varepsilon_{ij}$ . The predicted trade share  $\hat{T}_i$  is thus computed as:

$$\hat{T}_i = \sum_{j=1}^{100} \exp(\hat{\boldsymbol{\alpha}}' \cdot \mathbf{x}_{ij}) \quad (A2)$$

for each region  $i$ . The predicted values  $\hat{T}_i$  can be used as instruments when regressing the observed trade shares on GDP per capita. The correlation coefficients between the actual and the constructed trade shares are 0.784 for Germany and 0.758 for Italy. Table A2 presents the relationship between observed and constructed trade share. Even after controlling for the population and the size of the regions, the constructed trade share contributes significant explanatory power to actual trade.

The predicted values  $\hat{T}_i$  are then used as instruments for the observed trade shares  $T_i$  in the regressions of GDP per capita of region  $i$  on the trade share, the logarithm of population, the logarithm of size, and the area dummies  $S_i$  for eastern *Länder* (Germany) and for southern regions (Italy):

$$\ln\left(\frac{GDP_i}{N_i}\right) = \beta_0 + \beta_1 T_i + \beta_2 \ln N_i + \beta_3 \ln A_i + \beta_4 \ln S_i + \eta_i \quad (A3)$$

Equation (A3) is estimated separately for Germany and for Italy both by OLS and by IV, and the regression results are reported in Table 4 (without the area dummies) and in Table 5 (with the area dummies).

In order to validate the separate estimation of GDP per capita in Germany and in Italy, Table A3 presents the results of a pooled regression for the regions of the two countries. Columns (1) and (2) present the results of estimation by OLS, and columns (3) and (4) the estimation by IV. Columns (2) and (4) contain the coefficients of the variables interacted with a dummy variable which takes the value 1 for all the regions in East Germany. The null hypothesis that the coefficients on the variables are the same for Germany and Italy is rejected both when the equation is estimated by OLS ( $F(6,24) = 2.70$ ) and when it is estimated by IV ( $\text{Chi}^2(6) = 32,48$ ).

Data sources:

Regional accounts were obtained from the official German and Italian statistical sites (Statistische Ämter des Bundes und der Länder, Volkswirtschaftliche Gesamtrechnung der Länder; ISTAT, Conti e aggregati economici territoriali). Foreign trade data for Germany come from the Statistisches Bundesamt, GENESIS-Online data bank; for Italy from ISTAT's Coeweb data bank. Distances between the various national and regional capitals come from the DistanceFromTo website. Whether countries or regions were landlocked or had common borders was subjectively decided by looking at an atlas.

**Table A1. The Bilateral Trade Equation**

	Germany		Italy	
	(1) Variable	(2) Interaction	(3) Variable	(4) Interaction
Dependent variable: log of trade share				
Constant	-8.100*** (0.680)	-1.410 (1.269)	-16.40*** (2.526)	4.320 (2.772)
Ln distance	-0.986*** (0.043)	-0.047 (0.087)	-1.175*** (0.096)	0.062 (0.111)
Ln population (country <i>i</i> )	-0.124+ (0.074)	0.586*** (0.137)	0.547*** (0.163)	-0.209 (0.196)
Ln size (country <i>i</i> )	0.028 (0.043)	-0.337*** (0.067)	0.293 (0.366)	-0.191 (0.397)
Ln population (country <i>j</i> )	0.661*** (0.042)	-0.023 (0.075)	0.722*** (0.082)	-0.031 (0.097)
Ln area (country <i>j</i> )	-0.028 (0.034)	0.038 (0.062)	0.016 (0.072)	-0.071 (0.083)
Landlocked	-0.327** (0.124)	0.033 (0.232)	-0.489+ (0.260)	-0.182 (0.314)
East	-0.244* (0.102)			
South		-1.442*** (0.101)		
No. obs.	1503		1958	
Adjusted $R^2$	0.441		0.369	
Root MSE	1.349		1.946	

*Note:* Heteroskedasticity robust standard errors in parentheses. The trade share is defined as the ratio between the bilateral trade between *Land/region i* and country *j* and the GDP of country *I* (equation (A1)).

