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The long-term impact of Objective 1 funding on unemployment and labour market disparities: Evidence from the UK

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Abstract

The development programmes financed by EU Cohesion Policy put a strong emphasis on the promotion of employment opportunities and the reduction of labour market inequalities in the most disadvantaged regions of Europe. Impact evaluations of these programmes are seldom performed with robust counterfactual analyses. This paper exploits the introduction of Objective 1 eligibility in 2000 in the UK regions of Cornwall and South Yorkshire as a natural experiment, in order to test the impact of EU Structural Funds on unemployment and labour market inequalities. A difference-in-differences model assesses the labour performance of the two regions during the 2000-2006 and the 2007-2013 programming periods. This paper is the first in the literature to study convergence dynamics within EU regions eligible for Cohesion support and to test the effect of EU Regional Policy after Objective 1 funds are no longer available to a region. The results provide evidence that Objective 1 funding has delivered very different labour market outcomes in the two case-studies considered. While Cornwall has consistently reduced unemployment, South Yorkshire saw unemployment decrease only temporarily but was unable to sustain the labour market gains when Objective 1 eligibility was lost. In addition, a more equitable distribution of employment opportunities was obtained in Cornwall, while no evidence of a variation of labour disparities was found in South Yorkshire. Distinct development strategies may be at the root of the different performances of the two regions.

Keywords: EU Cohesion Policy, Objective 1, unemployment, labour market disparities, UK.

JEL Classification: R11; O18; J60.

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1. Introduction

A large number of evaluations have assessed the impact of European Union's (EU) Cohesion Policy, the largest transnational programme for regional development promotion worldwide. Great attention has been devoted to determine the effectiveness of EU funds in improving economic and labour conditions in Objective 1 regions, the most economically disadvantaged areas receiving the large majority of the funds. However, whether Structural Funds have successfully contributed to promote convergence by improving the economic performance of the poorest EU regions is still an open question in the literature. While some scholars see Cohesion Policy as a distortion to market forces (e.g. Boldrin and Canova, 2001; Midelfart-Knarvik and Overman, 2002), others stress its contribution to growth and to the reduction of economic disparities in Europe (e.g. Cappelen et al., 2003). Some studies have focused on the necessary conditions enabling the EU funds to deliver on their economic promises (e.g. Rodríguez-Pose and Fratesi, 2004; Ederveen et al., 2006). In order to provide more conclusive evidence on the effectiveness of Cohesion Policy, a new strand in the literature has proposed the adoption of 'quasi-experiments' to compare policy outcomes in the recipient regions with appropriate counterfactuals. By employing quasi-experimental techniques, these studies aim to minimise the effect of unobserved heterogeneous factors from biasing the estimates obtained with traditional regression approaches (Becker et al., 2010).

Many EU Cohesion Policy evaluations have a specific focus on Objective 1 regions. Studies such as Rodríguez-Pose and Fratesi (2004) and Becker et al. (2013) estimate the impact of Structural Funds on this particular set of regions. Yet, the category of poorest EU regions should not be considered as fixed, but rather as a flexible classification subject to variations over time, as the eligibility for Objective 1 funding is not something that is expected to last for ever. Regions classified as Objective 1 should converge to higher levels of income and lose their status of areas in highest need of support. Little evidence exists in the literature on whether the loss of Objective 1 funding has any impact on economic and labour outcomes. Convergence between EU regions requires any socio-economic gain from Objective 1 policies to be lasting and sustainable in the long-term. Whether this is the case or whether the reduction in the flow of funds deriving from the loss of Objective 1 status leaves a region without vital subsidies for its economy is a question that has not yet been investigated.

The debate in the literature has mainly focused on the effect of Cohesion Policy interventions on income and labour inequalities across regions and countries. Much less attention has been devoted to the impact of the programmes in reducing disparities within the targeted regions. Large inequalities may exist not only across regions but also within regional borders and the impact of Cohesion Policy interventions on these inequalities is uncertain. The significant spatial heterogeneity that exists within regions may affect the policy outcome (Gagliardi and Percoco, 2013). Areas may respond differently depending on their socioeconomic conditions and on the size of the policy effort. Regional imbalances increase if the capacity to make

profitable use of the transfers is higher in the relatively more advantaged places; they decrease if well-tailored interventions are put in place in the less developed areas of the region. Little is known on whether an effective use of Structural Funds implies a relative reduction of intra-regional imbalances or whether disparities are more likely to increase.

This paper contributes to the existing literature by looking at the impact of Cohesion Policy on labour market outcomes. Three are the main objectives of the empirical analysis. First, we test the overall effectiveness of the policy in reducing unemployment; second, we identify the areas within a region where the effects are more visible; and third, we determine the long-term impact of the intervention across multiple programming periods. The selected case studies allow for the capturing of the causal effects of the interventions. By exploiting a change in eligibility for Cohesion support in the two UK regions of Cornwall and South Yorkshire, a difference-in-differences model is developed and tested on multiple geographical levels of aggregation – regional, district and ward. While Cornwall became eligible for Objective 1 funding for the 2000-2006 period and retained the eligibility over the 2007-2013 period, South Yorkshire was classified as Objective 1 for 2000-2006 and as Phasing-in for 2007-2013. This difference allows to compare the two regions in terms of labour market performance and to look at the long-term consequences of retaining or losing Objective 1 support.

The results provide clear evidence of a significant reduction in unemployment in Cornwall during the period in which the region was classified as Objective 1. Areas with higher pre-treatment unemployment experienced the largest reductions, suggesting that during the Objective 1 period unemployment inequalities in Cornwall have decreased. This effect has been sustainable over time and increased during the second programming period in which the region received Objective 1 funds. Significant employment gains are found also in South Yorkshire during the 2000-2006 period. However, the evidence suggests that all gains are offset when the region saw the proportion of EU subsidies reduce drastically in 2007-2013. EU funds in South Yorkshire do not seem to have significantly affected unemployment disparities within the region.

The remainder of the paper is organised as follows. Section 2 introduces the background of EU Cohesion Policy, offers a brief overview of the literature and discusses the evolution of Cohesion Policy in the UK; Section 3 presents the data sources and model; Section 4 and 5 analyse the two case-studies, i.e. Cornwall and South Yorkshire; Section 6 discusses a set of potential explanations for the results obtained; Section 7 concludes.

2. Background and literature review

European Cohesion Policy was established in 1988 as a programme aiming to promote social and economic cohesion in the EU. The size of the programme has increased considerably over time. Starting from the 1994-1999 period, Cohesion Policy expenditures represent approximately one third of the EU's total budget. Periodic changes have modified the way in which regions are classified for Cohesion Policy purposes. At the beginning of every new programming period, the EU revises the regional allocation of funds and the list of regions considered 'in most need of support'. While the priority objectives of Cohesion Policy have changed, the eligibility rule for determining 'Objective 1' status – i.e. 'Regions whose development is lagging behind' (European Commission, 2008a) – has always remained the same¹. Objective 1 regions, receiving the large majority of Structural Funds², are those whose GDP per head in purchasing power parity is below 75% of the EU average for the last three years before the start of a new programming period (Gripaios and Bishop, 2006).

The effectiveness of Cohesion Policy in fostering economic development and promoting convergence has been assessed in a vast number of evaluations performed with many different empirical methodologies. The majority of studies draw on samples of EU NUTS2 regions, employ panel data and rely on strict functional forms (Cappelen et al., 2003; Ederveen et al., 2003; Rodríguez-Pose and Fratesi, 2004; Beugelsdijk and Eijffinger, 2005; Ederveen et al., 2006; Puigcerver-Peñalver, 2007; Esposti and Bussoletti, 2008). More recent works have attempted to address endogeneity issues by using instrumental variable models in combination with spatial econometric techniques (Dall'erba and Le Gallo, 2008; Ramajo et al., 2008; Mohl and Hagen, 2010). In spite of the large number of studies produced, no consensus has been reached on whether Structural Fund spending is beneficial (Cappelen et al., 2003; Bahr, 2008; Esposti and Bussoletti, 2008), beneficial under some conditions (Rodríguez-Pose and Fratesi, 2004; Mohl and Hagen, 2010), insignificant (Garcia-Milá and McGuire, 2001; Dall'erba and Le Gallo, 2008) or even detrimental and unjustified (Boldrin and Canova, 2001; Dall'erba et al., 2009).

A new strand of the literature has proposed novel estimation methodologies based on quasi-experimental identification strategies to capture the causal impact of the policy on economic outcomes. A commonly used approach exploits the eligibility rule for Objective 1 status (GDP p/c below 75% of EU average) as a threshold for a regression discontinuity design (RDD). Becker et al. (2010) and Pellegrini et al. (2013) use this methodology and find a positive and significant effect of SFs on economic growth in Objective 1 regions. Other evaluations have focused on single countries or on particular regions. Adopting a spatial RDD methodology, Giua (2014) provides evidence on the positive and significant causal effect of Cohesion Policy on employment in the municipalities of Italian and Spanish of Objective 1 regions. In this paper we follow

¹ The name of 'Objective 1' regions was changed into 'Convergence regions' for the 2007-2013 period and again into 'Less developed regions' for 2014-2020, but the rule of eligibility has not been modified.

² For the 2000-2006 period, Objective 1 regions received 71.6% of the total Cohesion Policy budget (€213bn), despite representing only 37% of the total EU population (European Commission, 2008a). For the 2007-2013 period the proportion of funds to 'Convergence regions' (previously Objective 1) was increased to 82% (European Commission, 2008b).

the ‘quasi-experimental’ approach, exploiting the 2000 variations in Objective 1 eligibility in order to identify the effects of Structural Funds.

The main objective of the Cohesion Policy programme is to speed up the process of convergence between the less developed regions and the economic core of the EU. As stated by the European Commission, the goal is to “reduce the significant economic, social and territorial disparities that still exist between Europe’s regions” (European Commission, 2011). Regions receiving the largest proportion of funds are expected to reach higher levels of income and eventually lose their Objective 1 status. EU funds should bring the subsidised regions to a new balanced growth path, which is expected to be sustainable as the flow of funds is progressively reduced. If socio-economic gains achieved during the period of higher financial support are lost when the funds reduce, the ultimate purpose of EU Cohesion Policy, i.e. convergence between EU regions, cannot be pursued. Therefore, an accurate evaluation of Objective 1 programmes needs to take into consideration their impact both during the period of higher funds availability and when the funds are cut down because the region is shifting from a low to a medium-low income. The literature of EU Cohesion Policy evaluations has so far considered Objective 1 regions as a fixed category (e.g. Rodríguez-Pose and Fratesi, 2004; Becker et al., 2013; Giua, 2014), with little or no interest in the long-run effect of the policy interventions. While some evidence exist in the literature on the effect of place-based policies before and after financial aid is available to a region (e.g. Kline and Moretti, 2014), no study has ever looked at the long-term impact of the EU Objective 1 programme.

One way to make long-run convergence between regions easier to achieve is to reduce the economic and social disparities that exist within the NUTS2 borders of the poorest European regions³. In order to reinforce the economic, social and territorial cohesion within the continent, Structural Funds are expected to deliver benefits to the most disadvantaged areas within the regions receiving the highest shares of funds. The impact of the policy on intra-regional disparities depends on the nature of the development strategy implemented, as well as on the peculiarities of the region in question. Less developed regions may find it easier to foster their competitive advantage by investing in the relatively more efficient firms and places, ‘picking winners’ rather than solving their main economic bottlenecks. The risk in this case is that EU funds may facilitate a reduction in core-periphery patterns at the country-level, while reproducing inequalities regionally and locally. An approach that pays more attention to the sub-regional dimension may help to evaluate the extent to which EU Cohesion Policy contributes to the reduction of inequalities – not just across but also within regions.

Recent research has begun to explore the heterogeneous impact of Cohesion Policy on different areas within the targeted regions. Gagliardi and Percoco (2013) distinguish between European NUTS3 regions in terms of

³ NUTS2 borders are the ones used to determine Objective 1 eligibility. However, in some cases the NUTS2 aggregation is purely conventional and it does not reflect the actual delimitation of functional economic areas (Dunford, 2010). This implies that economic and social inequalities within NUTS2 borders are more likely to exist.

their geographical characteristics and find that rural areas close to urban centres are those benefitting the most from policy support. Shifting the level of analysis from the national and regional level to the sub-regional level offers a much-needed view of the social and economic dynamics taking place within the regions as a result of the implementation of the development programmes. This paper contributes to the literature by taking a closer look at these dynamics and determine the extent to which an effective use of the funds can promote a more homogeneous distribution of employment opportunities across space.

EU Regional Policy in the UK

The focus of this paper is on the UK, a country that has drawn relatively little attention in the literature of EU Cohesion Policy evaluations. The only attempt to empirically test the economic effectiveness of Structural Funds in this context is Criscuolo et al.'s (2012) study, which mainly focuses on the impact of Regional Selective Assistance (RSA) policies on UK firms. They find a statistically insignificant correlation between Objective 1 eligibility and changes in firms' employment.

