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Paolo Seri & Lorenzo Compagnucci

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What are university satellite campuses for? A perspective on their contribution to Italian municipalities and regions

Paolo Seri^a ^o and Lorenzo Compagnucci^{b,c} ^o

ABSTRACT

This paper is the first to present a long-term retrospective overview of the impact of Italian university satellite campuses (SCs), since Decree n. 509 of 1999 fostered a massive increase in the number of SCs, even in small municipalities around 10,000 residents. By drawing on a novel panel dataset aggregated at the urban level for the period 2000–20, findings show that SCs increased the number of graduates at the regional level. However, SCs alone have uneven effects on population trends and income at the urban level. They should be periodically reviewed and redesigned to address structural changes and local development.

KEYWORDS

depopulation; event analysis; human capital; peripheral campus; regional campus; urban development

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1. INTRODUCTION

In recent decades there has been a rapid increase in the number of universities around the world (Harrison & Turok, 2017). This phenomenon has paved the way to an apparently simple question: What are universities for? (Kempton et al., 2021b, p. 14). The question is relative to a contemporary and complex topic, namely, the contribution of universities to the regions in which they operate (Kempton et al., 2021a). Due to both the lack of and the heterogeneity of data, economists have only recently started to measure the impact of universities in a systematic way (e.g., Odei & Anderson, 2021; Siegfried et al., 2007; Valero & Van Reenen, 2019). Such impacts extend over time (Brekke, 2021; Drucker & Goldstein, 2007) and should be measured on a scale of several years or even decades (Bonaccorsi et al., 2019; Carree et al., 2014; Felsenstein, 1996).

Although universities are able, in diverse ways, to affect the areas they serve, such as by anchoring local employment and expenditure, enabling innovation through research and knowledge transfer, and strengthening democratic values, it is worth noting that maximising the formation of human capital still remains their most important mission (Aghion et al., 2009; Goldin & Katz, 2008; Sianesi & Van Reenen, 2003; Valero & Van Reenen, 2019). To do so, universities have been seeking to increase student share, by creating university satellite campuses (SCs), also called branch or peripheral campuses. SCs have been established in areas previously without any higher education institutions (Charles, 2016; Leaney & Mwale, 2021; Wildavsky, 2012).

The diffusion of SCs is a growing phenomenon at both the international (e.g., Conlé et al., 2021; Eder & Döringer, 2022; Eversole, 2022) and Italian levels where SCs represent a distinct organisational form of the higher education system (Goglio & Parigi, 2016). Ever since Decree n. 509 of 3 November 1999 reformed the structure of Italian university degrees by introducing bachelor's and master's degree programmes from the academic year 2001–02, there has been a massive increase in the number of SCs, even in small Italian municipalities of around 10,000 residents (Demarinis et al., 2011; ISTAT, 2016). It has been demonstrated that SCs have been created in Italy with the same rationale as other countries, namely to facilitate access to tertiary education by reducing the geographical distance between students' places of residence and the campus, and to increase the numbers of graduates (Demarinis et al., 2011; ISTAT, 2016, 2021). However, local administrators have frequently exploited the creation of SCs as mere rhetoric for local development in order to achieve political consensus and to ensure their re-election (Animali & Seri, 2009; Goglio & Parigi, 2016). Although Italian policymakers have invested considerable resources in SCs and promoted such campuses for narrowing the economic, social and cultural divide between and within

CONTACT Lorenzo Compagnucci 🖾 lorenzo.compagnucci@unimc.it

^aCentre for Entrepreneurship and Innovation, Polytechnic University of Marche, Ancona, Italy

^b Department of Law, University of Macerata, Macerata, Italy

^c Italy's National University Centre for Applied Economic Studies (CiMET), Ferrara, Italy

Italian regions (Bagnasco, 2004; Rossi & Goglio, 2020; Seri, 2014), several studies have highlighted that this aspect is still under-investigated (e.g., Animali & Seri, 2009; Goglio & Parigi, 2016; Rossi et al., 2012; Rossi & Goglio, 2020; Seri, 2014). In particular, the potential benefits of SCs are particularly difficult to capture, and are still unknown at the urban level (Goglio & Parigi, 2016). There is no long-term statistical evidence of the impact Italian SCs have really had in the areas they serve (Goglio & Parigi, 2016; Rossi & Goglio, 2020).

Furthermore, the literature has shown both mixed results and a number of limitations. First, existing works have either investigated only a single SC or a small sample of branch campuses: such quali-quantitative analyses offer an overly narrow understanding of the diffusion of SCs at the national level. Second, while SCs have started appearing in Italy since the end of the 1990s, previous studies have been based on short-term analyses. This means that they do not capture either the potential long-term dynamics at work in the creation of SCs, or their impact. Third, extant research mainly relies on primary data collected on a small scale: it would be useful to involve further data from institutional secondary sources so as to cover the whole country. This would strengthen both the reliability and generalisability of the analysis. Fourth, several scholars have also emphasised the importance of overcoming unrealistic expectations of the impacts of universities; to do so, policymakers should be better informed through the provision of quantitative evidence at the urban level (Bonaccorsi et al., 2016; Drucker, 2016; Kempton, 2019; Kempton et al., 2021b; Teixeira & Queirós, 2016), to assist in the design of university policies, strategies and investments, by taking into account demographic decline and the consequent decrease in eligible students (Bianchi & Laddomada, 2021; Bunde et al., 2022).

Thus, this paper contributes to the literature on SCs by presenting – for the first time – a long-term retrospective overview of the creation of Italian SCs, and of their impact at the urban and the regional level. Drawing on the literature reviewed, as a first step in this exploratory analysis, the following research questions have been addressed:

- Have SCs increased the total number of graduates at the regional level in the period 2000–20?
- Have SCs had any impact on population trends in the hosting municipalities over the long-term?
- Have SCs had any impact on per capita income at the urban level over the long-term?

