

LANCASTER UNIVERSITY

DOCTORAL THESIS

Economic policy evaluation: environment and refugee centres

Author:

Matteo CARUSO

Supervisors:

Dr. Aurelie SLECHTEN

Dr. Pavel CHAKRABORTY

*A thesis submitted in fulfillment of the requirements for the degree of Doctor of
Philosophy*

in the

Department of Economics
Lancaster University Management School

December 2024

Declaration of Authorship

I, Matteo CARUSO, declare that this thesis titled “Economic policy evaluation: environment and integration” and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. Except for such quotations, this thesis is entirely my work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

“A string of facts, however well attested, has no power to correct or dislodge a powerful story. The only thing that can displace a story is a story.”

George Monbiot

Abstract

In a world that is growing faster and unexpectedly, the role of national and local governments in addressing social issues becomes much more relevant. Thanks to the availability of more advanced and detailed data, economists are nowadays more able to analyse and assess the outcomes of specific policies, both on firms and individuals. Through the use of new and mainstream advanced econometric methods, it is possible to dig deeper into unexplored issues and provide guidance for the improvement and implementation of those policies. This work aims to address two economically and socially relevant topics: the protection of the environment in the United States and the management of the refugee crisis in Italy.

In the first chapter, I explore the effects on high-skilled labour of a change in emission standards for cars sold in the United States. Corporate Average Fuel Economy (CAFE) standards establish the average level of miles per gallon (mpg) for each automaker's fleet of vehicles sold on the market. They have been in place since the 1970s but they have remained stable for many years. In 2010, the Obama Administration announced a new relevant variation of those standards for new models starting in 2012. Previous literature has explored the impact of those and similar regulations on firms' innovation and productivity. In these works, the main outcome variables are often patents or R&D expenditure. I add to this strand of research by analysing the impact of these standards on suppliers' labour force. Since innovation requires a relevant amount of human capital, I look at technical personnel such as engineers and scientists to explore how the industry changed its workforce composition to implement research and development investments and meet the new criteria. I show how the industry supplying internal combustion engines (ICE) displayed a significant increase in the number of mechanical engineers compared to other control units. The main tasks of mechanical engineers are strictly related to the design and development of new ICEs. On the other hand, the same analysis does not show a similar effect for the industry supplying electric vehicle engines (EVE). These conclusions provide evidence of how the industry responded to the new regulation through an incremental innovation rather than a radical one. These results are corroborated by the low number of new pure EVs sold in the United States compared to standard petrol-based or hybrid models. My analysis provides new evidence of the impact that these new standards had not only on automotive innovation but also on the composition of its workforce.

For my second chapter, I study the impact of refugee centres in Italy on municipalities' public spending. Since the beginning of the century, the problem of refugees fleeing from wars and persecution has been particularly relevant to Italy given its strategic position in the Mediterranean Sea. Both local and central governments have tried to address this issue through different types of projects to host and manage this relevant inflow. Many projects were initially informal and managed by the single Italian municipalities, until the central government decided in 2005 to institutionalise them with the Protection of Asylum Seekers and Refugee System (SPRAR). Through this system, municipalities could decide to host a refugee centre with the fi-

nancial help of the Ministry of the Interior, financing up to 80% of the cost. SPRAR centres are small in size and provide language courses, job orientation, and legal advice to the hosted refugees. They are managed by local non-governmental organisations (NGOs) and are supervised by the municipality itself. The Arab Spring crisis in 2011 exacerbated the refugee crisis and forced the central government in 2014 to set up many new Extraordinary Emergency Centres (CAS). These centres are instead assigned by the government directly to private actors or NGOs and they do not involve the municipality's participation. Municipalities have no saying on where the prefecture (local representation of the central government) decides to establish the centre. CAS centres are not required to provide any type of course or formation for the refugee. Using municipality's balance sheets, I study the impact that these two type of centres have on municipalities' current spending. I restrict the analysis to municipalities with less than 5000 residents. Municipalities with SPRAR centres show an increase in social spending due to the presence of the centre and other activities related to culture. Even when controlling for revenues from the central government, this increase is statistically significant. This may suggest that the spending for the SPRAR centre has a non-negligible impact on municipalities' own financial resources. Most of this spending comes in the form of transfers to families, firms, and local associations. This hypothesis is supported by the increase in foreign population (especially from North Africa) for municipalities with SPRAR. This is mainly due to SPRAR projects requiring refugees to set up their residency into the municipality. There is no similar increase for municipalities' with CAS centres, where refugees are not required to acquire any residency status. These results shed some light over the actual impact that refugee centres have on local finances and communities.