While the relatively low level of internal disparities in the UK has partly constrained the possibility for the country to obtain financial resources from the EU⁴, the UK remains one of the largest absolute recipients of funds. Only Spain, Italy, Germany and Greece have received more Structural Funds during the 2000-2006 period. In addition, the UK ranks high for the amount of European Social Fund (ESF) received. For the period 2000-2006 the EU committed around €8 billion to the UK, the fourth highest amount among all EU countries.

The geography of UK regions targeted by EU Cohesion Policy has changed over time. During the 1994-1999 period, only Merseyside in England, the Highlands and Islands of Scotland and Northern Ireland were awarded Objective 1 status. For the 2000-2006 programming period the list of UK 'lagging behind' regions was radically modified. Of the aforementioned regions, only Merseyside retained Objective 1 support while three new regions were declared eligible: Cornwall and South Yorkshire in England and West Wales and The Valleys in Wales (see maps in Appendix A1). During both the 1994-1999 and the 2000-2006 programming periods the Objective 1 status was assigned on the basis of clearly defined NUTS2 regional borders, while other forms of financial help were provided to specific areas independently of NUTS2 geographical definitions. Table 1 summarises the amount of EU funds per inhabitant⁵ in 1994-1999, 2000-

⁴ Two of the largest recipients of SFs are Italy and Spain, both characterised by a large development gap between their Northern part and their poorer Southern regions.

⁵ These figures are based on 'payments' from the European Commission. Payments refer to the share of financial resources the European Commission has paid to EU regions and are available to be spent. Although they do not reflect the exact final spending from the regions, they represent much more accurate estimates of actual spending than

2006 and 2007-2013 obtained by English regions. It can be noted that all regions received some form of financial support, but the amount of funds awarded to non-Objective 1 regions is far lower than what was received by the regions considered in highest need of help. During 1994-1999, the entire territory of Cornwall fell within the classification of Objective 5b, i.e. ‘Adapt agricultural structures and promote the development of rural areas’, while South Yorkshire was classified as Objective 2, i.e. ‘Reconvert region affected by declining industry’. The fact that the two regions were among the top receivers of Structural Funds in England before 2000 will be accounted for in the empirical analysis.

Table 1
Annual Euros of Structural Funds per inhabitant in English regions, 1994-1999, 2000-2006 and 2007-2013

Region	1994-1999	Region	2000-2006	Region	2007-2013 ^a
Merseyside*	61.9	<i>Cornwall and Isles of Scilly*</i>	138.0	<i>Cornwall and Isles of Scilly*</i>	144.6
Tees Valley and Durham	32.1	Merseyside*	137.3	Merseyside	39.4
Greater Manchester	28.7	<i>South Yorkshire*</i>	126.8	<i>South Yorkshire</i>	34.3
<i>South Yorkshire</i>	27.5	Tees Valley and Durham	54.2	Tees Valley and Durham	22.3
Northumberland	27.0	Northumberland	52.3	Northumberland	22.3
<i>Cornwall and Isles of Scilly</i>	26.8	West Midlands	45.4	Greater Manchester	14.9
West Midlands	26.5	Greater Manchester	44.0	Cumbria	14.2
Cumbria	24.3	East Yorkshire	40.5	East Yorkshire	13.6
East Yorkshire	23.5	Cumbria	36.3	North Yorkshire	13.5
Derbyshire and Nottinghamshire	17.1	Devon	36.3	Lancashire	13.3
Devon	16.1	Lincolnshire	35.5	West Yorkshire	12.8
Shropshire and Staffordshire	14.5	Shropshire and Staffordshire	32.3	Cheshire	12.6
West Yorkshire	10.1	Lancashire	31.0	Derbyshire and Nottinghamshire	12.6
Lancashire	9.1	West Yorkshire	30.9	Lincolnshire	12.4
North Yorkshire	8.6	Derbyshire and Nottinghamshire	30.0	Leicestershire, Rutland	11.6
Lincolnshire	7.7	North Yorkshire	26.4	Shropshire and Staffordshire	11.4
Herefordshire, Worcestershire	7.1	Inner London	22.2	Herefordshire, Worcestershire	11.3
Inner London	5.3	East Anglia	21.1	West Midlands	11.2
Kent	3.8	Herefordshire, Worcestershire	20.5	Devon	10.3
East Anglia	3.5	Cheshire	18.3	Essex	9.6
Cheshire	3.3	Kent	17.6	Dorset and Somerset	9.2
Outer London	1.9	Outer London	16.6	East Anglia	8.9
Essex	1.5	Bedfordshire and Hertfordshire	16.4	Outer London	8.1
Gloucestershire, Wiltshire	1.4	Leicestershire, Rutland	16.0	Inner London	7.8
Dorset and Somerset	1.4	Gloucestershire, Wiltshire	15.5	Kent	7.7
Hampshire and Isle of Wight	1.3	Essex	15.3	Hampshire and Isle of Wight	7.7
Leicestershire, Rutland	1.2	Dorset and Somerset	15.0	Gloucestershire, Wiltshire	7.7
Bedfordshire and Hertfordshire	1.1	Surrey, East and West Sussex	14.4	Surrey, East and West Sussex	7.3
Surrey, East and West Sussex	0.9	Hampshire and Isle of Wight	13.9	Bedfordshire and Hertfordshire	6.8
Berkshire, Buckinghamshire	0.8	Berkshire, Buckinghamshire	13.6	Berkshire, Buckinghamshire	5.6

European Commission ‘commitments’, often used in SFs evaluations as a proxy for EU funds expenditures (e.g. Rodriguez-Pose and Fratesi, 2004).

* **Objective 1 regions.** a / provisional figures, updated to 2014. Note: values are calculated as Structural Funds' payments from the European Commission divided by regional population. Figures at current prices. Source: DG Regional Policy.

Given the strict and specific criterion adopted to assign the Objective 1 status, variations in eligibility like the ones experienced by Cornwall and South Yorkshire in 2000 represent almost unique cases in the history of Cohesion Policy. As Objective 1 regions are expected to use Structural Funds to improve the economic performance and converge to the average level of per capita income of the EU, it is very unusual for regions to 'switch' to Objective 1 in countries that have been part of the EU for a long time.

3. Model and data

We exploit the change in Objective 1 eligibility experienced in 2000 by the UK regions of Cornwall and South Yorkshire to evaluate the impact of the EU funds on unemployment in these two regions. As further discussed in the next sections, if the sudden increase in EU grants can be considered exogenous to the pre-treatment economic trends of the regions, this makes it possible to identify the effect of EU-financed development programmes by looking at the evolution of unemployment before and after the introduction of Objective 1 support. The long-term trend of the treated regions is compared to an appropriate counterfactual after controlling for a set of relevant factors potentially affecting the evolution of the regional economies.

The difference-in-differences analysis is performed at three different geographical levels: NUTS2 region, district and ward. The outcome variable, unemployment, has already been adopted in the literature as a measure to assess the effectiveness of EU-funded strategies in Objective 1 regions and the evolution in disparities related to Cohesion Policy programmes (Garcia-Milá and McGuire, 2001; Puga, 2002).

The dataset is obtained from a range of different data sources. The proxy for unemployment is given by the share of people claiming Job-Seeker's Allowance (JSA) unemployment benefits. Data are obtained from the Office for National Statistics (ONS) Nomis database and are available from the year 1992. We focus on the 1992-2014 period. While the share of unemployment benefit claimants is not an official measure of unemployment, it is the only available indicator for areas smaller than Local Authorities.

Regions and districts. Two are the main sources of data for the analysis performed at the region and district level. The first is the Quarterly Labour Force Survey (LFS) Local Area Data, providing information on employment, economic activity and related subjects at the level of UK Local Authority Districts (LADs) from 1992 to 2006. The period is collapsed from quarterly to yearly. The second, used only for the regional level analysis, is Eurostat Regio, providing data from 1995 until 2014. Information on regional GDP per capita is obtained from OECD statistics. Our final dataset is composed of LFS variables from 1992 to 2006,

Eurostat and OECD variables from 1995 to 2014 and the unemployment proxy available from 1992 to 2014 (details in Appendix A2).

Wards. Due to the 1996 revision of frozen ward boundaries, the unemployment variable is only available for wards from 1996. The data on unemployment is complemented with 1991 UK Census data. Data from following Censuses cannot be used because they relate to a different ward classification. The list of variables used in the ward level analysis and their descriptive statistics are shown in Appendix A3. The variable for wards' residents is given by the number of 1991 residents interpolated between 1996 and 2014 by assigning the average population growth rate of the region to its constituent wards. Other data obtained from the 1991 Census refer to sectorial shares, employment and demographic structures of the wards.

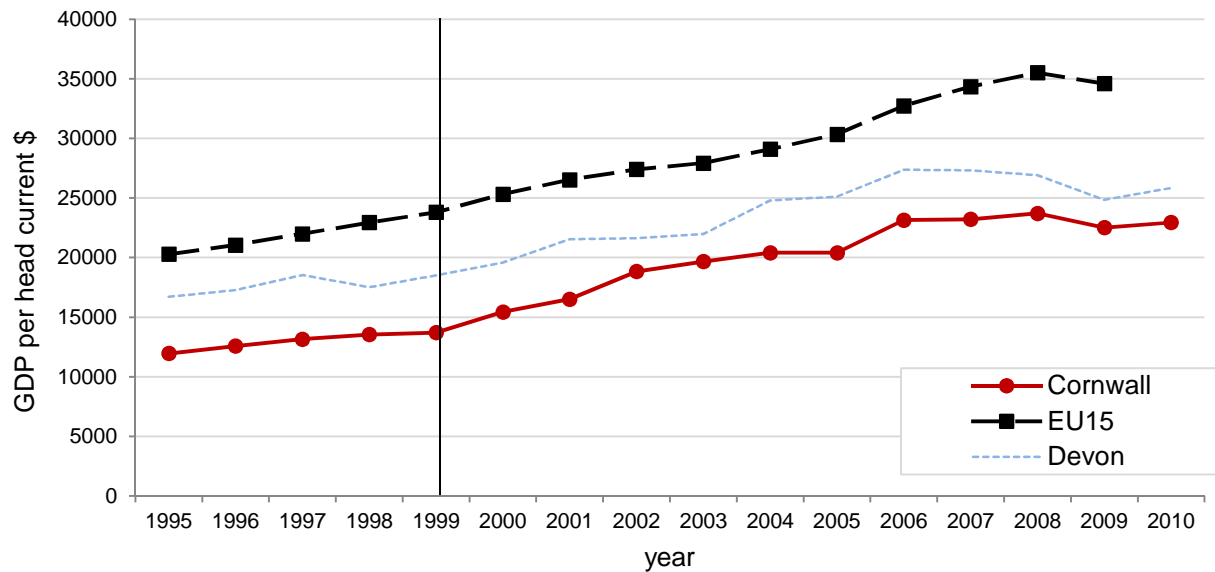
4. Case-study 1: Cornwall

The first region taken into account for our empirical analysis is Cornwall. This case is interesting because the reasons behind the change in Objective 1 eligibility are independent from any circumstance directly affecting the long-term economic trajectory of the region. As it can be noted in Figure 1, Cornwall has not experienced negative shocks making its GDP fall below the 75% threshold before 2000. Figure 1 plots the evolution of GDP per capita before and during the 2000-2006 intervention period, comparing the trend in Cornwall with the average GDP of the EU in 1999 (with 15 Member States). Between 1995⁶ and 1999, Cornwall was growing at a slightly lower pace with respect to the EU15⁷. On average, however, the growth rate of the region is comparable to that of the EU, as Cornwall's GDP was 58.8% of the EU15 in 1995 and 57.6% in 1999. The most significant catch-up phase can be observed from 2000 onwards. At the end of the 2000-2006 programming period Cornwall's GDP per capita was 70% of the EU15 level.

Figure 1
GDP per head, 1995-2010

⁶ Data on GDP per capita at the regional level, extracted from OECD Statistics, are not available before the year 1995.

⁷ The 1995-1999 average growth rate of Cornwall was 3.5% while in the EU15 it was 4%.



Source: own elaboration with OECD data.

Cornwall's eligibility change in 2000 occurred independently from the long-term economic trajectory of the region. The reasons behind the attainment of the Objective 1 status are related to the introduction of Government Office Regions to replace Standard Statistical Regions, a decision taken by the UK Government in 1998. The 1998 revision of UK NUTS regional borders modified the way in which Cornwall was classified for statistical purposes. Previously, Cornwall and its neighbouring region Devon were incorporated into a single statistical area. Under the 'Devonwall' political concept promoted by the UK Conservative Party from the 1970s, the two regions had been linked together in an economic, political and statistical sense. After the 1997 UK general elections and the defeat of the Conservatives, the Liberal Democrats withdrew their support to the 'Devonwall' project, opening the doors to the statistical separation of the two regions and the possibility for Cornwall to be awarded Objective 1 status. Therefore, the change in eligibility of the region was unexpected and, indeed, impossible to predict until at least mid-1997. The 1998 reform justified the division of Devon and Cornwall on the basis of "the very different economic conditions of the two counties, and Cornwall's sparsity of population, geographical peripherality and distinct cultural and historic factors reflecting a Celtic background" (House of Common, 1998).