From the methodological standpoint, a quasi-experimental analysis was designed by drawing on the enactment of Decree n. 509 of 1999 that enabled the diffusion of SCs on the national scale. Along with a fixed effect panel regression model, we studied the dynamics of the treatment effect through an event study design that includes leads and lags from the timing of the introduction of the SC, comparing the municipalities that, in the period 2000–20, have hosted at least one SC course, with the municipalities that have had no university courses at all. To do this, we undertook a one-year study, in collaboration with the Italian Ministry of University and Research (MUR), to build a new panel dataset aggregated at the urban level. We mined and rearranged data on 130,000 university courses, which are, or were, active between 2000 and 2020, in the established SCs and in the 97 Italian parent universities, including 67 public universities and 30 legally recognised private universities.¹ These data have been merged with further data concerning all Italian municipalities (around 7900). Italian municipalities are administrative entities that can vary considerably in size and population, indeed they can be either cities, which are usually larger and more populous, including hundreds of thousands residents, or towns, which are less densely populated. Since SCs have been created even in small Italian towns of around 10,000 residents, the term municipality has been adopted in the analysis to indicate both cities and towns.

The paper is organised as follows. Section 2 reviews the literature and presents the context of analysis. Section 3 both describes the materials and methods, and offers an extensive preliminary analysis. Section 4 discusses the results. Section 5 summarises the main findings and suggests a selection of policy implications that could be drawn from our results.

2. RELATED LITERATURE

2.1. The impacts of universities

The creation of universities and their contribution to regional and urban development have a long and multidisciplinary tradition (e.g., Goldstein & Renault, 2004; Harrison & Turok, 2017; Schubert & Kroll, 2016). Indeed, universities have historically played a crucial role in promoting education and research as determinants for both the formation of human capital and economic growth (Aghion et al., 2009; Bloom et al., 2017; Eversole, 2022; OECD, 2009). Universities are also expected to support innovation, entrepreneurship (Bramwell & Wolfe, 2008) and, more recently, the enactment of regional policies for innovation (Foray, 2018). On the other hand, universities have adapted their core activities so as to seek private funding sources and, also, to address mounting competition for student share, revealing a trend towards a sort of academic capitalism (Guerrero et al., 2015; Marginson, 2004; Marrocu et al., 2022; Musselin, 2018).

Under this framework, there is a wide variety of channels through which universities are able to affect the areas they serve. For instance, Valero and Van Reenen (2019) have identified four channels: (1) human capital formation; (2) boosting innovation; (3) strengthening democratic values; and (4) effects on demand. Since the early 1970s, the literature has made several attempts to evaluate the impact of universities on their regional economies. Caffrey and Isaacs (1971) first introduced a standard procedure to measure the economic impact of academia. The procedure consisted of adding together the expenditures of students, scholars, other staff and visitors, and then applying multipliers to account for the interdependency of economic activities within a local economy (Glückler et al., 2018).

Over time, the methodologies adopted have diversified, yielding a wide range of estimates (Drucker & Goldstein, 2007). However, four main currents can be found in the literature. An early series of studies introduced a methodology which focused on the economic impact produced by single universities or by university systems (e.g., Blackwell et al., 2002), which also involved knowledge-production functions and drew on the early findings of Solow (1957). These studies estimated the direct and indirect impacts of university spending, investment, and employment in a region. The novelty of Blackwell et al. (2002) lies in their handling of three sources of impact: export, import substitution and the creation of human capital. Thus, the analysis took into account effects that went beyond the traditional focus on generalised economic impact. Nevertheless, this approach has its limitations. Indeed, it does not quantify the economic impacts of academic activities well, mainly because it usually focuses on a narrow set of university activities affecting economic growth.

A second series of studies started to use a wider set of data and analytical techniques to estimate further factors, including the creation of academic spin-off companies (e.g., O'Shea et al., 2005), university-industry linkages (e.g., Walshok et al., 2002), patents and licensing agreements (e.g., Roessner et al., 2013). Walshok et al.'s (2002) study was a step forward in multiplier analysis: the authors went beyond expenditure and employment, and focused on the mechanisms for knowledge transfer between academia and companies at the regional level, and provided an assessment of their outcomes. The analysis included the number of research contracts, consultancy services and new academic spin-off companies generated.

A third minor body of the literature has involved surveys as a tool for measuring the economic impact of universities (e.g., Langford et al., 2006). However, this approach is not widely adopted because a considerable bulk of qualitative research is needed to validate the correlations resulting from survey studies. Overall, this body of research has advanced understanding of the results collected of single-case universities and their economic impact at the regional level to only a small extent.

A fourth current of knowledge has recently started to emerge which adopts methodological approaches, such as time-series and panel design, that are more flexible than analyses which latter have always relied heavily on theory as a means of specifying a functional form. Aghion et al. (2009) showed that an increase in investment in fouryear college education positively affected economic growth and patenting. From the methodological point of view, the authors used political instruments. The study was based on instrumental variables (IVs) which generate variations in investment in education which are conditioned by a State's observed characteristics. The IVs draw on the narrative that appointment to certain political committees will enable legislators to deliver payback to their constituents in the form of specific education investments which are disproportionately biased towards satisfying the personal-interests of certain constituents.