For the third chapter, I extend the previous analysis on refugee centres analysing what impact they might have on local politics. More precisely, in a this joint work with Dr. Giuseppe Migali, I study whether the opening of the refugee centre affects the current mayor's chances of winning a second term. Focusing on two types of centers—the System for the Protection of Asylum Seekers and Refugees (SAI) and the Extraordinary Reception Centers (CAS)— we analyse how these facilities impact voter behavior, especially in light of the integration services provided by SAI centers and the more temporary role of CAS centers. The main results suggest that SAI centers, which promote integration, are positively associated with mayors' re-election prospects in regions with high social capital, particularly in Northern Italy. CAS centers, in contrast, are found to have minimal impact on re-election chances, except in certain areas where they may slightly increase support for right-wing parties. We also provide evidence of possible bias in the location of this second type of centres due to political strategic behaviour of central governments.

Acknowledgements

This Ph.D. thesis represents the work of three years which has been completed with the help and support of several people who deserve to be mentioned.

First, I would like to give my sincere thanks to my supervisors Aurelie Slechten and Pavel Chakraborty, who always managed to find a great balance between support and criticism, something which is not always easy. I believe I have been extremely lucky to have these two enthusiastic researchers to guide me and I truly hope our professional and personal collaboration will not end with this thesis.

I want to thank also the Department of Economics at Lancaster University, from the faculty to the administration office. Since the start of the Ph.D. programme, I have found a very inclusive and diverse environment, in which I received constructive feedback, valuable advice, and constant support. Unexpectedly, Macroeconomics people helped too.

I would like to thank the incredible group of Ph.D. friends, both Scottish and non-Scottish, with whom I managed to share valuable moments and laughs during lunch breaks, seminars, and drinks at the Fylde College bar.

I am also grateful to Giuseppe Migali for our collaboration in this research, and to Pierre-Louis Vezina and Dakshina De Silva for their useful input as examiners of my thesis.

Contents

Declaration of Authorship	iii
Abstract	vii
Acknowledgements	x
1 US corporate average fuel economy standards and innovation in the automotive industry: the role of high-skilled labour	1
1.1 Introduction	1
1.2 Institutional framework and descriptive analysis	4
1.2.1 CAFE standards	4
1.2.2 Response of the automotive industry	5
1.3 Identification strategy and data	8
1.3.1 Method: synthetic control	8
1.3.2 Data	10
1.4 Results	13
1.4.1 Results for mechanical engineers in the Motor Vehicle Parts Manufacturing Industry (3363)	13
1.4.2 Results for mechanical and electrical engineers in the Electronic Equipment Industry (3353)	17
1.5 Discussion	22
1.6 Conclusions	23
2 Refugee centres and local economies: evidence from Italian municipalities	24
2.1 Introduction	24
2.2 Institutional background and Italy’s legislation on refugees	26
2.2.1 The Protection System for Asylum Seekers and Refugees (SPRAR) and the MLG approach	26
2.2.2 Centres of Extraordinary Emergency (CAS) and the centralist approach	28
2.3 Data and descriptive analysis	29
2.3.1 Data on centres	29
2.3.2 Data on public finances and covariates	31
2.4 Identification strategy and methodology	32
2.4.1 Population dynamics and propensity score matching	33
2.5 Results	36
2.5.1 Population	36
2.5.2 Current spending	38
2.5.3 Total spending net of government funding for SAI municipalities	38
2.5.4 Decomposing public spending: social, public safety, culture, tourism	40
2.6 Discussion	43
2.7 Conclusions	46