The economic differences between Cornwall and Devon emphasised by the UK Government are evident if we compare the level of per capita GDP in the two regions (Figure 1). Devon's GDP per head was 77% of the EU15 in 1999. However, when looking at other measures of economic prosperity such as the Total Household Income or the Gross Disposable Household Income⁸, the figures for 1997-1999 appear very similar for the two regions and in both cases well above the 75% EU threshold (Gripaios and McVittie,

⁸ Total Household Income (THI) is calculated as all income received by household residents in a region, while Gross Disposable Household Income deducts from THI expenditures on taxes, social security, pension contributions and interest payments.

2003). This suggests that Cornwall was “somewhat fortunate to be awarded Objective 1 status” (Gripaios and McVittie, 2003: 372), due to the specific rule adopted for eligibility. The principal reason for the region’s qualification for financial support was the way borders had been re-drawn (Gripaios and McVittie, 2003; Gripaios and Bishop, 2006).

Cornwall’s labour market strategy: focus on disadvantaged areas

From the year 2000, the financial support from the EU allowed Cornwall to realise a large number of targeted employment programmes. The Objective One Single Programming Document (SPD) for Cornwall, defined priority axes for interventions and included a strategic goal entitled ‘Developing people’. This priority objective was in large part financed by the ESF⁹, which according to the Lisbon Strategy and the Europe 2020 strategy is intended to support sustainable economic growth and the social inclusion of EU regions by (among other objectives) “helping unemployed and inactive people enter work” (ESF website).

The “Developing people” goal in Cornwall’s SPD aimed to “develop and maintain a highly skilled, adaptable workforce which meets economic needs in the region, whilst promoting equality of opportunity and equal access to the labour market”. Priority measures under this axis were focused on “opening up job opportunities to the disadvantaged” and on “active labour market policies and lifelong learning, promoting social inclusion and encouraging female participation in the workforce” (South West Observatory Skills and Learning, 2008)

From the year 2000, the availability of EU funds has made possible the implementation of a wide number of projects aimed at generating new job opportunities in the areas of the regions with higher concentration of inactive and unemployed people. A specific section of Cornwall’s list of funded projects, ‘The Way to Work’¹⁰, was dedicated to this typology of interventions, seen as a fundamental priority for the social and economic development of the region. By looking at the online project list it can be seen that several projects were launched already in 2000. A total of over £65 million was spent on this axis. These programmes were intended to promote a more equal employment distribution within the region.

Effect on unemployment

⁹ During 2000-2006 and 2007-2013 EU SFs were divided into four different categories: the European Regional Development Fund (ERDF), the European Social Fund (ESF), the Financial Instrument for Fisheries Guidance (FIFG) and the European Agricultural Guidance and Guarantee Fund (EAGGF).

¹⁰ The extensive list of implemented projects as part of the ‘Way to Work’ section can be found at: http://www.objectiveone.com/O1htm/01-projects-sector/all_projects_waytowork.htm.

I. Regional level

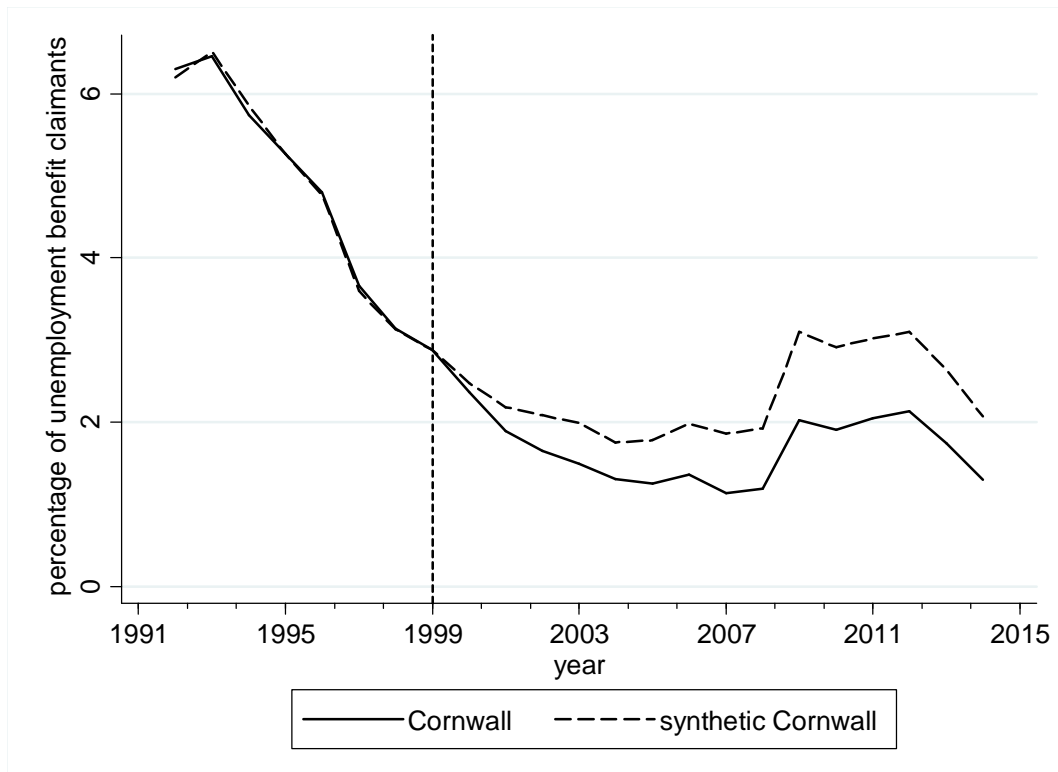
In order to compare Cornwall's unemployment trend with an appropriate counterfactual we adopt the Synthetic Control Method for comparative case studies developed by Abadie and Gardeazabal (2003) and Abadie et al. (2010; 2015) (see the Annex for an explanation of this methodology). To construct the synthetic control unit, we consider a number of labour market indicators related to the typology of the labour force, the sectorial composition and the level of education and training. In addition, we control for the level of pre-treatment GDP per capita. By construction, Cornwall is the region with the lowest per capita GDP among all regions in the sample, making it impossible for the synthetic region to perfectly match the treated region on this characteristic. Nonetheless, including this control is important in order to minimise 'convergence' effects not being determined by Structural Funds support. We also account for the fact that Cornwall was subject to a form of 'soft treatment' during 1994-1999, as the region received EU Objective 5b support. Therefore, in creating the synthetic region we control for the amount of Structural Funds received during the period 1994-1999.

Table A4 in the Appendix summarises pre-treatment average values of all variables used to construct the synthetic region, comparing them to the averages for Cornwall and England. Table A5 presents the list of 'weights' used to obtain the synthetic region. Devon provides almost 60% of the weights, not surprisingly given the strong connection with the Cornish economy discussed above¹¹. The remaining weights are from regions that are among the highest recipients of Structural Funds during 1994-1999. This makes the synthetic region have a share of per capita Structural Funds in the pre-treatment period that is substantially above the English average and close to the Cornwall figure. The level of per capita GDP is not too far from the one of Cornwall.

Figure 2 plots the unemployment trend for Cornwall with the estimated trend of the synthetic region between 1992 and 2014. The pre-treatment indicators predict appropriately the evolution of Cornwall's unemployment trajectory until 1999. From 2000 onwards a gap is clearly visible, indicating that Cornwall reduced its share of unemployment benefit claimants more than the synthetic control during the 2000-2006 programming period. The gap remains large also during the 2007-2013 period.

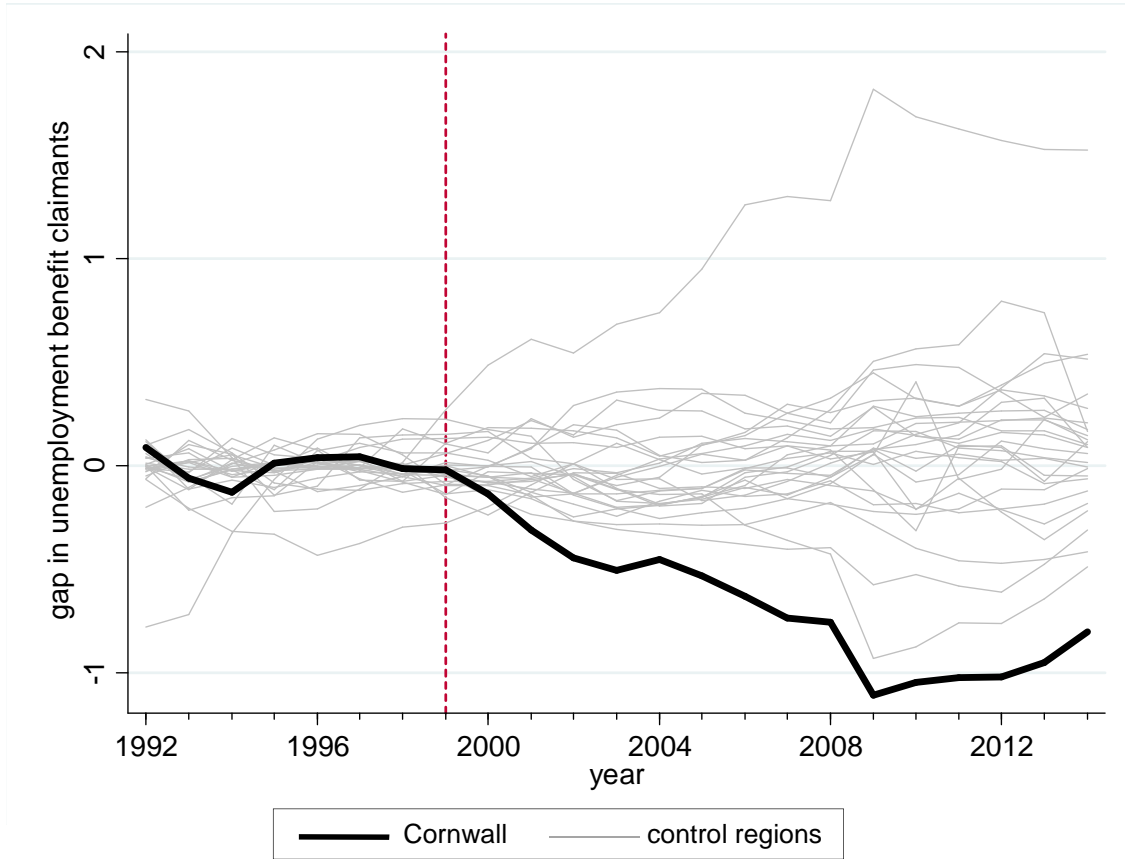
¹¹ In order to minimise spillover effects, the empirical estimation has been replicated by excluding Devon as a potential weight. The strong proximity between the Cornish and the Devon economy implies that if Devon is considered, any significant estimated difference between Cornwall and the synthetic region may be related to treatment externalities affecting Devon rather than to actual treatment effects on Cornwall. However, this does not seem to be the case as the results of this alternative estimation (available upon request) are not significantly different from the ones presented in the paper.

Figure 2
Unemployment trends 1992-2014: Cornwall vs. synthetic Cornwall



In order to test for the significance of the estimated effect we follow Abadie et al. (2010) and run a series of placebo studies by iteratively applying the synthetic control method to every other untreated English region. We shift Cornwall among the control units and reassign the treatment to each one of the regions in the sample. We then compute the gap between the two trends for all iterations and compare it to the one estimated for Cornwall. The results of the placebo test, displayed in Figure 3, provide clear evidence of a significant effect. No other region in the sample has witnessed a reduction in unemployment as large as the one experienced by Cornwall. A difference in the gap between Cornwall and every other English regions is visible from 2002 and tends to increase over time, suggesting that throughout the Objective 1 period (2000-2013) Cornwall has reduced the proportion of unemployment benefit claimants more than regions not eligible for Objective 1 grants.

Figure 3
Unemployment gap in Cornwall and placebo gaps



II. District level

In this section we adopt data at the level of Local Authority Districts (LADs) from the LFS Local Area and estimate a classic difference-in-differences (DiD) model. This geographical level allows to test the robustness of the regional level results and to control for the effect of a potentially confounding labour policy implemented in the same period of Objective 1 policies. Indeed, Structural Funds were not the only form of employment-promoting aid to disadvantaged UK areas. The main employment promotion policy potentially confounding our results is the Regional Selective Assistance (RSA) programme, funded by the UK Government and intended to ‘create and safeguard’ employment in the poorest areas of the country. Changes in eligibility for RSA of different UK areas occur in coincidence with the start of new EU programming periods. Before 2000 the large majority of Cornwall’s territory was already considered eligible under the largest RSA support scheme, but the two Cornwall districts of Carrick and North Cornwall became eligible to receive RSA transfers in 2000 (Criscuolo et al., 2012). Hence, one way to test for the confounding effect of RSA policies is to see whether the results are sensitive to the exclusion of Carrick and North Cornwall from the sample.