Valero and Van Reenen (2019) studied the location of universities at the regional level and their economic impact in 78 countries. The authors estimated fixed effects models at the subnational level over a period of 60 years. Findings revealed a positive relationship between the number of higher education institutions and the future growth of gross domestic product (GDP) per capita. This result was also partly determined by an increase in the supply of human capital. Furthermore, the study provided evidence of positive spill-over effects to neighbouring regions. Agasisti and Bertoletti (2020) estimated the association between the presence of university campus and regional economic growth. Findings showed that the higher the number of universities located in a region, the stronger the economic growth of that area would be. Furthermore, the effect obtained doubles when the size of the university is included in the specifications. The authors used a dynamic panel model, and the risk of endogeneity bias was addressed by involving a generalised method of moments (GMM). Nevertheless, these studies present two drawbacks. The first is the attribution problem: identifying the causal link between university initiatives and regional outcomes. The second, is that such studies usually cannot be generalised.

More recently, Marrocu et al. (2022) examined the effects of universities on the total factor productivity (TFP) of 270 NUTS-2 regions in Europe over the period 2000–16. The authors distinguished between direct and indirect effects. Findings revealed that the presence of an academic campus exerted a positive impact on regional TFP. There were also positive spillovers in neighbouring regions. Furthermore, the authors showed that the presence of a university plays a key role in driving the creation of human capital, thus indirectly fostering productivity at the regional level.

Our empirical analysis contributes to this stream of knowledge, by focusing on the impact of SCs which are almost exclusively focused on teaching and attracting students, in order to increase human capital formation and urban income (Animali & Seri, 2009; Demarinis et al., 2011; Eversole, 2016; ISTAT, 2016, 2021; Rossi & Goglio, 2020). The literature on SCs is presented in the following sections.

2.2. University SCs

Over the last 70 years there has been a steady, worldwide, increase in both the demand for higher education and in the number of universities. However, the distribution of academic campuses is very skewed because seven countries, the USA, Brazil, Mexico, the Philippines, Japan, India and Russia, host more than half the World's existing universities (Marrocu et al., 2022). Since the 1990s, some top-ranked international universities have started to establish SCs, often in municipalities in which there had been a lack of academic institutions (Charles, 2016; Leaney & Mwale, 2021; Wildavsky, 2012).

SCs are a form of decentralisation designed to facilitate access to tertiary education by residents (Rossi & Goglio, 2020), to increase educational attainment, and to foster both regional equity and development (Eversole, 2016). On the other hand, many studies have argued that SCs usually offer generic programmes that may not meet labour market needs at the local level (Ebden, 2010). In addition, most SC academic staff are junior scholars (Eversole, 2016; Wirihana et al., 2017). Thus, SCs might perform lower in teaching than their parent universities which have a higher number of experienced scholars (Charles, 2016; Eversole, 2016). This has also raised some concerns regarding the performance of SC students and their employability (Kemp & Norton, 2014). Moreover, SCs may face major difficulties in recruiting and retaining academic staff and they often experience funding issues. Along with these challenges, diseconomies of scale have progressively exacerbated the vulnerability of SCs especially in times of cost cutting (Allison & Eversole, 2008; Eder & Döringer, 2022; Wirihana et al., 2017).

Extant research has mainly relied on case studies, by focusing on topics such as teaching, learning, and the management of SCs and their facilities. Several studies have restricted their investigation to single degree programmes, such as nursing (e.g., Hays et al., 2021), pharmacy (e.g., Adams et al., 2015) or medical education (Wallach et al., 2021). As regards both the performance and skill development of low socio-economic status (SES) students, Craft (2019) explored an Australian SC and demonstrated that the government had achieved its aims, that of increasing the overall number of enrolled students and, especially, of SES residents, by establishing the SC. Furthermore, student failure rates had been reduced.

From the managerial standpoint, Healey (2015) focused on international SCs and the role of their managers. Findings have revealed that SC managers need more support from parent universities in terms of human and financial resources. This is crucial to balance the demand of both internal and external stakeholders, including students, scholars, administrative staff, firms and local governments. From the policy perspective, Leaney and Mwale (2021) have recently analysed the withdrawal of SCs, in peripheral municipalities as a consequence of spending cuts. Findings showed that the withdrawal of SCs has widened social-spatial inequalities. The authors also warned university managers and policy-makers about ensuring the effectiveness of SCs, by understanding how the needs of local communities can be addressed through targeted educational programmes.

2.3. SCs in Italy

SCs have also spread in Europe where 22% of all universities and 29% of all universities of applied sciences have established a branch campus in another European NUTS-3 region. In 2016, more than 250 NUTS-3 regions (out of 1700), containing about 15% of the European Union population, were served only by SCs (Bonaccorsi & Lepori, 2020). In particular, there were four countries, namely Austria, Belgium, Greece and Macedonia, in which more than 20% of the population lived in NUTS-3 regions served only by peripheral campuses. As regards Bulgaria, France, Spain, Slovenia and the UK, more than 20% of the country area was served by branch campuses (European Tertiary Education Register (ETER), 2019).

However, the share of parent universities with an SC varies greatly from country to country. On the one hand, the share of universities with an SC is also high in countries with small populations, such as Norway, where most universities have an SC, and more densely populated countries such as France (60%), Italy (41%), Spain (39%) and the UK (34%). On the other hand, only 12% of German universities have established an SC; among Eastern European countries, the share is very low in Poland (4%), Czech Republic (3%) and Romania (2%) (ETER, 2019).