3	The political impact of refugee centres: evidence from Italian municipalities	47
3.1	Introduction	47
3.2	Institutional framework and data	49
3.2.1	Local elections	49
3.2.2	National elections	50
3.3	Data and descriptive analysis	52
3.4	Identification strategy and methodology	54
3.5	Results	58
3.5.1	Results for mayor's reelection	58
3.5.2	Results for CAS and SAI political allocation	62
3.6	Discussion	65
3.7	Conclusions	69
A	Appendix Chapter 2	69
A.1	Images event study for population	69
A.2	Images event study for total spending	71
A.3	Images event study for total spending (net of government funding)	72
A.4	Images event study for current spending on police	73
A.5	Images event study for current spending on education	74
A.6	Images event study for current spending on culture	75
A.7	Images event study for current spending on tourism	76
A.8	Images event study for number of tourists and tourist reception facilities	77
A.9	Images event study for current spending on social	78
A.10	Tables for total current spending	79
A.11	Tables for total current spending on tourism	80
A.12	Tables for total current spending on social	81
B	Appendix Chapter 3	86
B.13	Tables on mayor's reelection	86
B.14	Tables on refugee centres allocation	87
	Bibliography	94

Chapter 1

1 US corporate average fuel economy standards and innovation in the automotive industry: the role of high-skilled labour

This paper studies the effects of an increase in US Corporate Average Fuel Economy (CAFE) standards on green innovation in the automotive industry specifically through the demand for high-skilled labor. Through the use of the synthetic control (SC) method, I find evidence of an increase in the number of mechanical engineers in the industry supplying gasoline and internal combustion engines (ICEs) to the automobile industry after the introduction of the Federal regulation. I do not find any evidence for similar effects in the industry supplying electric motors for electric vehicles (EVs). These results suggest that the automobile industry reacted to the regulation by increasing the efficiency of standard fuel-based technologies rather than investing in the electrification of passenger cars, limiting its potential environmental benefits.

Keywords: CAFE standards, fuel efficiency, alternative fuel vehicles, high-skilled labour, synthetic control method

JEL: Q42, Q55, Q58, L92, L51, J24

1.1 Introduction

Air pollution in the US remains a major public health and environmental issue and recent evidence shows possible social benefits from the electrification of light-duty vehicles (Choma et al., 2020; Tong and Azevedo, 2020). The US Federal government but also individual states have implemented different policies to address the issue of cars-produced pollution. While market-based instruments are usually considered the most cost-efficient tool for policymakers, command-and-control policies (e.g. standards and regulations) have been frequently implemented in the US automotive industry to push producers toward the adoption of new, greener technologies. While there is evidence of improvements in car efficiency, it less clear what was the immediate reaction of the automotive industry. In order to meet the new standards and reduce pollution generated by vehicles, automakers could either decide to improve the fuel efficiency of more mainstream Internal Combustion Engines Vehicles (ICEVs) or to switch to (or increase) the production of Electric Vehicles (EVs). Although R&D expenditures could be a proxy for innovation, it is also true that this sector involves several activities, not all related to the improvement of fuel ef-

efficiency. Studying instead specific job roles related to R&D could help understand better what could be the effects on innovation.

I contribute to this issue by analysing the effects of a substantial change in the US Corporate Average Fuel Economy (CAFE) standards on the R&D sector for the automotive industry using as a variable the number of high-skilled labour hired by motor vehicle parts suppliers. CAFE standards are performance standards that light-duty vehicles (LDV) have to meet to be sold in the US car market. The most relevant change in these standards came after years of stagnation with the Obama Administration in 2010 with its so-called National Program. The objectives were to improve vehicle efficiency, promote innovation, and reduce car GHG emissions (Lipman, 2017). The National Program raised the level of miles per gallon (mpg) that car producers have to meet for their fleet of vehicles on average, together with a limit on CO₂ emissions that each fleet of vehicles is allowed to produce. Using a Synthetic Control (SC), I find evidence of an increase in the number of mechanical engineers in the automotive industry suppliers for ICEs after the formal approval of the National Program in 2010, compared to other non-affected industries. Through the same approach, I do not find any variation in the number of mechanical and electrical engineers for the industry supplying electric motors for EVs.