Using district-level data significantly reduces the number of variables at our disposal and reduces the time-span. We lack information on the level of income and the amount of Structural Funds received in the pre-

treatment period. For this reason, in order to construct a more comparable control group we limit the sample to districts belonging to non-Objective 1 regions receiving at least 15 Euros per capita in Structural Funds during 1994-1999 (see Table 1). We end up with a sample of 83 districts, six of which are from Cornwall.

The panel is collapsed into two periods, one before (1999) and one after (2000-2006 average) the start of the programming period¹². A logit model checking for significant differences in treatment and control groups before the treatment suggests that the two groups are not statistically different in terms of their pre-treatment unemployment level and display a high degree of similarity for all other control variables (Appendix A6). The average treatment effect on Cornwall districts is estimated with a model where the dependent variable is the difference in unemployment between the treatment and pre-treatment periods. Following Angrist and Pischke (2008), multiple specifications are considered. The model is estimated both with lagged control variables and with explanatory variables in first differences controlling for time-invariant unobservables.

$$\Delta U_{i,2006-1999} = \beta_1 U_{i,1999} + \beta_2 \text{Cornwall districts}_i + \beta_3 X_{i,1999} + \varepsilon_{i,2006-1999} \quad (1)$$

$$\Delta U_{i,2006-1999} = \beta_2 \text{Cornwall districts}_i + \beta_3 \Delta X_{i,2006-1999} + \Delta \varepsilon_{i,2006-1999} \quad (2)$$

Where: $\Delta U_{i,2006-1999} = U_{i,2000-2006 \text{ avg}} - U_{i,1999}$; $U_{i,1999}$ is the value of unemployment in 1999 and $X_{i,1999}$ and $\Delta X_{i,2006-1999}$ are a set of lagged and differenced control variables, respectively. The control variables are the same used in the logit model.

The results, shown in table 2, confirm that Cornwall districts experienced a significant reduction in their share of unemployment benefit claimants after becoming eligible for Objective 1 funding, as compared to control districts. The coefficient of the treatment dummy reduces in magnitude but remains strongly significant when controlling for the labour market characteristics of the districts. Columns (4) and (6) show that the coefficient of Cornwall districts is not significantly affected by the exclusion from the sample of Carrick and North Cornwall. Therefore, it is plausible to assume that Cornwall's change in unemployment can be ascribed to the success of employment-promoting programmes funded by Structural Funds rather than to Regional Selective Assistance programmes.

Table 2
Difference-in-differences estimates, district level

Dependent variable:	Δ Unemployment benefit claimants 1999-2006					
	(1)	(2)	(3)	(4)	(5)	(6)
Cornwall districts	-0.611***	-0.523***	-0.360***	-0.394***	-0.618***	-0.657**

¹² Collapsing the panel in DiD models reduces the information on the pre-treatment period but limits serial correlation issues (Bertrand et al., 2004).

	(0.143)	(0.0815)	(0.0782)	(0.105)	(0.169)	(0.255)
Unemployment benefit claimants (1999)		-0.247*** (0.0301)	-0.292*** (0.0472)	-0.290*** (0.0479)		
Lagged control variables	NO	NO	YES	YES	NO	NO
Control variables in first difference	NO	NO	NO	NO	YES	YES
Observations	83	83	83	81	83	81
R-squared	0.181	0.769	0.827	0.822	0.291	0.265

Note: Robust standard errors in parenthesis; *** p<0.01, ** p<0.05, * p<0.1. Carrick and North Cornwall districts excluded in specifications in columns (4) and (6).

III. *Ward level*

As a final test of robustness of the estimated effect on unemployment we consider the geographical level of electoral wards. The time-span is 1996-2014, which allows to sub-divide the 2000-2014 treatment period into shorter 7-years periods reflecting the EU budget programmes 2000-2006 and 2007-2013. In such a way, it is possible to test how the effectiveness of EU funds has varied over time.

The analysis is performed by estimating a two-periods differences-in-differences model. The pre-treatment value is calculated as the share of ward residents claiming unemployment benefits during 1996-1999. Our treatment observations are the 134 wards of Cornwall, while the full sample is composed by a total of 8403 wards. In order to identify the suitable control wards we use the propensity score matching (PSM) *psmatch2* estimator (Leuven and Sianesi, 2003), matching wards one-to-one without replacement.

Two different matching algorithms are used to estimate the average treatment effect on the treated wards: nearest neighbours and kernel matching¹³. The results of the estimations are displayed in Table 3. When the pre-treatment period (1996-1999) is compared with the whole treatment period (2000-2014), Cornwall wards are confirmed as having reduced the proportion of unemployed people more than untreated wards (row (1)). Comparing row (2) with row (3), we see that the estimated effect becomes larger in absolute value during the second period in which Cornwall was classified as Objective 1. This suggests that the performance of the region has been improving over time and that labour market gains of the first Objective 1 period have been sustainable and reinforced during the second period.

Table 3
Propensity Score Matching estimations – unemployment in Cornwall wards

¹³ The nearest neighbour technique selects for comparison the closer unit in the control group in terms of propensity score. The kernel algorithm uses a kernel Gaussian function to select the comparison group. In this case Standard errors are obtained with nonparametric bootstrapping with 100 Monte Carlo repetitions.

Dependent variable: Δ Unemployment

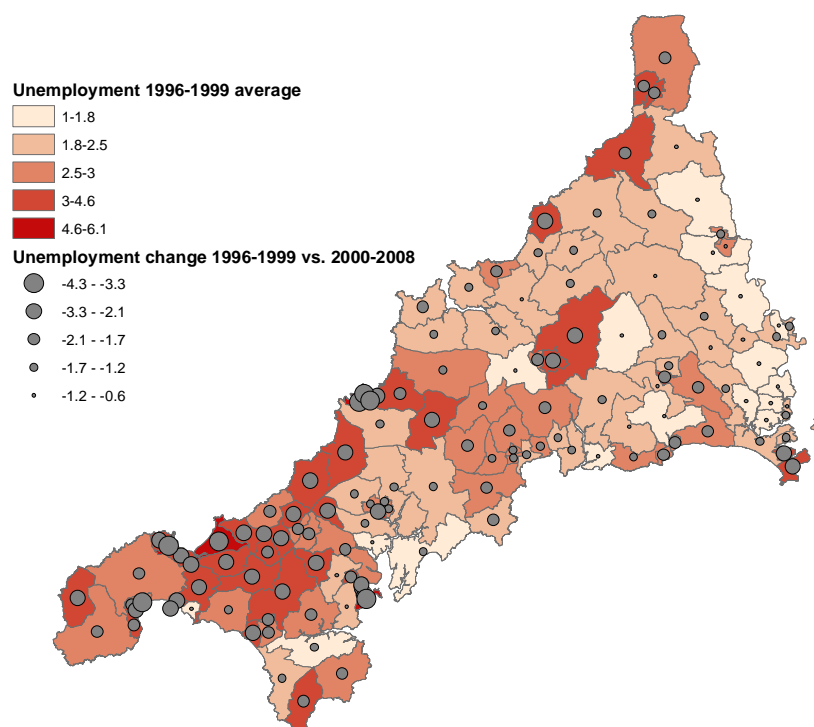
	Period	Average Treatment Effect on Cornwall wards	Std. Err.	Matching Algorithm
(1)	1996-1999 vs. 2000-2014	-0.361***	0.093	Nearest Neighbour
		-0.342***	0.103	Kernel matching
(2)	1996-1999 vs. 2000-2006	-0.303***	0.076	Nearest Neighbour
		-0.289***	0.074	Kernel matching
(3)	1996-1999 vs. 2007-2014	-0.485***	0.110	Nearest Neighbour
		-0.477***	0.106	Kernel matching
268 Observations				

Note: *** p<0.01.

Effect on labour market disparities

In the previous section we have shown that Cornwall reduced its unemployment by more than comparable regions not in receipt of Objective 1 support. In this section we identify the areas within Cornwall driving these results and test whether the improvement of labour conditions in Cornwall is associated with employment convergence. As shown in Figure 4, before the beginning of the Objective 1 period Cornwall was characterised by visible disparities in terms of unemployment and social conditions. These disparities have been mitigated during the first period in which the region received Objective 1 financial support. The map shows that the areas with a higher unemployment density tend to be those experiencing the highest reductions during the period 2000-2008.

Figure 4
Map of Cornwall wards – pre-treatment unemployment vs. unemployment change



Source: own elaboration with Nomis data

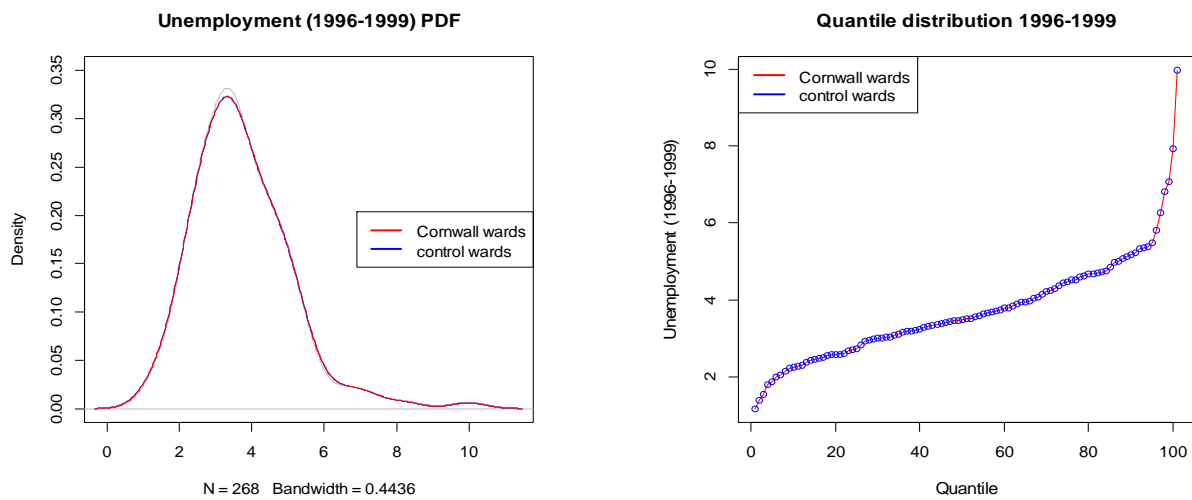
In order to assess whether the change in disparities can be attributable to Cohesion Policy interventions, Cornwall's spatial variation in unemployment needs to be compared with the one of a suitable control group. We perform a quantile analysis estimating the difference between the statistical distribution of unemployment in Cornwall's wards and the unemployment distribution of a control group of wards. A quantile function illustrates the values of the variable for each quantile of the distribution, testing for the presence of significant differences in each point of the unemployment distribution in the two groups.

A key condition for this empirical exercise to produce interpretable results is that Cornwall wards and control wards have similar unemployment conditions before 2000. If the two groups start from different levels, the observed change in unemployment during the treatment period may be due to these discrepancies. If, instead, the two pre-treatment distributions are the same, the observed difference between the pre-Objective 1 period and the Objective 1 period can be interpreted as an effect of EU-funded labour policies. For this reason, the propensity score matching performed to obtain the control group is based exclusively on the similarity of wards on their level of unemployment in 1996-1999¹⁴.

¹⁴ Matching wards only on pre-treatment unemployment allows to obtain a perfect correspondence between the quantile distribution of the treatment and the control group. However, the matching based on one single variable produces a control group which may not be sufficiently similar to the treatment group on a number of relevant characteristics. As an alternative matching methodology, we perform the matching by considering a large number of labour market variables. In addition to this set of covariates, the matching includes polynomials up to the eight degree for the variable unemployment

On the left side of Figure 5 we see the probability density functions (PDF) of Cornwall wards and control wards, after the matching on unemployment 1996-1999 was performed. As expected, the statistical distribution of the two groups is perfectly overlapping, indicating that unemployment in the pre-treatment period is the same in the two groups. This is reflected on the identical quantile distribution of the two groups, shown on the right-hand Figure 5 graph. Before 2000, treatment and control wards had the exact same level of unemployment inequalities.