In the case of Italy, according to the MUR, the number of Italian municipalities with at least one SC rose from 62 in 1990 (Seri, 2014) to 170 in 2001 and, in 2009, there were 252 municipalities with at least one campus. However, by 2020 the number of these latter had fallen slightly to 200.² Several legislative interventions have contributed to this over the years. In 1989, universities were given more autonomy, which allowed them to define their own statutes and regulations, and since 1993, Italian universities have also gained greater flexibility in the management and allocation of their budgets and financial resources. Furthermore, several new parent universities were established between 1991 and 1996, especially in the South of the country, in order to facilitate access to tertiary education in less developed areas. Shortly after, Law n. 662 of 23 December 1996 required larger universities (over 40,000 students)³ to decentralise their teaching activities by creating SCs in neighbouring municipalities or provinces. Furthermore, after Decree n. 509 of 3 November 1999 reformed the structure of academic degrees by introducing bachelor's and master's degree programmes, there has been a massive increase in the numbers of SCs, even in small municipalities of around 10,000 inhabitants (ISTAT, 2016; Rossi & Goglio, 2020), after the academic year 2001-02.

Although Italian policymakers have invested considerable resources to establish SCs in order to facilitate residents' access to tertiary higher education, thus improving human capital formation, (Bagnasco, 2004; Rossi & Goglio, 2020; Seri, 2014), the question is still underexplored and there is no long-term statistical evidence on the impact SCs really make in the regions they serve (Goglio & Parigi, 2016; Rossi & Goglio, 2020). Italian SCs are the result of longstanding public policies that, instead of enacting measures to support student mobility, have financed the establishment of higher education facilities closer to peripheral communities (Regini, 2009), while keeping resources and research activities concentrated in the parent campuses active in metropolitan areas (Bonaccorsi & Lepori, 2020). Unlike their parent universities, SCs have smaller structures and fewer staff because they are mainly focused on teaching and do not address

research and Third Mission activities directly (Bonaccorsi & Lepori, 2020). Such activities include, among others, the creation of technology transfer offices to provide support services for academic entrepreneurship, patenting, academic spin-off and start-up formation, and consultancy services (Compagnucci & Spigarelli, 2020).

A pioneering study by Animali and Seri (2009) examined eight SCs active in the Marche Region, in Central Italy, during the early 2000s. The analysis assessed the impact of knowledge production on both graduate employability and on the capacity of local production systems to absorb students in the period between 2000 and 2004. The authors found that SC creation seems to be mainly determined by the ambitions of local authorities and lobbying groups to increase their visibility and to attract funding from central government. However, the SC formation activities did seem to lack any in-depth analysis of real local needs, issues and priorities. A follow-up study by Seri (2014), measured the human capital produced, absorbed and employed within the local production systems of the Marche Region in the period 2000-04. Findings demonstrated that the spread of SCs has contributed only marginally to improving the overall rate of graduation at the regional level.

Goglio and Parigi (2016) investigated the reasons that underlie the creation of SCs in Italian regions. The authors linked, empirically, the spread of branch campuses to lobbying carried out by tenured professors, in order to divert internal competition for academic positions and to maintain the distribution of power within the parent university. Rossi and Goglio (2020) carried out a case study on the SC in Cuneo, which belongs to the parent University of Turin, in Northern Italy. The authors assessed the impact exerted by the SC on both the local economy and on the creation of human capital. Findings revealed that the main contributions of the campus were: increasing access to university education for local residents; stimulating local demand for knowledge-intensive services; and strengthening collaborations with firms at local level.

More recently, an emerging body of the literature has argued that future research on the contribution of university campuses, should explore the relationship between higher education institutions and depopulation trends underway in areas in which SCs operate (Bianchi & Laddomada, 2021; Bunde et al., 2022). According to the Italian National Institute of Statistics (ISTAT), in Italy, a considerable decrease in population is expected, passing from 59.2 million residents to 47.7 million over the next 50 years (2021-70) (Armenise et al., 2023). In particular, in 2040, there will be around 1.5 million residents aged between 18 and 20. Thus, a reduction of around 235,000 young people (-13% compared with 2020) potentially eligible to enrol in university courses (Bianchi & Laddomada, 2021; ISTAT, 2022). These trends will be heterogeneous, impacting, with different intensity, on Italian regions and their universities (Armenise & Benassi, 2021).

Overall, the literature has shown that local communities usually benefit from the presence of SCs (Rossi et al., 2012; Wirihana et al., 2017). Indeed, SCs mainly attract residents who, in the absence of any academic institution, would not have moved, or would not have been able to move, long distances to attend a university after completing secondary school (Animali & Seri, 2009; Briscoe & De Oliver, 2006). This means that SCs could also help retain both residents and talents in the more peripheral areas, by providing them with academic paths for higher qualifications and future career development, thus contributing to addressing the depopulation trends which are underway, especially in the South of the country, and in small municipalities. Furthermore, previous studies (e.g., Craft, 2019; Crawford & McKenzie, 2022; Frenette, 2007) have demonstrated that SCs tend to increase the participation of students with limited family resources (e.g., Bratti et al., 2008; Cooke & Boyle, 2011; Goglio, 2011; Mulder & Clark, 2002; O'Neill & Bagchi-Sen, 2022), thus improving, in the long term, the level of human capital and graduate employability, which latter will be able to obtain 'better' jobs, and higher incomes.

Drawing on the literature, this analysis examines – for the first time – the impact of Italian SCs at both the regional and urban levels over the period 2000–20. The following hypotheses are proposed:

Hypothesis 1. SCs increased the total number of graduates at the regional level over the period 2000–20.

Hypothesis 2. SCs had a positive impact on population trends in the hosting municipalities over the period 2000–20.

Hypothesis 3. SCs exerted a positive influence on per capita income in the hosting municipalities over the period 2000–20.

3. MATERIAL AND METHODS

3.1. Data and sample

This study is based on a novel longitudinal panel aggregated at the urban level. The sample includes data on 130,300 university courses that were taught between 2000 and 2020 in Italy. Unfortunately, information available from the Italian MUR for the period 1990–2000 were too scattered and uneven, and would not have made it possible to distinguish between parent universities and SCs. The dataset comprises information about the geographical location of university courses in around 7900 municipalities. The dataset also includes the number of students who graduated from each university course in the period 2000–20. These data are from the Italian Ministry of University and Research (MUR), Ministry of Economy and Finance (MEF), National Institute of Statistics (ISTAT) and Eurostat.