For the analysis, I use data from the US Bureau of Labor Statistics (BLS) for the period 2002-2018. To implement the SC method, I use a sample of 17 control US industries to construct a synthetic non-treated unit for comparison as a counterfactual. For what concerns the ICEV suppliers, the treated unit is the Motor Vehicle Parts Manufacturing industry, defined at the 4-digit level of the North America Industry Classification System (NAICS 3363). This industry mainly manufactures motors and equipment related to ICE. Although relatively small, the sample size is still in line with previous studies relying on the SC method (Ferman et al., 2020). I run the same analysis for the Electrical Equipment Manufacturing industry (NAICS 3353) which manufactures electric motors for EVs. Here I analyse both mechanical engineers and electrical engineers as they both appear to be related to the design and development of electric motors. No significant change appears to take place. These results suggest investments from the automotive industry towards already existing technologies (ICE) rather than innovations in new ones (EV). Although this may improve consumers' fuel consumption and US oil independence, it may reduce the intended positive environmental effect of the regulation, failing to significantly reduce tailpipe emissions and local air pollution.

This work provides interesting insights regarding the effects of performance-based

standards on innovation in the automotive industry and its spillovers in the job market. A wide strand of literature studied the relationship between environmental regulations and innovation: most of the work in this area has focused on the Porter Hypothesis (PH) (Porter and Van Der Linde, 1995) for which flexible and well-crafted policies have a positive impact on firms' efficiency by pushing them to invest more in innovative technology and better management of the production process.¹ While there is evidence of the positive effects of environmental instruments on firms' green innovation, most of the attention has been addressed to market-based instruments (MBI), such as taxation and cap-and-trade systems, compared to performance and technology standards, or command-and-control (CAC) (Fabrizi et al., 2018). MBIs are generally considered to be more flexible than CAC policies and are usually preferred by policy-makers (Fabrizi et al., 2018). Nonetheless, Lanoie et al. (2011) distinguishes between technology-based and performance-based standards. Technology-based standards are considered to be more prescriptive, indicating already existing technologies and leaving less scope for innovation. Performance-based standards, like CAFE standards, are instead more flexible, setting specific requirements but leaving the single firm to find new systems of production, incentivising investments in innovation.

For what concerns transportation, performance-based standards are often used by developed countries to reduce transport environmental externalities, but their results on local pollution and fuel consumption are often mixed (Timilsina and Dulal, 2009). Wang and Miao (2021) and Bento et al. (2015) find that CAFE standards increase the rate of technological improvement in new passenger cars. Nonetheless, they do not analyse what type of technology improvement takes place. Aghion et al. (2016) show how in the automotive industry, fuel price variations enhance new technologies. They also show how firms that have previously invested in dirty or grey patents are more likely to continue innovating in the same type of technology, rather than investing in new clean ones. Although they analyse a market-based effect, this could be enhanced by a performance-based standard too. Given the relevance of ICEVs in the US automotive industry, compared to EVs, this path dependency may limit the environmental benefits of new regulations, by pushing car manufacturers to innovate in dirty or grey technologies.

Other studies on environmental regulations and innovation have used patents (Sen, 2015; Fabrizi et al., 2018; Pan et al., 2019) or a technology change (Zhang et al.,

¹Many authors distinguish between a 'strong' and a 'weak' version of the PH. The former maintains that proper regulations can not only incentivise innovation but that they can increase overall profits for the firm itself. The latter instead states that while regulations improve innovation they do not improve firms' overall profitability (Jaffe and Palmer (1997)). The focus of this research hinges more on the weak PH as the main interest is to understand whether a new incentive innovation can improve R&D employment, without assessing firms' overall profits.