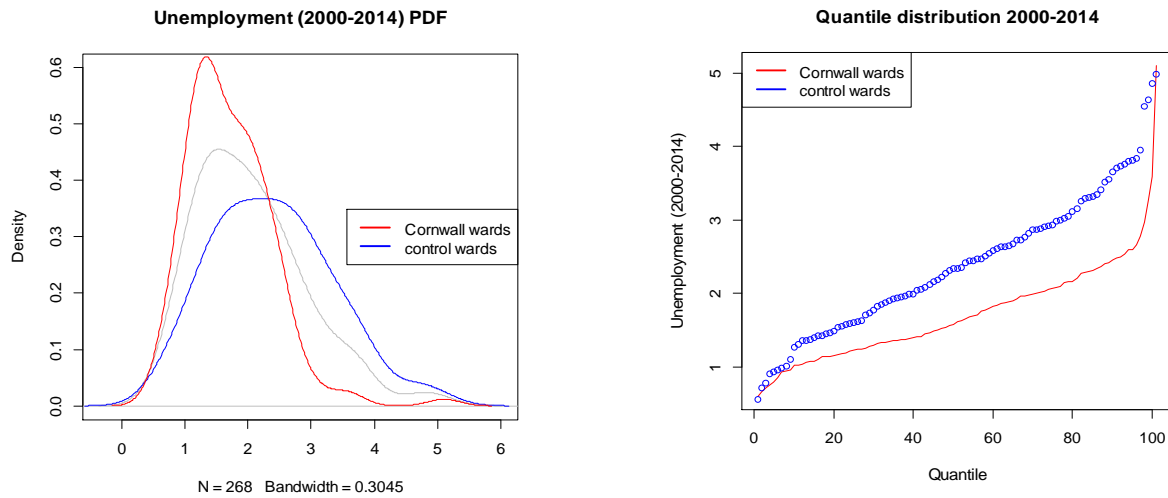
Figure 5
Cornwall: probability density function and quantile distribution for unemployment 1996-1999



Cornwall's wards most affected by the unemployment change can be identified by calculating the difference between the quantile distribution of the treatment and the control groups before (1996-1999) and during (2000-2014) the treatment period. Figure 6 plots the density function and quantile difference for the two groups. A sharp difference is clearly visible. Lower tails for the Cornwall distribution indicate that more wards have similar unemployment rates in the treated region (left-hand graph of Figure 6). The difference in the quantile distribution between treatment and control groups is mainly driven by Cornwall's wards located at the higher end of the distribution, i.e. those with higher pre-treatment unemployment (right-hand graph of Figure 6). This suggests that during the 2000-2014 period the distribution of unemployment in Cornwall has become less unequal.

1996-1999. This allows to obtain treatment and control groups that are similar on many labour characteristics, while assigning more weight to the pre-treatment unemployment variable. In such a way, the quantile distribution of treatment and control groups for unemployment 1996-1999 is very similar, although not exactly the same. Testing for differences in unemployment disparities with this alternative methodology does not change significantly the results presented in the paper (results available upon request).

Figure 6
Cornwall: probability density function and quantile distribution for unemployment 2000-2014



In order to test the significance of the estimated quantile difference, we plot a graph with the difference in quantiles between treatment and control wards and 95% confidence bands. The black bold line of Figure 7 represents the estimated quantile difference shown in the right-hand graph of Figure 6. The negative slope of the line reflects the fact that the highest unemployment reductions are found in the wards with higher unemployment concentration. The portions of the line outside the confidence bands indicate a statistically significant quantile difference.

Figure 7
Cornwall: quantile difference significance test, 2000-2014

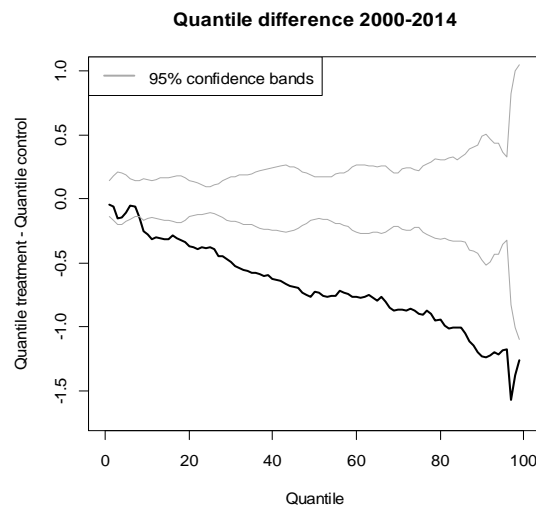
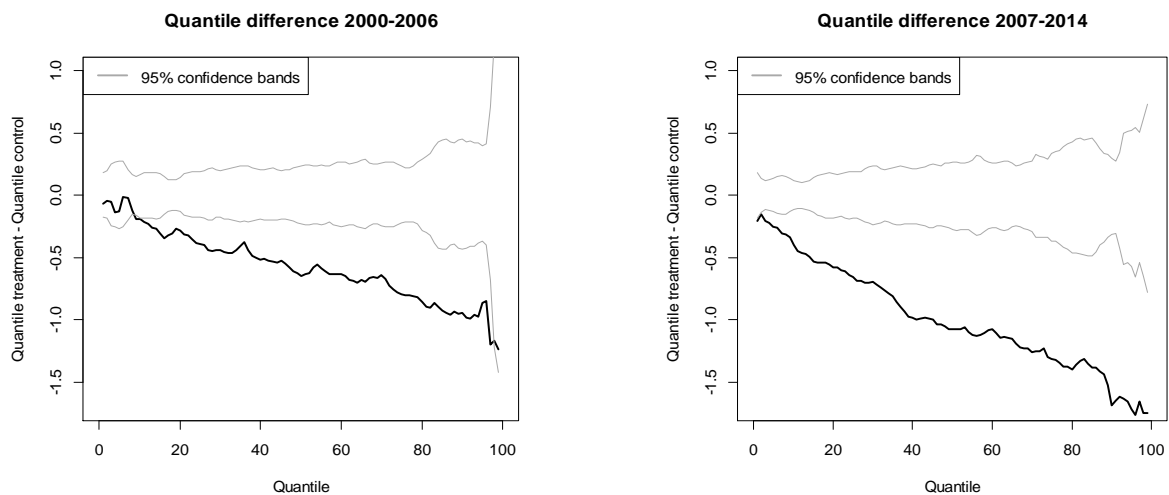


Figure 7 provides evidence of a significant change in the unemployment distribution of Cornwall wards with respect to untreated wards between 1996-1999 and 2000-2014. Figure 8 examines how the variation in

unemployment disparities has evolved across EU programming periods. A significant reduction in within-region inequalities is clearly visible during the first period in which Cornwall has received Objective 1 funds (right-hand graph, Figure 8). The bold black line is outside the 95% confidence bands, indicating a significant difference in the quantile distribution during 2000-2006. The slope of the line reflecting the quantile difference between treatment and control wards is steeper during the second Objective 1 period, 2007-2014 (left-hand graph, Figure 8). This indicates that the reduction in unemployment disparities was further reinforced in this period, with stronger effects with respect to the 2000-2006 period.

In sum, Cornwall's labour market has undergone a significant transformation since when the region has become eligible for Objective 1 support. During the first programming period (2000-2006), Cornwall has created far more jobs than not-eligible regions, improving in particular the labour conditions of areas where unemployment was most concentrated. This has had the effect of reducing unemployment disparities within the region. The trend has been further strengthened during the second period (2007-2014), when disparities have decreased even more than in the previous seven years.

Figure 8
Cornwall: quantile difference significance test, 2000-2006 and 2007-2014



5. Case-study 2: South Yorkshire

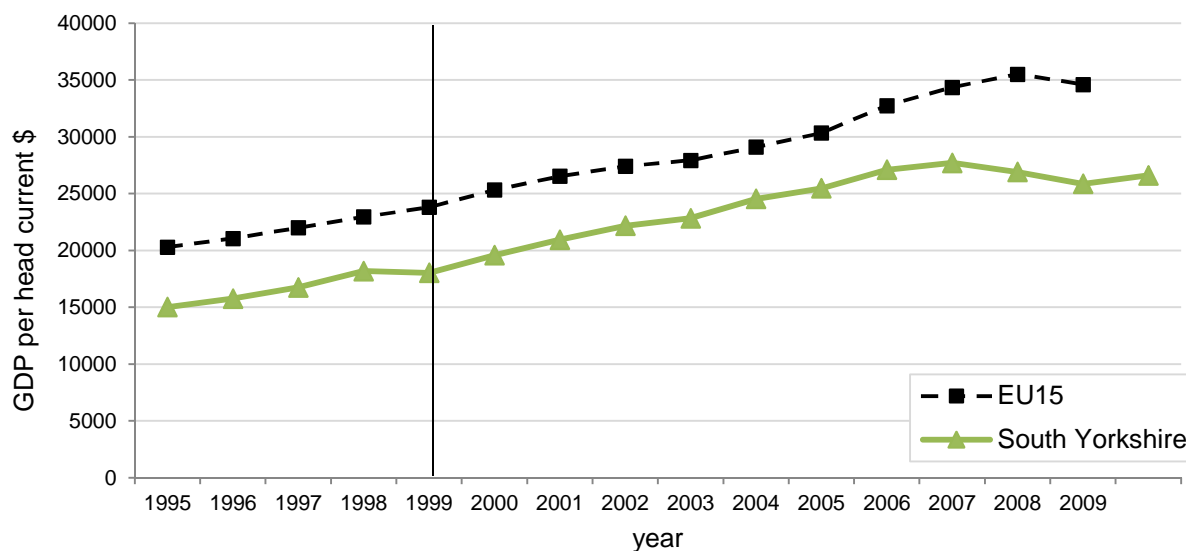
The second region considered in our empirical analysis is South Yorkshire. Formerly specialised in manufacturing, this region has gone through a period of deindustrialisation which brought to the closure of most coal mines of the region in the early 1990s. The region's economic decline was seriously addressed by the central Government only from 1997 onwards, when the newly-elected Labour Government promoted interventions tackling the growing unemployment by matching national resources with the EU funds (Kirk et al., 2012). From 1994 to 1999 the entire South Yorkshire territory was classified as Objective 2. The

proportion of EU funds available to the region increased massively from 2000, when South Yorkshire became eligible for Objective 1 support for the first time in its history.

If we compare it to the Cornwall case, it can be said that the attainment of Objective 1 eligibility has occurred in a less ‘unexpected’ way. There is no border re-definition behind the change in the amount of funds made available to the region. Hence, the endogeneity in the eligibility shift is higher. Anticipation effects and externalities may be an issue, if we assume that people and firms react to the change in eligibility before this has actually occurred.

Nevertheless, the counterfactual analysis is facilitated by the fact that the GDP trend of the region has been almost parallel to the one of the EU15 (Figure 9). The regional growth rate during the 1995-1999 period was 4.8%, slightly above the EU15’s 4%. South Yorkshire started receiving Objective 1 funds from 2000 due to its GDP per head being just below the 75% threshold in 1999. Table 1 in section 2 shows that Objective 1 eligibility for the 2000-2006 period has increased the proportion of available funds by about 5 times with respect to 1994-1999. The region continued catching up with the EU average income during the 2000-2006 and due to this increase in per capita GDP and to the Eastern Enlargement – which made the 75% threshold easier to be exceeded– during the 2007-2013 period South Yorkshire lost the status of Objective 1 becoming a Phasing-in region.

Figure 9
GDP per head, 1995-2010



Source: own elaboration with OECD data.

From 2007 South Yorkshire became entitled of receiving transitional funding, obtaining more than any other non-Objective 1 region but much less than Cornwall, the only English region classified as Objective 1 during

the programming period (Table 1). In addition, South Yorkshire lost the possibility of forming an independent managing authority for the EU funds and became part of a larger managing authority, Yorkshire and The Humber, in charge of allocating resources and developing growth strategies for all territories within its borders. Due to its peculiar history of eligibility changes, South Yorkshire represents the ideal case for testing the extent to which Objective 1 funding has had permanent effects on the long-term trend of the region.

In the following sub-sections, we investigate the dynamics of South Yorkshire's labour market throughout the two programming periods 2000-2006 and 2007-2013, adopting the same methodologies used for the Cornwall case to test how unemployment and labour market disparities have evolved over time.

Effect on unemployment

First we focus on South Yorkshire's unemployment trajectory during the period of highest EU financial support. In order to obtain a valuable counterfactual we resort again to the synthetic control method. The weights used to construct the synthetic region and the average pre-treatment values are reported in Tables A4 and A7, respectively¹⁵.

The unemployment trends of South Yorkshire and its synthetic counterpart over the 1992-2014 period are displayed in Figure 10. It can be noted that South Yorkshire and synthetic South Yorkshire follow a very similar trajectory until 1999, a necessary condition for the analysis to produce meaningful results. The two trends diverge marginally in 1999, possibly as a result of anticipation effects discussed above. Nevertheless, the largest gap between the two lines is visible during the period in which the region was entitled to receive Objective 1 funds, i.e. 2000-2006. South Yorkshire's lower line suggests that the region has reduced the proportion of unemployed people more than a region similar in all relevant characteristics except for not having received Objective 1 aid.

This result should be taken with caution. As mentioned above, before 2000 the region was eligible for Objective 2, which mainly provided regional help by means of the European Social Fund. Given that ESF programmes are usually oriented to the promotion of employment, it may be that South Yorkshire's employment gains during 2000-2006 are partly due to previously financed programmes.

Unlike Cornwall, the gap tends to reduce over time. Particularly from the year 2009, South Yorkshire and the synthetic region report increasingly similar levels of unemployment, up to the point when the two lines

¹⁵ As for Cornwall, in order to minimise spillover effects the robustness of the results has been tested by replicating the analysis excluding all regions that share a border with South Yorkshire from potential weights.

overlap again in 2013-2014. This suggests that during the period in which the region has been classified as Phasing-in, the labour market performance has actually been worse than the one of the synthetic region, completely offsetting all labour market improvements of the previous seven years.