3.2. Variables

Drawing on the literature reviewed (e.g., Animali & Seri, 2009; Conlé et al., 2021; Eversole, 2022; Goglio, 2011; Goglio & Parigi, 2016; Kempton, 2019; Rossi et al., 2012; Rossi & Goglio, 2020; Seri, 2014; Valero & Van Reenen, 2019), the creation of Italian SCs and their

long-term impact are analysed using the following variables. We considered the number of municipalities with at least one university campus (*univ*) since the creation of a higher education institution usually exerts a positive influence on the number of graduates and on the income of the areas they serve (Goldstein & Renault, 2004; Rossi & Goglio, 2020), and university campuses usually attract students, talents and new residents (Valero & Van Reenen, 2019). We also considered the number of graduates produced each year by each SC course (*graduates*) (Goldstein & Renault, 2004); this variable was relevant for our study because graduates are more likely to seek work in the area where the campus is located (Valero & Van Reenen, 2019).

However, universities campuses per se are not enough to trigger opportunities for economic growth and their impact depends on the presence of complementary factors (Bonaccorsi et al., 2019). Thus, this analysis considered a series of further variables, including the number of pupils enrolled in upper secondary education at the NUTS-2 level, as such institutions are increasingly oriented towards preparing students for university enrolment. The unemployment rate at NUTS-2 level was also included in the analysis. Since high unemployment rates drive down the opportunity costs of education, young people have an incentive to enrol in an educational institution and to stay in education longer, thus they can improve their knowledge and strengthen their skills for when labour-market conditions are more favourable (OECD, 2023). In addition, we considered a selection of variables measuring some of the fundamental trends of all Italian municipalities, including *population*, number of taxpayers (*taxpayers*); per capita income from property ownership (perc_realest); and per capita income (perc_income), which has been adjusted according to the consumer price index (CPI) (Table 1).

Table 1. Variables.

3.3. Descriptive statistics and preliminary analyses

Figure 1 shows the number of Italian municipalities with at least one SC established between 2000 and 2020. Since the end of the 1990s, university reforms have contributed to the proliferation of new SCs in all regions, even in small municipalities with around 10,000 inhabitants. However, in 2001, there was a drop of 9% (from 200 to 172) in the number of municipalities with at least one SC. This drop may have been determined by Decree n. 509 of 3 November 1999 that reformed university degrees.⁴ On the one hand, at the very beginning, to comply with the transition to the new system, some universities had to rearrange their courses by relabelling, changing, merging or closing them. On the other hand, the Decree had reformed the structure of university degrees by introducing bachelor's and master's degree programmes. In the long-run these reforms enabled universities to offer new courses in both main and branch campuses. The reform became operational in the academic year 2001-02. As a result, there was a steady increase in the number of SCs between 2002 and 2009.

The creation of new SCs peaked in 2009 when there were 252 municipalities with at least one campus. However, the number of municipalities with at least one branch campus did decline slightly over the final twelve years of the period studied: both public spending cuts and the increase in e-learning courses, especially those offered by private universities, may have contributed to reducing the number of SCs in Italy (ISTAT, 2021). In very few cases, for example the Libera Università della Sicilia Centrale 'KORE' of Enna, a former SC was transformed into an autonomous university, i.e., a parent university, recognised by the MUR. Since this occurred very rarely in the period between 2000 and 2020 it did not influence our analysis. However, it is worth noting that, during the period studied, many local authorities have signed

Unit of									
Variables	Definitions	Source ^a	Period	measure	Observations	Mean	SD	Minimum	Maximum
Univ	University campus in the municipality	MUR	2000–20	0–1	160,931	0.03	0.17	0.00	1.00
Graduates	Number of graduates (by municipality)	MUR	2000–20	n	160,931	36.24	700.71	0.00	43,752.00
Population	Urban population	ISTAT	2000–20	n	160,931	7529.26	41,511.87	28.00	2,822,021.00
upp_second	Pupils enrolled in upper	ISTAT	2000–20	n	400	134,755	52,123.65	5321	451,306
	secondary education (NUTS-2)								
unempl_rate	Unemployment rate (NUTS-2)	ISTAT	2000–20	Rate	400	12.8	4.7	3.1	22.2
Taxpayers	Number of taxpayers at the	MEF	2000–20	n	160,931	5189.45	29,441.33	21.00	1,953,890.00
	urban level								
perc_income	Per capita income at the urban	MEF	2000–20	Current	160,931	15,636.65	4071.04	4130.85	78,652.70
	level			prices (\in)					
perc_realest	Per capita property ownership	MEF	2000–20	Current	160,931	1244.68	955.01	72.07	43,450.75
	income at the urban level			prices (€)					

Note: ^aMUR, Ministry of University and Research; MEF, Ministry of Economy and Finance; ISTAT, Italian National Institute of Statistics.



Figure 1. Number of Italian municipalities with at least one university campus, 2000–20. Source: Authors' elaboration.

agreements with universities in order to provide further public (State) services for students and workers at SCs: i.e., the universities involve their scholars and administrative staff to manage teaching, and the municipalities usually provide the buildings for classes, facilities and accommodation for both students and staff (Bagnasco, 2004; Carbone, 2021; ISTAT, 2016; ISTAT, 2021).

Figure 2 shows the geographical distribution of all universities at the urban level in 2020. The map includes those municipalities with at least one campus. Darker areas denote higher numbers of graduates from the university campuses, while lighter colours show lower numbers.