2018). Studies focusing on the input of innovation, i.e. R&D expenditure, are more limited and they do not distinguish between green and brown investments (Jaffe and Palmer, 1997; Hamamoto, 2006; Chakraborty and Chatterjee, 2017). I add to this analysis by investigating another possible channel through which innovation may occur, i.e. investment in R&D personnel through an increase in the number of engineers, whose goal is to improve car performance. By analysing the same specific occupation (mechanical engineers) in two different industries, I corroborate the idea that innovation may be more directed towards fuel efficiency improvements in dirty or grey technologies, i.e. ICE systems, rather than the electrification of the automotive industry.

The channel through which environmental interventions have a positive impact on high-skilled employment hinges on the hypothesis that they promote innovation which requires a higher intensity of human capital. Previous empirical studies have shown how human capital provides a strong contribution to innovation and R&D (Afcha and García-Quevedo, 2016). Additionally, there is evidence of heterogeneous effects of environmental instruments on employment (Morgenstern et al., 2002; Autor et al., 2006; Bowen et al., 2018). Marin and Vona (2019) provide evidence of a positive bias towards high-skilled workers, compared to low-skilled, due to a change in energy prices. My paper also contributes to this literature by looking at the impact of a CAC policy on highly specialised occupations.

1.2 Institutional framework and descriptive analysis

1.2.1 CAFE standards

Federal standards regarding fuel economy for passenger cars and light trucks in the US are regulated by the CAFE standards, introduced with the Energy Policy and Conservation Act of 1975 (Lipman, 2017). These standards, promulgated by the National Highway Traffic Safety (NHTSA), as part of the US Department of Transportation, require minima levels of fuel economy (miles per gallon or mpg) for passenger cars sold in the US in each model year (MY). They were first enacted to meet the need for energy independence after the oil crisis of 1973 and promote fuel conservation (Wang and Miao, 2021). CAFE standards are performance-based standards, as they require light-duty vehicles (LDVs) to meet stringent fuel efficiency standards but they are not prescriptive in the technology automakers are required to achieve this (EPA and NHTSA, 2012), providing stringency yet allowing for flexibility, which is the baseline for the PH (Porter and Van Der Linde, 1995). The US Environmental Protection Agency (EPA) is the regulatory body to set and adjust

emission standards for passenger cars, as stated in the Clean Air Act of 1968. Significant amendments were made in 1977 and 1990 (Lattanzio, 2021). While EPA and NHTSA worked on parallel trends for many years, tightening both fuel economy levels and car emissions, the first coordinated action came under the Obama Administration in 2010, when they released a joint regulatory proposal to address both fuel consumption and greenhouse gas emissions. This coordinated effort was referred to as the National Program (EPA and NHTSA, 2010). In 2012, they released a second proposal, referred as Phase 2, for which GHG emissions from new passenger cars are expected to be reduced by 50%, achieving roughly 160 grams per mile, by 2025, compared to 2010 levels (Lattanzio, 2021). Both agencies undertook this second joint rule-making in collaboration with the State of California and the approval of various environmental groups, the United Auto Workers union, and thirteen auto manufacturers representing 90% of US vehicles sales (EPA and NHTSA, 2012).² According to the Final Rule, these standards should significantly reduce passenger cars' GHG emissions and increase savings in fuel consumption.