+ Significant at 10% \*Significant at 5% \*\*Significant at 1% \*\*\* Significant at 0.1%.

**Table A2. The Relation between Actual and Constructed Trade Shares**

	(1)	Germany (2)	(3)	(4)	Italy (5)	(6)
Dependent variable: Actual trade share						
Constant	0.022 (0.159)	1.538* (0.524)	0.569 (0.914)	0.206*** (0.027)	-0.944+ (0.456)	-0.715 (0.486)
Constructed trade share	2.196*** (0.386)		2.042* (0.838)	1.043*** (0.167)		0.840** (0.258)
Ln population		-0.044 (0.161)	-0.067 (0.125)		0.009 (0.046)	0.048 (0.048)
Ln size		-0.050 (0.118)	0.007 (0.090)		0.139 (0.080)	0.141 (0.082)
East	0.033 (0.113)	-0.193 (0.129)	-0.034 (0.148)			
South				-0.001 (0.057)	-0.194** (0.051)	0.057 (0.056)
No. obs.	16	16	16	20	20	20
Adjusted $R^2$	0.478	0.084	0.424	0.525	0.515	0.555
Root MSE	0.194	0.257	0.204	0.118	0.119	0.114

*Note:* Heteroskedasticity robust standard errors in parentheses.

- + Significant at 10%
- \* Significant at 5%.
- \*\* Significant at 1%.
- \*\*\* Significant at 0.1%.

**Table A3. Pooled regression for trade and income per capita**

	OLS		IV	
	(1) Variable	(2) Interaction	(3) Variable	(4) Interaction
Dependent variable: log of GDP per capita				
Constant	3.451*** (0.421)	-0.811 (0.557)	4.047*** (1.129)	-1.307 (1.159)
Trade share	0.409 (0.384)	0.191 (0.390)	1.188* (0.560)	-0.647 (0.567)
Ln population	-0.070+ (0.039)	0.223** (0.073)	-0.084* (0.039)	0.239*** (0.062)
Ln size	0.030 (0.066)	-0.119 (0.071)	-0.058 (0.157)	-0.039 (0.159)
Dummy for poor region	-0.385* (0.181)	0.400 (0.260)	-0.187 (0.199)	0.288 (0.255)
Trade share × Dummy for poor region	-0.094 (0.370)	-0.073 (0.448)	-0.286 (0.831)	-0.055 (0.872)
No. obs.	36		36	
Adjusted $R^2$	0.832		0.768	
Root MSE	0.114		0.109	
$F(6,24)$	2.70*			
Chi2(6)			32.48***	

*Note:* Heteroskedasticity robust standard errors in parentheses.

Columns (2) and (4): interactions with Dummy variable = 1 for German regions.

The null hypothesis for the test statistics  $F(6,24)$  and  $\text{Chi}(6)$  is that the coefficients on the interactions of the variables with the dummy variable for the German regions are jointly equal to zero.

+ Significant at 10%.

\* Significant at 5%.

\*\* Significant at 1%.

\*\*\* Significant at 0.1%.