Figure 3 compares the trend of average per capita income of all Italian municipalities in the period 2000– 20. The chart distinguishes between municipalities which host at least one university course (red line) and those without any kind of university campus (blue line). As expected, it can be observed that, on average, municipalities with at least one campus recorded higher per capita incomes during the period analysed.

3.4. Empirical strategy

To address the first research question, namely whether SCs have increased the total number of graduates in the long-term instead of subtracting them from their parent universities, we considered the NUTS-2 level of analysis which includes both parent and satellite universities. This is a necessary condition to test the effect of the geographical diffusion of university courses, which is measured as the increase in the number of municipalities – within the region – with at least one academic course. To do this, we collapsed the sum of graduates and the sum of number of municipalities with at least one university campus at the regional level (NUTS-2) in the 2000–20 panel dataset. Then, we estimated the following model:

$$RG_{it} = \alpha_i + \beta X_{i,t} + e_{i,t}$$
(1)

Model [1] is a fixed effect panel regression model where RG_{it} is the dependent variable (number of graduates) observed for the region *i* at time *t*, while $X_{i,t}$ is the time-variant regressor vector containing the number of municipalities with at least one university course in the region and the other control variables for the period 2000–20. The β is the matrix of parameters and α is the unobserved time-invariant regional effect (e.g., the specific historical and institutional characteristics of regions).

As regards the second and the third research question, i.e., whether the creation of SCs has had any impact on population trends and on average per capita income in the small and medium hosting municipalities, the analysis was focused on the urban level and considers only those SCs that were established between 2000 and 2020. This analysis includes those municipalities with more than 10,000 and fewer than 100,000 inhabitants. We omitted both smaller and larger municipalities to obtain a sample with two comparable groups: the treatment group which contains those municipalities where one or more university courses were activated between 2000 and 2020 by parent universities; and a control group which includes all the municipalities with no university courses at all. Drawing on extant works (e.g., Borusyak et al., 2022; Goodman-Bacon, 2021; Sun & Abraham, 2021), we studied the dynamics of the treatment effect through an event study design that includes leads and lags from the timing of



Figure 2. Geographical distribution of university campuses and graduates in Italy, 2020. Source: Authors' elaboration.

the introduction of the SC. We defined, as treated units, those municipalities *s* where an SC was established at year *t*. Let T_{0m} be the time when municipality *m* initially received the SC – i.e., the lowest *t*, such that SC_{s,t} = 1, and let r = t- T_{0m} be the relative time from treatment.⁵ Thus, the event study equations for addressing research questions two and three are respectively:

$$UP_{mt} = \beta_0 + \sum_{r} \gamma r |\{r = t - T_{0m}\} + X'_{m,t}\beta_1 + \alpha_m + \tau_{a(m),t} + \epsilon_{m,t}$$
(2)

$$UI_{mt} = \beta_0 + \sum_r \gamma r |\{r = t - T_{0m}\} + X'_{m,t}\beta_1 + \alpha_m + \tau_{a(m),t} + \epsilon_{m,t}$$
(3)

In model [2], UP_{mt} is the urban population for municipality m and time t, while in model [3] UI_{mt} is the urban per capita income for municipality m and time t. A series of γ leads and lags are considered relative to the event of interest. $X'_{m,t}$ collects potential controls at urban and year levels, α_m are municipality fixed effects and $\tau_{a(m),t}$ are administrative region (of the municipality) and year fixed effects. We conducted the event study on more subsamples of our dataset, all of which were included in the set of municipalities with more than 10,000 and fewer than 100,000 inhabitants. We chose this range because it contains the municipalities where SCs have been established during the 20 years considered in the dataset. The inclusion of leads and lags in model [2] and model [3] allowed us to investigate both the dynamic effect of SC introduction and the presence of pre-trends. Despite the



Figure 3. Average per capita income of municipalities with and without university, 2000–20. Source: Authors' elaboration.

existence of a large set of municipalities acting as the control group – about 87% of municipalities did not establish an SC within our time frame – identification required that this control group was not on a separate trend.

4. RESULTS AND DISCUSSION

4.1. SCs and graduates

Testing whether the creation of Italian SCs has increased the total number of graduates or has subtracted graduates from parent universities, may permit broader understanding of the whole phenomenon of SCs at a national level. Assessing the effectiveness of the university reforms that have supported the diffusion of SCs since the end of the 1990s, could play a crucial role in assisting policy-makers when defining and adopting future strategies and complementary policies for tertiary education. Previous studies (e.g., Rossi & Goglio, 2020; Seri, 2014) have revealed that the SCs main contribution was to facilitate residents' access to tertiary education, thus one of the goals set by the reforms has been achieved, and these studies revealed only a slight increase in the graduation rate. However, these results are not conclusive, and would seem to depend both on the indicators chosen to measure the impact of higher education institutions, and on the level of analysis, namely regions (NUTS-2 areas) and provinces (NUTS-3 areas). Figure 4 illustrates the results concerning the long-term dynamics at work at the national level, from 2000 to 2020. The lower line indicates the number of municipalities with at least one campus while the upper line represents the total number of graduates.

Figure 4 shows a correlated pattern between the number of municipalities with at least one university campus and the total number of graduates. However, this correlation exists only from 2001 to 2010. After 2012, the two measures seem to follow diverging directions. This is probably due both to the fact that the diffusion of SCs had different impacts in different Italian regions, perhaps because of the diverse structure of urban systems in each region. Thus, to better understand the relationship between university campuses and graduates, we regressed these two variables at the regional level for all Italian regions. To do so, we ran a fixed effects panel regression, as described in Section 3.4, by drawing on the total regional graduates and the total number of municipalities with at least one university campus The presence of region-specific, time-invariant and unobservable factors, which can influence dependent variables, led us to use fixed (regional) effects models in our econometric exercise. The appropriateness of this strategy was further confirmed when comparing fixed vs. random models using the Hausman Test (Hahn et al., 2011). Results reported in Table 2 a significant impact of the independent variable - i.e., the number of municipalities with at least one university campus within the region - on the total number of graduates within the region.