1.2.2 Response of the automotive industry

The choice of the automotive industry is suitable for this research for different reasons. First of all, in the United States, transportation accounts for 44% of carbon oxide (CO) and 54.5% of nitrogen oxide (NO_x) total emissions. Highway vehicles alone represent 26% of CO and 31% of NO_x (Davis and Boundy, 2021), substantially affecting local air quality. Empirical evidence has shown how polluting vehicles can have a direct negative effect on local health (Knittel et al., 2016; Alexander and Schwandt, 2022). Thus, alternative fuel vehicles (AFV) have gained the attention of passenger car manufacturers and policy makers, especially in the United States, investing in new technologies development to improve their supply of AFV models (Ghadikolaie et al., 2021). Examples of AFV may involve vehicles using a mix of gasoline and other renewable fuels, e.g. 85% ethanol and 15% gasoline; hybrid electric vehicles (HEV), using both gasoline and electricity; full-electric vehicles (EVs), either battery EV (BEV) or plug-in (PHEV) (Ghadikolaie et al., 2021). Figure 1 shows the number of AFV models in the US from 1999 to 2020: while numbers remained low for a long period, after 2010 many new AFV models were developed by car makers. In Figure 2, it is clear how this increase is mostly led by models using a mix of ethanol and gasoline (up to 85%), followed by HEVs and diesel. Figure 3 shows the sales of HEV in the US. While numbers dropped from 2008 to 2011, probably due to the recession, in 2012 they jumped above pre-crisis levels. This is may due to the fact that Phase 1 of the National Program required car makers to

²Data and a general review of the policy are present in the report by Lattanzio (2021)

meet the new standards from 2012 onwards. The US Department of Energy, in its Alternative Fuels Data Center, provides also the number of sales for HEV in the US (Figure 3). In 2012, when the standards came into force, the number of HEV sales actually increased when compared to period before the regulation, over pre-crisis levels.³

Figure 1: Alternative fuel models

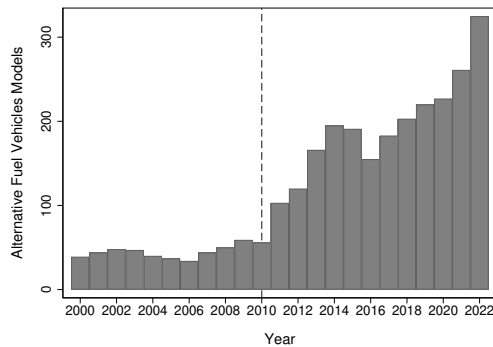


Figure 2: Alternative fuel models by technology

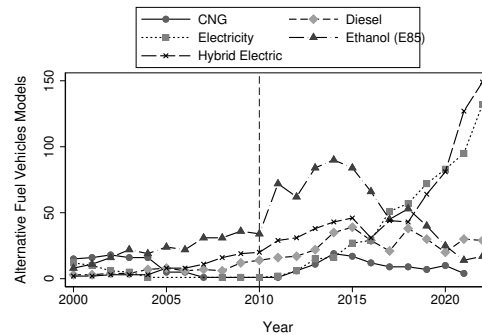


Figure 3: HEV sales in the US (thousands)

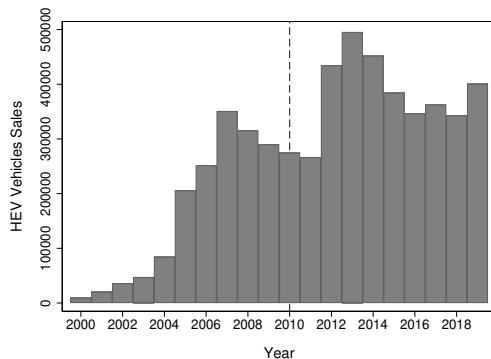
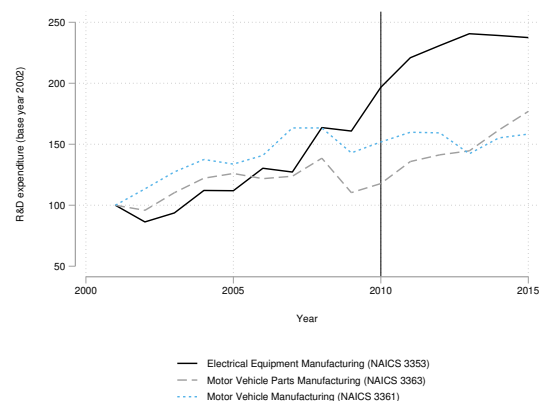