## References

- Annoni, P. and K.Kozovska (2010), *EU Regional Competitiveness Index 2010*, European Commission, Luxembourg.
- Annoni, P. and L.Dijkstra (2013), *EU Regional Competitiveness Index 2013*, [http://ec.europa.eu/regional\\_policy/sources/docgener/studies/pdf/6th\\_report/rci\\_2013\\_report\\_final.pdf](http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/6th_report/rci_2013_report_final.pdf).
- Ariely, D., X.Garcia-Rada, L.Hornuf and H.Mann (2014), “The (True) Legacy of Two Really Existing Economic Systems”, LMU, Munich Discussion Paper, No.2014-26.
- Arrow, K.J (1972), “Gifts and Exchanges”, *Philosophy and Public Affairs*, Vol.1 No.4, Summer, 343-62.
- Bairoch, P. (1985), *De Jéricho à Mexico: villes et économie dans l’histoire*, Paris, Gallimard.
- Barro, R.J. and X.Sala-i-Martin (1991), “Convergence Across States and Regions”, *Brookings Papers on Economic Activity*, No.1, 107-82.
- Boltho, A., W.Carlin and P.Scaramozzino (1997), “Will East Germany Become a New Mezzogiorno ?”, *Journal of Comparative Economics*, Vol.24, No.3, June, 241-64.
- Borchardt, K. (1966), “Regionale Wachstumsdifferenzierung in Deutschland im 19. Jahrhundert unter besonderer Berücksichtigung des West-Ost-Gefälles”, in W.Abel, K.Borchardt, H.Kellenbenz and W.Zorn (eds.), *Wirtschaft, Geschichte und Wirtschaftsgeschichte*, Stuttgart, Gustav Fischer Verlag.
- Brosig-Koch, J., C.Helbach, A.Ockenfels and J.Weimann (2011), “Still Different after all these Years: Solidarity Behavior in East and West Germany”, *Journal of Public Economics*, Vol.95, No.11-12, December, 1373-76.
- Buch, C.M. and P.Monti (2010), “Openness and Income Disparities: Does Trade Explain the ‘Mezzogiorno Effect’”, *Review of World Economics*, Vol.145, 667-688.
- Buch, C.M. and F.Toubal (2009), “Openness and Growth: The Long Shadow of the Berlin Wall”, *Journal of Macroeconomics*, Vol.31, No.3, September, 409-23.
- Charron, N. (2013), “QoG at the Sub-national Level and the EQI”, in N.Charron, V.Lapuate and B.Rothstein, *Quality of Government and Corruption from a European Perspective*, Cheltenham, Edward Elgar.
- Charron, N., L.Dijkstra and V.Lapuate (2012), “Regional Governance Matters: A Study on Regional Variation on Quality of Government within the EU”, European

Commission Working Paper, WP 01/2012.

- Charron, N., L.Dijkstra and V.Lapiente (2014), “Mapping the Regional Divide in Europe: A Measure of Assessing the Quality of Government in 206 European Regions”, *Social Indicators Research*, DOI: 10.1007/s11205-014-0702-y.
- Ciccarelli, C. and A.Missiaia (2013), “The Industrial Labor Force of Italy’s Provinces: Estimates from the Population Censuses, 1871-1911”, *Rivista di Storia Economica*, Vol.29, No.2, August, 141-91.
- Costinot, A. (2009), “On the Origins of Comparative Advantage”, *Journal of International Economics*, Vol.77, No.2, April, 255-64.
- De Long J.B. and A.Shleifer (1993), “Princes and Merchants: European City Growth before the Industrial Revolution”, *Journal of Law and Economics*, Vol.36, No.2, October, 671-702.
- Deutsch, K.W. (1953), “The Growth of Nations: Some Recurrent Patterns of Political and Social Integration”, *World Politics*, Vol.5, No.2, January, 168-95.
- DIW (2015], “25 Years of German Unity”, Press Release, 9 September 2015.
- Frankel, J.A. and D.Romer (1979), “Does Trade Cause Growth ?”, *American Economic Review*, Vol.89, No.3, June, 379-99.
- Giacché, V. (2013), *Anschluss, l’annessione*, Reggio Emilia, Imprimatur editore.
- Guiso, L., P.Sapienza and L.Zingales (2008), “Long Term Persistence”, NBER Working Paper, No.14278, August.
- Hausmann, R., J.Hwang and D.Rodrik (2007), “What you Export Matters”, *Journal of Economic Growth*, Vol.12, No.1, March, 1-25.
- Hausmann, R., C.A.Hidalgo, S.Bustos, M.Coscia, M.A.Yildirim (2013), *The Atlas of Economic Complexity: Mapping Paths to Prosperity*, Cambridge, MA., MIT Press.
- Heilemann, U. (2005), “Ostdeutschland – ein “Mezzogiorno Fall”?”, *Wirtschaftsdients*, Vol.85, No.8, August, 505-12.
- Heineck, G. and B. Süßmuth (2013), “A Different Look at Lenin’s Legacy: Social Capital and Risk Taking in the Two Germanies”, *Journal of Comparative Economics*, Vol.41, No.3, August, 789-803.
- Horváth, R. (2013), “Does Trust Promote Economic Growth ?”, *Journal of Comparative Economics*, Vol.41, No.3, August, 653-68.