Although SCs have been portrayed as key drivers for creating human capital and strengthening skills to render labour market entrants more employable (Huggins & Johnston, 2009; OECD, 2009), the mere presence of a campus does not mean that any development of a given region should be taken for granted as being the result of SCs. Nonetheless, in the case of Italy, our findings do demonstrate the effectiveness of the strategy enacted by the university reforms, namely that of increasing the over-all number of graduates in a region by establishing branch campuses.

However, as shown in Figure 5, this strategy seems to have been more effective in some regions than in others. This could be due to the fact that the mechanism works better in regions with a polycentric urban system, i.e., those areas where the population, or employment, are not concentrated to a high degree in one single centre (Riguelle et al., 2007). On the other hand, people and students living in regions with a monocentric urban system tend not to take advantage of the creation of SCs because they remain more attracted by the relatively (for the region) much bigger universities and municipalities. This may be the case of big municipalities, such as Milan in Lombardy, Rome in Lazio, Naples in Campania, Bologna in Emilia Romagna and Turin in Piedmont. Furthermore, the mechanisms examined may work differently also because of both regional-specific infrastructural factors, (such as the quality of road and rail connections), and cultural factors all of which merit further investigation.

Understanding the association between the spatial organisation of municipalities and the socio-economic conditions of a region is important for both national and local policy-makers. Indeed, it can influence university policies, and assist both when planning for public services and for designing institutions that can offer effective support for the economic development of diverse territories (Brezzi & Veneri, 2014).

4.2. SCs and the urban population

The introduction of SCs, even in small and medium municipalities, has been portrayed as being a way of creating equal opportunities among, and within, Italian regions, and of combating population shift and the draining of talent from Italian municipalities (Rossi & Goglio, 2020; Seri, 2014). However, there is no clear statistical evidence regarding the impact of SCs on population decline in affected areas. We tested whether, in the period between 2000 and 2020, the creation of SCs in medium and small municipalities, had had any impact on these municipalities when compared with general depopulation trends. Figure 6 shows the empirical results of the event study described in model [2] in Section 3.4.

The first event study - plot (a) - conducted on the whole sample of municipalities ranging in size from 10,000-100,000 inhabitants, does not provide evidence of any impact on population following the institution of SCs. The same results were obtained in plots (b) and (c), which respectively correspond to event studies performed on the sample of municipalities ranging from 10,000 to 29,999, and from 30,000 to 59,999 inhabitants. Plot (d) shows the results of the event study conducted on the sample of municipalities ranging from 60,000 to 100,000 inhabitants. Findings reveal some evidence of an impact on population: there was a small increase in population the 4 years following the creation of an SC. But this could be the result not only of the institution of the SC in the municipality, but also of other policies and initiatives activated within the same time-span, and this we cannot ascertain using the variables in our dataset.

Sometimes SCs have failed to meet the expectations of both policy-makers and communities due to lack of attention paid to local priorities and trends, lack of university engagement with local stakeholders, conflicting interests,



Figure 4. Dynamics of total graduates at national level, 2000–20.

Note: The lower line indicates the number of municipalities with at least one campus, while the upper line represents the total number of graduates.

Source: Authors' elaboration.

Table 2. Res	sults of fixed	l effects pane	l regression.

graduates	
univ	518.723***
	(87.337)
population	0.013***
	(0.001)
perc_income	0.356***
	(0.081)
upp_second	0.014*
	(0.003)
perc_realest	-0.2450
	(0.212)
unempl	-0.015
	(0.190)
Observations	428
Groups	20

Note: Standard errors are shown in parentheses. *p < 0.10, **p < 0.05, ***p < 0.01. $R^2 = 0.657$. graduates = dependent variable (total regional graduates);

graduates = dependent variable (total regional graduates); univ = total number of municipalities with at least one university campus.

and poor leadership and management of campuses (Eder & Döringer, 2022). Indeed, the role of university campuses is a complex and multilevel phenomenon that

extends over time, thus it requires well-defined longterm policies (Brekke, 2021; Drucker & Goldstein, 2007) in order to address heterogeneous challenges (Kosonen, 2012). In particular, strategies and investments to create and support higher education institutions, should be coordinated with the felt needs of the local community (Pinheiro, 2018), by considering any demographic changes underway, such as lower birth rates, which will progressively result in a decrease in the number of both eligible students and workers (Armenise et al., 2023; Armenise & Benassi, 2021; Bianchi & Laddomada, 2021; Bunde et al., 2022).

4.3. SCs and urban income

Although the creation of SCs has been presented as a tool to improve income at the local level, while reducing the economic divide between, and within, Italian municipalities (Bagnasco, 2004; Rossi & Goglio, 2020; Seri, 2014), there is no clear statistical evidence regarding the impact of SCs on the per capita income in municipalities that hosted at least one university course in the period studied (2000–20). Figure 7 shows the empirical results of the event study described in model [3] in Section 3.4.

Regardless of the size of the municipality, SCs alone have exerted little positive impact on urban income in all municipalities that have hosted at least one SC course. Nevertheless, the positive effect seems more marked in



Figure 5. Number of municipalities with at least one university and total graduates at the regional level, 2000–20. Source: Authors' elaboration.