Figure 10
Unemployment trends 1992-2014: South Yorkshire vs. synthetic South Yorkshire

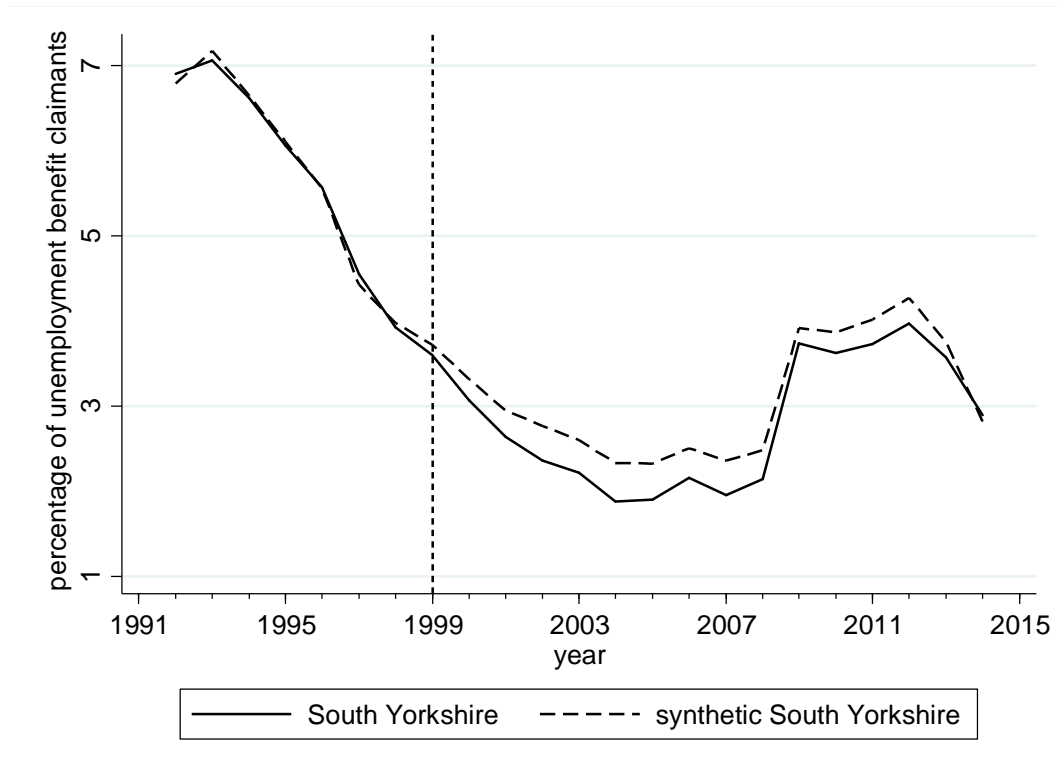
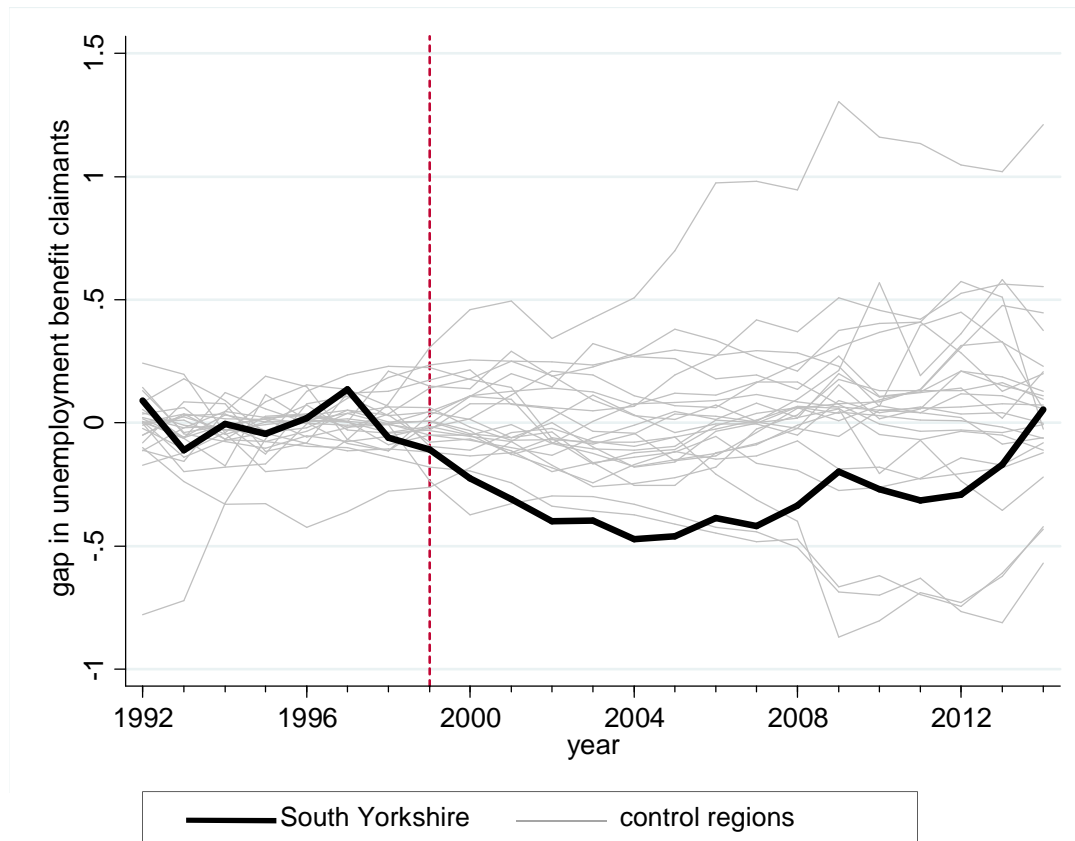


Figure 11 tests the significance of the estimated gap and finds that between 2001 and 2005 South Yorkshire's proportion of unemployment benefit claimants is lower than any other English region not eligible for Objective 1 policies. This evidences a statistically significant difference. During the following years the gap get progressively closer to zero, making South Yorkshire among the worst performing English regions between 2007 and 2013. Therefore, it can be argued that in the long-run Objective 1 policies had no significant effects on the unemployment trend of the region.

Figure 11
Unemployment gap in South Yorkshire and placebo gaps



Effect on labour market disparities

South Yorkshire was capable of reducing unemployment more than regions not in receipt of Objective 1 funds, but only temporarily. In coincidence with a reduction of EU funds, the labour market conditions of the region worsened, bringing it back to its old unemployment trend. This section investigates the extent to which South Yorkshire has reached a more equitable distribution of unemployment opportunities within the region during the period of highest financial support. South Yorkshire's quantile distribution of unemployment before/during the treatment period is compared with a counterfactual group made of untreated English wards with similar levels of unemployment in 1996-1999.

The propensity score matching has been successful in constructing a control group having the same density function and quantile distribution of South Yorkshire's pre-treatment unemployment (Figure 12). Figure 13 compares the density function and quantile distribution of the two groups during 2000-2014. Different from the case of Cornwall, the distribution of treatment and control wards during the treatment period is very similar. No evidence is found of a significant change in the quantile distribution of wards in South Yorkshire with respect to untreated wards. The difference between the two groups, described in Figure 14 by a black

bold line, is completely within the 95% confidence bands, confirming the fact that unemployment inequalities in South Yorkshire were not significantly affected by Objective 1 and Phasing-in programmes.

Figure 12
 South Yorkshire: Probability density function and quantile distribution for unemployment 1996-1999

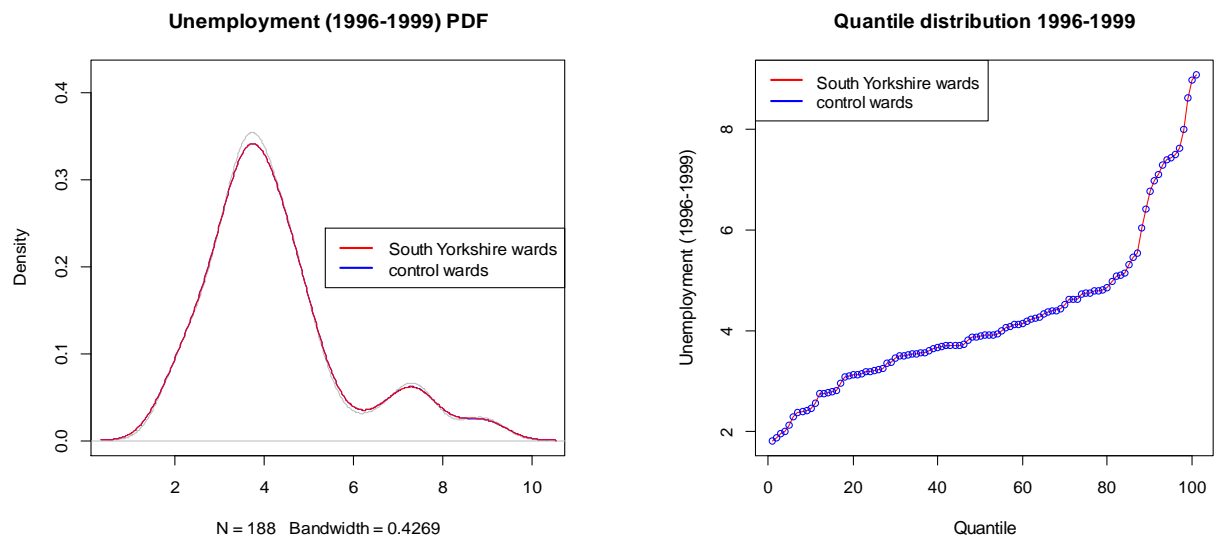


Figure 13
 South Yorkshire: Probability density function and quantile distribution for unemployment 2000-2014

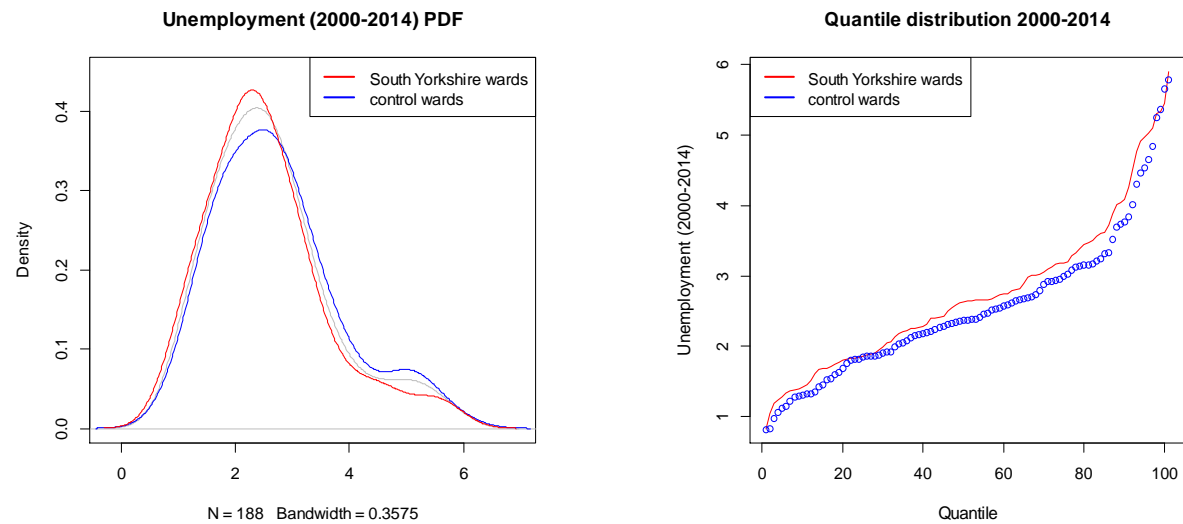


Figure 14
 South Yorkshire: quantile difference significance test, 2000-2014

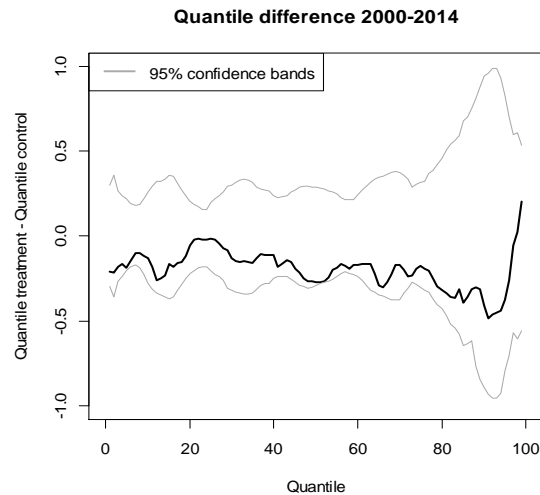
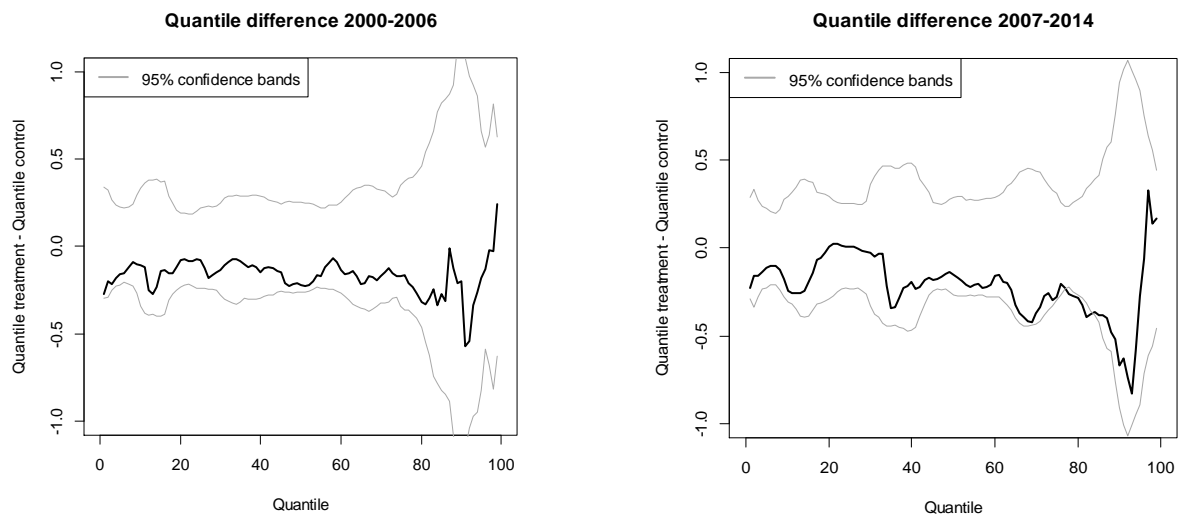