- Howard, M.M. (2003), *The Weakness of Civil Society in Post-communist Europe*, Cambridge, Cambridge University Press.
- ISTAT (2016), *Banca dati territoriali per le politiche di sviluppo*, Rome.
- Jacob, M. (2010), “Long-Term Persistence: The Free and Imperial City Experience in Germany”, Working Paper, available at SSRN.
- Jacob, M. and M. Tyrell (2010), “The Legacy of Surveillance: An Explanation for Social Capital Erosion and the Persistent Economic Disparity between East and West Germany”, Working Paper available at SSRN.
- Knack, S. and P. Keefer (1997), “Does Social Capital have an Economic Payoff? A Cross-Country Investigation”, *Quarterly Journal of Economics*, Vol.112, No.4, 1251-88.
- Levchenko, A.A. (2007), “Institutional Quality and International Trade”, *Review of Economic Studies*, Vol.74, No.3, 791-819.
- Mauro, L. and E. Podrecca (1994), “The Case of Italian Regions; Convergence or Dualism?”, *Economic Notes*, Vol.24, No.3, 447-72.
- Mummert, A. and F. Schneider (2002), “The German Shadow Economy: Parted in a United Germany?”, *Finanzarchiv*, Vol.58, No.3, September, 286-316.
- Ockenfels, A. and J. Weimann (1999), “Types and Patterns: An Experimental East-West German Comparison of Cooperation and Solidarity”, *Journal of Public Economics*, Vol.71, No.2, February, 275-87.
- Paci, R. and F. Pigliaru (1999), “Growth and Sectoral Dynamics in the Italian Regions”, in J. Adams and F. Pigliaru (eds.), *Economic Growth and Change*, Cheltenham, Edward Elgar.
- Putnam, R. (1993), *Making Democracy Work – Civic Traditions in Modern Italy*, Princeton, NJ, Princeton University Press.
- Rainer, H. and T. Siedler (2009), “Does Democracy Foster Trust?”, *Journal of Comparative Economics*, Vol.37, No.2, June, 251-69.
- Regione Emilia-Romagna (2013), *Quaderni elettorali*, Elezioni politiche 2013.
- Schneider, F. (2013), “Size and Development of the Shadow Economy in 31 European and 5 Other OECD Countries from 2003 to 2012: Some New Facts”, mimeo.
- Schneider, F. and A. Buehn (2009), “Shadow Economies and Corruption all over the

- World: Revised Estimates for 120 Countries”, *Economics*, Vol.1, October, 1-53.
- Sinn, H.W., (2002), “Germany’s Economic Unification: An Assessment after Ten Years”, *Review of International Economics*, Vol.10, No.1, February, 113-28.
- Sinn, H.-W. and F.Westermann (2000), “Two Mezzogiornos”, CESifo Working Paper No. 378, Munich.
- SVIMEZ (2011), *150 anni di statistiche italiane: Nord e Sud, 1861-2011*, Bologna, Il Mulino.
- Tabellini, G. (2010), “Culture and Institutions: Economic Development in the Regions of Europe”, *Journal of the European Economic Association*, Vol.8, No.4, June, 677-716.
- Tafenu, E., H.Herwartz and F.Schneider (2010), “Regional Estimates of the Shadow Economy in Europe”, *International Economic Journal*, Vol.24, No.4, 629-36.
- Tamm, T., D.-K.Hubrich, N.Spengler and H.Krimmer (2011), *Nutzerhandbuch Zivilgesellschaftsdaten*, Band 3, Mai.
- Tipton, F.B.Jr. (1976), *Regional Variations in the Economic Development of East Germany during the Nineteenth Century*, Middletown CT, Wesleyan University Press.
- Torgler, B. (2003), “Does Culture Matter ? Tax Morale in an East-West Comparison”, *Finanzarchiv*, Vol.59, 504-28.
- Verger, J. (1992), “Patterns” in J.Verger (ed.), *A History of the University in Europe*, Vol.1, Cambridge, Cambridge University Press.
- Wooldridge, J. (2010), *Econometric Analysis of Cross Section and Panel Data*, 2nd ed., Cambridge, MA., MIT Press.