Figure 6. Event study results: population at the urban level. Note: The baseline (omitted) base period is one year before the institution of the satellite campus in each municipality, indicated by the solid vertical line in the plot. Source: Authors' elaboration.

plot (b) which shows municipalities ranging in size from 10,000 to 30,000 residents. While it is complicated to disentangle such effects, further research could explore complementary policies that, along with SC creation, would have been able to produce an impact on urban income. As regards this, future analysis could investigate the consistencies between the type of university courses offered and the economic structure at the urban level. To do so, it could be interesting to disentangle the impact on both income and graduate employment in knowledge-intensive activities of Science, Technology, Engineering and Mathematics (STEM) disciplines and of those generated by courses in the field of the Social Sciences and Humanities (SSH).

5. CONCLUSIONS AND POLICY IMPLICATIONS

This paper has sought to contribute to the literature on the impact of SCs by providing – for the first time – a long-term retrospective overview of both the creation and the impact of Italian SCs on human capital formation at the regional level, and on population and income at the urban level, in the period from 2000 to 2020. A quasi-experimental analysis was designed by drawing on the enactment of Decree n. 509 of 1999 that fostered a

massive increase in the numbers of SCs, even in small municipalities of around 10,000 inhabitants, depicting SCs as a distinct organisational form of the Italian higher education system. We studied the dynamics of SC creation through an event study design that includes leads and lags from the timing of the introduction of the SC, comparing municipalities that, over time, hosted at least one SC course with municipalities with no university courses at all. To do so, a novel panel dataset was arranged at the urban level.

Our findings at the regional level, reveal that the creation of SCs did increase the total number of graduates rather than subtracting graduates from parent universities. This trend was already apparent at the national level in the period 2001-10. Afterwards, differences between regions with monocentric and polycentric urban systems were even clearer. Despite the objectives of the university reforms, bigger municipalities seem to have played an even greater role in human capital formation, while small and medium municipalities only slightly increased their graduation rates. Furthermore, SCs alone had little no discernible impact on the depopulation trends, underway since 2010, in either medium or small Italian municipalities. On the other hand, findings did demonstrate a small increase in population, observed during the 4 years following the introduction of SCs in bigger municipalities,



Figure 7. Event study results: income at the urban level.

Note: The baseline (omitted) base period is one year before the institution of the satellite campus in each municipality, indicated by the solid vertical line in the plot.

Source: Authors' elaboration.

those ranging in size from 60,000 to 100,000 residents. Regardless of the size of the municipality, SCs alone have produced a slight positive effect on urban income in all the municipalities that hosted at least one SC course, during the twenty years studied. Nevertheless, the positive effect is more visible in municipalities ranging in size from 10,000 to 30,000 residents.

Although policy-makers have presented SCs as a key tool for improving regional development, much of such rhetoric seems overoptimistic. Indeed, SCs have been ascribed an overly prominent role, as regards the contribution they make to the areas they serve, than the empirical results would suggest is warranted. Thus, this paper also presents a selection of policy implications that could be drawn from our findings.

From the university policy standpoint, further attention should be paid to the relationship between SCs and the areas they serve. Indeed, the academic institution influences and, at the same time, is shaped by the region, and/or by the urban environment in which it operates. This means that both parent universities, and their SCs, should adopt a flexible framework in order to understand their role and then, implement their strategies, which should, periodically, be reviewed and redesigned in response to any reduction, or increase in potentially eligible students. In particular, SCs should enact measures both to retain talents, and to attract international students, especially from emerging countries with younger populations and lower quality educational services and opportunities. Furthermore, since ageing workers will become the predominant segment of the active labour force, SCs could increase their student share by focusing more on upskilling, and reskilling, processes for workers, in order to meet company needs at the local level. At the same time, universities are increasingly required to comply with regulations regarding their financial responsibilities, and to demonstrate the validity, efficacy of their spending. To better allocate resources, parent universities should coordinate better with SCs both to avoid overlapping courses and to develop programmes which could be more consistent with the needs, the specialisations, of the local environment.

From the regional policy perspective, there are high levels of heterogeneity of graduation rates between, and within, regions served by SCs. Policy-makers should consider the characteristics of both municipalities and SCs, and avoid a 'one size fits all' approach which paved the way to a massive increase in the numbers of SCs, even in small municipalities, in the two decades studied. Regional and local policy-makers should collaborate with universities to map and understand the contribution of SCs to structural change in their areas, especially in terms of human capital formation and graduate employability. Along with identifying the impact on graduate employment in knowledge-intensive activities of the STEM and SSH courses taught in SCs, future research should extend knowledge about student mobility (e.g., ISTAT, 2021), by gathering empirical evidence about peripheral campuses and mobility at the urban level. Such evidence may contribute to designing more effective policies for education, and to incentivising SCs to play new, or enhanced roles, in line with evolving regional strategies for development.

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DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

NOTES

1. The universities included in this study are those legally recognised by the Ministry of University and Research (MUR). For the full list, see http://ustat.miur.it/dati/didattica/italia/atenei

2. MUR; http://dati.ustat.miur.it/dataset/laureati

3. Italian universities are classified by size, as follows: total number of university students more than 40,000 (mega-university); between 20,000 and 39,900 university students (big university); between 19,900 and 10,000 university students (medium university); and fewer than 10,000 university students (small university) (ISTAT, 2016).

4. The Bologna Process seeks to bring more coherence to higher education systems across Europe; http://www.ehea. info/. Following the Bologna process, Decree n. 509 of 3 November 1999 was enacted in 2001.

5. Since our sample covers the period from 2000 to 2020, then $r = \{-20, -19, \dots, 0, +1, \dots, +19\}$.

ORCID

Paolo Seri D http://orcid.org/0000-0002-7209-5219 Lorenzo Compagnucci D http://orcid.org/0000-0001-7644-9953

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