Figure 15 sub-divides the entire treatment period into two shorter EU programming periods referring to Objective 1 (2000-2006) and Phasing-in (2007-2013) years. The black line describing the quantile difference between South Yorkshire wards and control wards remains within the 95% confidence bands in both periods, suggesting that in neither period South Yorkshire has seen labour market inequalities modify. Not even in 2000-2006, when more EU funds were available and positive results have been obtained in the reduction of unemployment in the region.

Figure 15
South Yorkshire: quantile difference significance test, 2000-2006 and 2007-2014



6. Discussion

Summing up, the experience of Cornwall and South Yorkshire in managing Structural Funds appears rather different. Cornwall has benefitted from a long period of Objective 1 funds, spanning two EU budget periods, making good use of the funds to significantly improve labour market conditions in the region. Unemployment was consistently reduced, particularly in the most deprived areas. These positive results have been sustainable and reinforced over time. Conversely, South Yorkshire has only temporarily converted EU funds into better labour market conditions, as the positive outcomes of the period in which the region has been eligible for Objective 1 funds have been completely offset when eligibility was lost. A number of different hypothesis can be put forth in order to help explaining these results.

Investment intensity / Investment targets: One way to interpret our findings is to relate labour market improvements to the proportion of EU funds made available to the regions. That is, poorer regions may outperform richer regions only if a minimum threshold of aid is provided to them. In this view, South Yorkshire was incapable of keeping unemployment low because EU subsidies reduced massively after the region lost the Objective 1 status. However, this interpretation leaves unanswered the question of why South Yorkshire was so rapid in getting back to its original unemployment trajectory, with evidence of employment gains not being long-lasting already visible during the period of highest financial support.

A different explanation for the results may be that South Yorkshire has invested too little on employment promotion to make any achievement sustainable over time. According to Eurostat Regio data, 28% of the total funds paid by the European Commission to South Yorkshire during the 2000-2006 period were allocated to the 'human resources' pillar, against only 20% in Cornwall. The figure of South Yorkshire is also higher than the average for all EU Objective 1 regions, 26%. Therefore, South Yorkshire's failure in keeping unemployment low does not seem to be associated to the fact that too few resources have been allocated to this particular target.

Investment strategy: Rather than being related to the intensity of the investment made, the different performance of the two regions may be due to the way in which the resources have been spent. As discussed in section 4, Cornwall allocated a consistent share of the EU funds to social inclusion objectives, focusing especially on revamping employment in those areas with higher unemployment concentration. South Yorkshire has distributed Objective 1 funds more equally across space, favouring pan-South Yorkshire projects developed by many local organisations and delivering activities across the whole region (Fenoughty and Holmes, 2008). The distinct strategies may have been the main factor determining the different evolution of labour market inequalities in the two contexts. Long-term unemployment and social exclusion issues tend to be highly persistent and geographically concentrated, and they require sustained policy efforts in order to be tackled effectively (Pissarides, 1992; Gordon, 2002; Di Cataldo and Rodríguez-Pose, 2015). In absence of initiatives targeting the main unemployment hotspots and intended to get a large portion of disadvantaged workers back into employment, local worklessness clusters are likely to form again (Gordon, 2006). This

may be the reason behind the unsatisfactory long-term employment performance of South Yorkshire. As structural inequalities were not effectively addressed during the Objective 1 period, the reduction of EU funds in coincidence with the global crisis may have left unskilled workers in less advantaged areas without help and with little opportunities to find a job. The analysis has shown that Cornwall completed the second programming period of Objective 1 funding with a much lower degree of within-region employment disparities as compared to the pre-Objective 1 period. The lagging areas within the region have been sufficiently equipped to face the crisis and may be more prepared to see the flow of subsidies reduce.

Absorptive capacity and government institutions: Several EU Region Policy evaluations have identified the capacity of a region to absorb the funds ‘committed’ to them by the European Commission as the key element explaining differentials in Structural Funds’ performance. The regional absorptive capacity, in turn, is regarded as being dependent on the regional administrative capacity and the quality of regional government institutions (Milio, 2007; Becker et al., 2013). Institutions are increasingly recognised by the EU itself as mediators of the returns of Cohesion investment (Rodríguez-Pose and Garcilazo, 2015). According to the regional Quality of Government Index (QoG) developed by Charron et al. (2014), Cornwall’s QoG score on a scale from 1 to 10 is 8.5, while South Yorkshire’s is 7.5. The proportion of the total committed funds paid to the two regions in 2000-2006 was 89% for Cornwall and 82% for South Yorkshire. During the 2007-2013 period, Cornwall has used 80% of the committed funds, while South Yorkshire has performed well below the average of UK regions with only 68% of the total funds spent¹⁶.

Management of the funds: Finally, another factor that may have contributed to the long-term performance of the two regions is the different possibility to manage the EU funds. UK Objective 1 regions are allowed to form independent managing authorities, in charge of designing specific development and labour market strategies for the region. During 2007-2013, South Yorkshire was incorporated in the larger managing authority of Yorkshire and The Humber, which may have limited the possibility to tailor employment programmes to the specific needs of the local labour markets of the region.

7. Conclusions

The adoption of counterfactual methodologies can considerably improve the robustness of impact evaluations attempting to identify the effect of development policies in economically backward regions. This paper exploits the change in Objective 1 eligibility experienced by the UK regions of Cornwall and South Yorkshire in 2000 to study the effect of EU Cohesion Policy on unemployment outcomes and labour market inequalities over two EU programming periods, 2000-2006 and 2007-2013. The trajectory of the two regions

¹⁶ Figures for 2007-2013 are provisional. EU regions are allowed to complete projects for the 2007-2013 period in 2015.

has been compared with the ones of synthetic regions, similar to them on a number of key characteristics but not eligible for Objective 1 support. A quantile analysis at the level of electoral wards has been adopted to identify the areas within the regions most affected by the unemployment changes.

Our findings indicate that the two regions have followed radically different labour market trajectories over the analysed period. Cornwall has greatly benefitted from fourteen years of Objective 1 policies, having reduced the proportion of people claiming unemployment benefits and having promoted a more equitable distribution of employment opportunities within the region. South Yorkshire has received Objective 1 funds for one single programming period, during which some significant improvements of the regional labour market have been visible. However, all employment gains waned during the following period, when the region displayed one of the worst performances among English regions despite being still subsidised by the EU as part of the Phasing-in programme.

One way to explain these results is to relate the different trends of Cornwall and South Yorkshire to the development strategies the two regions have adopted during the period of highest European financial support. One of the main priority objectives of EU development programmes in Cornwall was to strengthen social cohesion and promote the labour market inclusion of the most disadvantaged workers. This involved focusing in particular on the areas of the region characterised by higher unemployment rates. This strategic approach envisioned within-regional convergence as a condition favouring the long-term economic competitiveness of Cornwall. On the other hand, South Yorkshire's decision to distribute funds more evenly across space prevented the region to see disparities decrease during the 14-years period and perhaps contributed decisively to revert all labour market improvements initially obtained. A lower capacity to absorb and spend the resources committed by the EU and a lower autonomy in the management of Structural Funds may have also played a role in making the long-term unemployment performance of South Yorkshire less satisfactory than Cornwall's.

The reduction of the European funds associated with the loss Objective 1 status may deeply affect the economy and the labour market of a region. Even when Phasing-in or Phasing-out programmes are put in place, the proportion of financial help reduces drastically, making the transition more complicated to be sustained. This study has shown that Objective 1 funding can be particularly successful in reducing unemployment in poorer regions. However, when designing and implementing development projects, Objective 1 regions should think carefully of what the legacy of these programmes will be. EU funds should be seen as an opportunity to improve not just economic but also social conditions, in order to make less advantaged territories more prepared when the resources will inevitably be cut down. Not doing so may imply that any improvement of the local economy obtained during the Objective 1 period may vanish in the long term. If this is the case, the whole Cohesion project of an economic, social and territorial convergence between European regions may be at risk.

Our study is the first in the literature to empirically analyse the long-term impact of EU Cohesion Policy and to assess convergence outcomes within the regions targeted by EU funds. The results of the analysis should be taken with caution, mostly because our investigation is based on two very specific contexts. An important task for future contributions is to test the validity of our findings in other regions, assessing whether unemployment rates and labour market disparities evolve in the same way as in the two case-studies analysed in this paper. In addition, the explanations we provide for our results are based on qualitative interpretations, so it would be worth testing empirically whether quantitative methods support this evidence.

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Annex

Synthetic Control Method

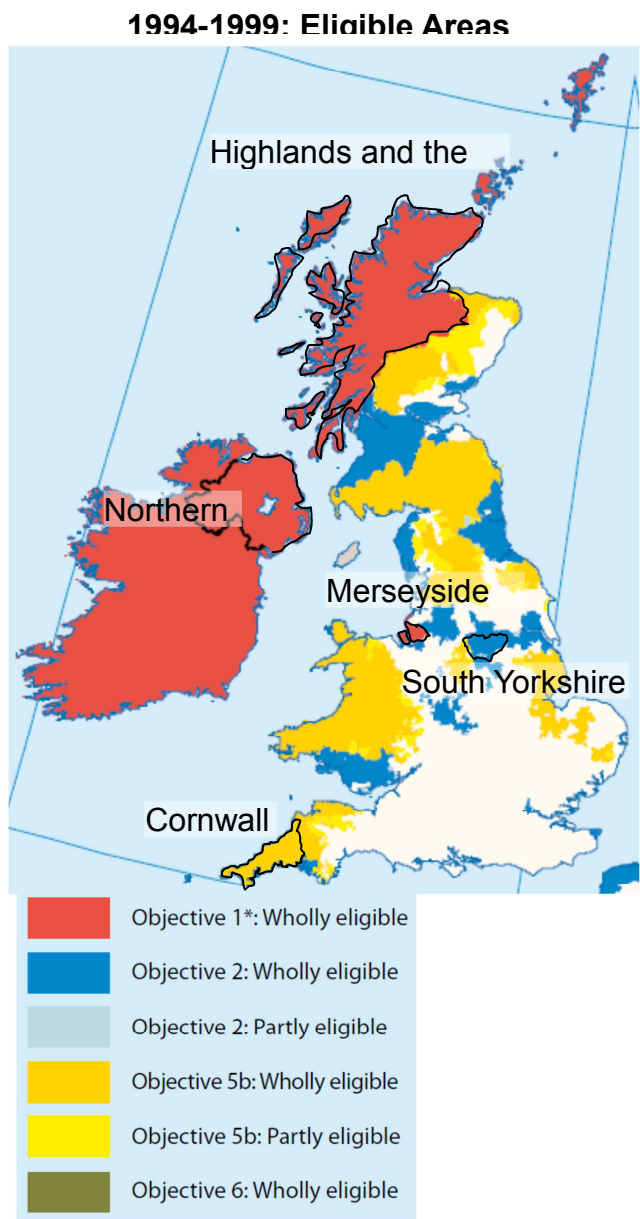
In the regional level analysis estimating the effect of Cohesion Policy on unemployment in Cornwall, we adopt the Synthetic Control Method for comparative case studies (Abadie and Gardeazabal, 2003; Abadie et al., 2010; 2015). This methodology allows to assess the effect of policy interventions taking place at an aggregate level, using data for geographical units not exposed to the treatment but comparable to the treated region. The sample is made of $J + 1$ units, with $j = 1$ being the case of interest (Cornwall) and $j = 2$ to $j = J + 1$ being potential comparisons. To construct the synthetic control we consider all English NUTS2 regions not receiving Objective 1 support during 2000-2006 (see Table 1), using data from pre-intervention (T_0) and post-intervention (T_1) years. The control unit is obtained from a $(J \times 1)$ vector $\mathbf{W} = (w_2, \dots, w_{J+1})'$ made of nonnegative weights all summing up to one. Each value of \mathbf{W} represents a weighted average of values obtained from control regions, that is, a potential synthetic control (Abadie et al., 2010). Let \mathbf{X}_1 be a $(k \times 1)$ vector of pre-treatment characteristics that can be used as predictors of labour market outcomes in Cornwall, and \mathbf{V} a $(k \times k)$ diagonal matrix whose values indicate the relative importance of each predictor. We look for a vector \mathbf{W}^* that minimises $(\mathbf{X}_1 - \mathbf{X}_0 \mathbf{W})' \mathbf{V} (\mathbf{X}_1 - \mathbf{X}_0 \mathbf{W})$, subject to $w_j \geq 0$ ($j = 2, \dots, J$) and $w_2 + \dots + w_{J+1} = 1$. As in Abadie and Gardeazabal (2003), we choose \mathbf{V} such that Cornwall's path in the pre-treatment period is best reproduced by the synthetic region.

Let Y_{jt} be the outcome of unit j at time t , \mathbf{Y}_1 a $(T_1 \times 1)$ vector collecting post-intervention values of the outcome variable for Cornwall and \mathbf{Y}_0 a $(T_1 \times J)$ matrix containing post-intervention values of the outcome for the control unit. The synthetic control estimator of the treatment effect on the treated region is given by the comparison of the different outcomes of the two units from the beginning of the Objective 1 programme until the end of the period. The synthetic control estimator is obtained as: $\mathbf{Y}_{1t} - \sum_{j=2}^{J+1} w_j^* Y_{jt}$. In order to minimise the confounding effect of unobservables and issues related to heterogeneous effects of observed and unobserved factors on the outcome variable, data is collected on the longest possible pre-treatment period (1992-1999).

This methodology assumes the absence of interference between different regions, that is, untreated regions are not directly affected by the treatment (Rosenbaum, 2007). In order to minimise any potential spillover effects, our analysis has been replicated by excluding from potential weights all regions that are neighbours of the treated regions, i.e. those most likely affected by treatment externalities. The results are not significantly different from the main empirical estimations presented in the paper (results available upon request).

Appendix

A1 Structural Funds eligibility maps in the UK, 1994-1999 and 2000-2006



Source: European Commission (2008).

A2 Variables description - Regional and district level analysis

Variable	Source	Availability	Definition and notes
Unemployment	Nomis database	NUTS2/LADs	Percentage of residents claiming unemployment benefits, 1992-2014.
Euros of Structural Funds per capita	DG Regional Policy	NUTS2	European Commission's payments of Structural Funds to NUTS2 regions, current euros per capita, 1994-2014.
Per capita GDP	OECD Statistics	NUTS2	Regional GDP per capita in dollars at current prices, 1995-2009.
Population in employment	LFS Local Area Data	NUTS2/LADs	Working population in percent of total residents, 1992-2006 NUTS2, 1999-2006 LADs.
Economically inactive population	LFS Local Area Data	NUTS2/LADs	Economically inactive residents in percent of working age population, 1992-2006 NUTS2, 1999-2006 LADs.
Female employment	LFS Local Area Data	NUTS2/LADs	Women in employment in percent of total working age population, 1992-2006 NUTS2, 1999-2006 LADs.
Full-time workers	LFS Local Area Data	NUTS2/LADs	Full-time workers in percent of working age population, 1992-2006 NUTS2, 1999-2006 LADs.
Self-employed workers	LFS Local Area Data	NUTS2/LADs	Self-employed workers in percent of working age population, 1992-2006 NUTS2, 1999-2006 LADs.
Long-term unemployment rate	Eurostat	NUTS2	Percentage of unemployed people for 12 months or more, 1995-2014.
Employed people in NACE sectors A-B	Eurostat	NUTS2	Percentage of people employed in Agriculture, forestry & fishing; Mining & quarrying, 1995-2014.
Employed people in NACE sectors C-E	Eurostat	NUTS2	Percentage of people employed in Manufacturing; Electricity & gas; Water supply & waste management, 1995-2014.
Employed people in NACE sector F	Eurostat	NUTS2	Percentage of people employed in Construction, 1995-2014.
Employed people in NACE sectors G-I	Eurostat	NUTS2	Percentage of people employed in Wholesale & retail trade; Transportation & storage; Accommodation & food service, 1995-2014.
Employed people in NACE sectors J-K	Eurostat	NUTS2	Percentage of people employed in Information & communication; Financial & insurance activities, 1995-2014.
Employed people in NACE sectors L-Q	Eurostat	NUTS2	Percentage of people employed in Real Estate activities; Professional, scientific & technical activities; Administrative and support service; Public administration and defense; Education, 1995-2014.
16 to 19 year old in full-time education	LFS Local Area Data	NUTS2/LADs	Percentage of residents 16 to 19 year old in full-time education, 1992-2006 NUTS2, 1999-2006 LADs.
Working age population with NVQ level 3 or above	LFS Local Area Data	NUTS2/LADs	Percentage of working age population holding NVQ level 3 or above. NVQ3 corresponds to two or more A-levels with a passing grade from A to C, 1994-2006 NUTS2, 1999-2006 LADs.
Working age population receiving job related training	LFS Local Area Data	LADs	Percentage of working age population having received job related training in the last 12 months, 1992-2006.
Employed people in manufacturing	LFS Local Area Data	LADs	Percentage of working age population employed in Manufacturing, 1999-2006.
Employed people in construction	LFS Local Area Data	LADs	Percentage of working age population employed in Construction, 1999-2006.
Employed people in transportation & communication	LFS Local Area Data	LADs	Percentage of working age population employed in Transport and communication, 1999-2006.
Employed people in banking, finance & real estate	LFS Local Area Data	LADs	Percentage of working age population employed in banking, finance & real estate, 1999-2006.
Employed people in education, health & social work	LFS Local Area Data	LADs	Percentage of working age population employed in education, health & social work, 1999-2006.

A3 Descriptive statistics – ward level variables

	Obs	Mean	Std. Dev.	Min	Max
Δ Unemployment 1996-1999 2000-2014	8518	-1.019	0.825	-10.723	2.151
Unemployment (1996-1999) ^a	8518	1.671	1.227	0.165	12.420
Unemployment (2000-2014) ^a	8518	1.866	1.326	0.206	12.945
Unemployment (2000-2006) ^a	8518	1.770	1.277	0.158	13.240
Unemployment (2007-2014) ^a	8518	1.671	1.227	0.165	12.420
Employed people in agriculture, forestry and fishing ^a	8519	0.017	0.028	0	0.252
Employed people in energy and water sector ^a	8519	0.008	0.011	0	0.182
Employed people in mining ^a	8519	0.013	0.014	0	0.144
Employed people in manufacturing ^a	8519	0.079	0.037	0	0.248
Employed people in construction ^a	8519	0.035	0.015	0	0.131
Employed people in distribution and catering ^a	8519	0.095	0.026	0.02	0.350
Employed people in transportation ^a	8519	0.028	0.016	0	0.229
Employed people in banking and finance ^a	8519	0.056	0.033	0	0.313
Economically active population ^a	8519	0.508	0.060	0.25	0.80
Unskilled occupations ^a	8519	0.030	0.022	0	0.188
Population aged 16-24 ^a	8519	1.261	0.201	0.536	2.912

a / variables normalised by wards' population.

A4 Pre-treatment characteristics: Cornwall, synthetic Cornwall and England (1992-1999)

	Cornwall	Synthetic Cornwall	England ^e
Euros of Structural Funds per capita ^a	26.74	20.62	11.08
Per capita GDP ^a	10,980	15,665	18,054
Population in employment ^b	53.23	53.77	58.57
Economically inactive population ^c	41.14	40.32	36.51
Female employment ^b	21.33	22.75	23.73
Full-time workers ^c	52.35	52.92	56.72
Self-employed workers ^b	11.64	7.54	7.64
Long-term unemployment rate ^a	26.18	27.07	25.13
Sectorial shares (percentage)			
Employed people in NACE sectors A-B ^a	6.28	3.07	2.39
Employed people in NACE sectors C-E ^a	11.63	16.48	16.59
Employed people in NACE sector F ^a	5.41	4.87	4.64
Employed people in NACE sectors G-I ^a	25.80	25.34	25.90
Employed people in NACE sectors J-K ^a	9.68	11.97	14.25
Employed people in NACE sectors L-Q ^a	31.37	33.62	30.11
Education and training			
16-19 year old in full-time education ^b	3.37	3.16	3.33
Working age population with NVQ level 3 or above ^d	33.88	33.97	36.37
Working age population receiving job related training ^b	10.64	11.79	12.14

Note: a / average for 1995-1999; b / average for 1992-1999; c / average for 1993-1999; d / average for 1994-1999; e / values for England are obtained as an average of all NUTS2 English regions excluding Merseyside and South Yorkshire.

A5 Synthetic control method – regional weights in the synthetic Cornwall and South Yorkshire

Region	Synthetic Cornwall Weight	Synthetic South Yorkshire Weight
Tees Valley and Durham	0.088	0.365
Northumberland	0.125	0.100
Cumbria	0	0
Cheshire	0	0
Greater Manchester	0	0.156
Lancashire	0	0
East Yorkshire	0	0.251
North Yorkshire	0	0
West Yorkshire	0	0
Derbyshire and Nottinghamshire	0	0
Leicestershire Rutland	0	0
Lincolnshire	0	0
Herefordshire Worcestershire	0	0
Shropshire and Staffordshire	0	0
West Midlands	0.212	0
East Anglia	0	0
Bedfordshire and Hertfordshire	0	0
Essex	0	0
Inner London	0	0.128
Outer London	0	0
Berkshire Buckinghamshire	0	0
Surrey East and West Sussex	0	0
Hampshire and Isle of Wight	0	0
Kent	0	0
Gloucestershire Wiltshire	0	0
Dorset and Somerset	0	0
Devon	0.575	0

A6 Logit model: test for significant pre-treatment differences in treatment and control groups

Dependent variable: Cornwall districts		
	(1)	(2)
<i>Pre-treatment variables (1999 values)</i>		
Unemployment benefit claimants	0.311 (0.204)	1.392 (1.178)
Population in employment		-0.261 (0.297)
Female employment		0.223 (0.361)
Full-time workers		0.126 (0.151)
Self-employed workers		0.866*** (0.244)
Employed people in manufacturing		-0.00903 (0.108)
Employed people in construction		-0.127 (0.411)
Employed people in transportation & communication		-1.030*** (0.397)
Employed people in banking, finance & real estate		-0.197 (0.321)
Employed people in education, health & social work		0.149 (0.169)
16-19 year old in full-time education		0.842** (0.345)
Share of population holding NVQ3 or above		-0.0925 (0.123)
Working age population receiving job related training		0.309* (0.183)
Observations	83	83
pseudo R-squared	0.015	0.461

Note: Robust standard errors in parenthesis; *** p<0.01, ** p<0.05, * p<0.1.

A7 Pre-treatment characteristics: South Yorkshire, synthetic South Yorkshire and England (1992-1999)

	South Yorkshire	Synthetic South Yorkshire	England ^e
Euros of Structural Funds per capita ^a	28.69	25.92	11.08
Per capita GDP ^a	13,840	19,640	18,054
Population in employment ^b	52.20	53.69	58.57
Economically inactive population ^c	41.04	39.73	36.51
Female employment ^b	22.24	22.61	23.73
Full-time workers ^c	49.47	51.58	56.72
Self-employed workers ^b	5.17	5.41	7.64
Long-term unemployment rate ^a	29.97	35.41	25.13
Sectorial shares (percentage)			
Employed people in NACE sectors A-B ^a	0.6	0.88	2.39
Employed people in NACE sectors C-E ^a	18.95	18.48	16.59
Employed people in NACE sector F ^a	5.61	4.83	4.64
Employed people in NACE sectors G-I ^a	27.33	25.66	25.90
Employed people in NACE sectors J-K ^a	11.78	12.50	14.25
Employed people in NACE sectors L-Q ^a	36.68	31.06	30.11
Education and training			
16-19 year old in full-time education ^b	2.73	2.92	3.33
Working age population with NVQ level 3 or above ^d	31.45	33.42	36.37
Working age population receiving job related training ^b	12.62	12.36	12.14

Note: a / average for 1995-1999; b / average for 1992-1999; c / average for 1993-1999; d / average for 1994-1999; e / values for England are obtained as an average of all NUTS2 English regions excluding Merseyside and Cornwall.