Figure 4: R&D expenditure for NAICS 3363, NAICS 3353, and NAICS 3361



Data source: CompustatID

The development of new models or the improvement of already existing technologies means additional investments in R&D for many companies. Nonetheless, it is important to underline that even though the industry of Motor Vehicle Manufacturing (NAICS 3361) has traditionally a closed form of innovation (Ili et al., 2010), namely car manufacturers developing their own R&D, the supply chain for vehicle manufacturing involves also different suppliers. The industry of Motor Vehicle Parts Manufacturing (NAICS 3363) develops and produces ICEs and related components, while a part of the Electrical Equipment Manufacturing industry (NAICS 3353)

³Unfortunately, the data center does not provide sales before 2010 for other types of vehicles, so a similar comparison is not possible for other AFVs

develops and produces electric motors for EV. Regulation-induced innovation may thus take place in all these three industries. To explore the input of innovation, following previous literature ([Jaffe and Palmer, 1997](#); [Hamamoto, 2006](#); [Chakraborty and Chatterjee, 2017](#)), I first look at R&D expenditure. Figure 4 shows the levels of R&D expenditure (with base year equal to 2002) for the three industries between 2001 and 2015. The expenditure does not seem to have any relevant variation in the period for any of the industries analysed. Since R&D involves a large number of activities, it is difficult to narrow down what kind of new development may take place only by looking at general R&D expenditure. I use the role of engineers within those industries to explore more in-depth the possible effects of the regulation on innovation for automobiles.

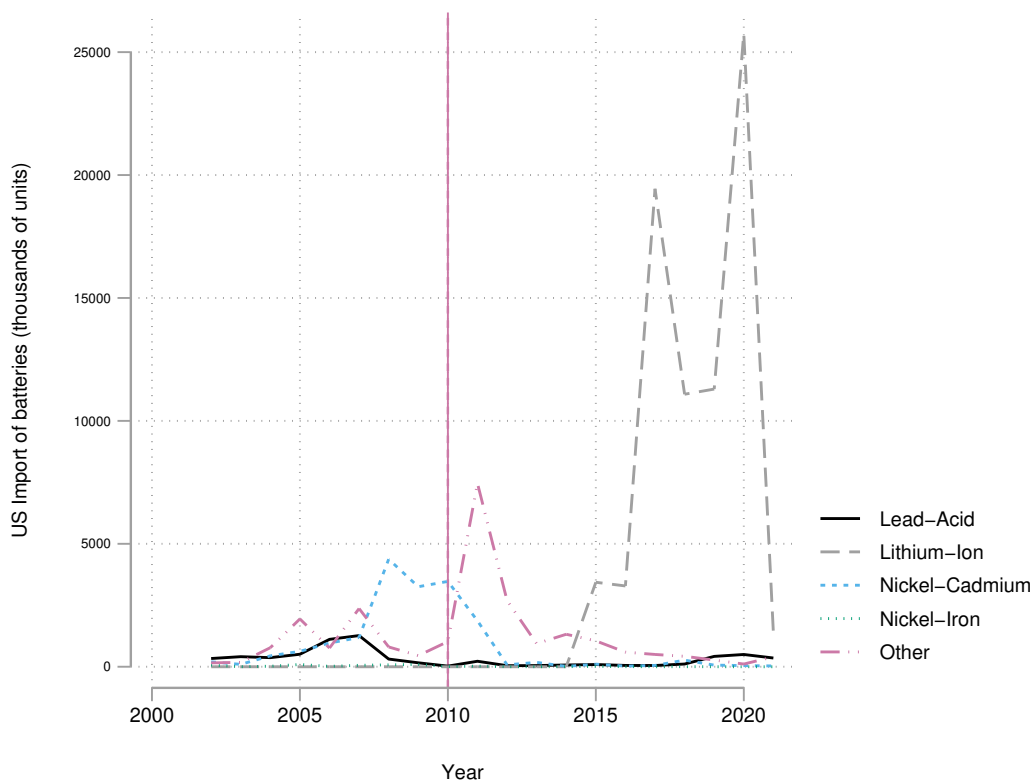
Moreover, for the production of EVs, battery cells and raw materials play a role too. Differently from the other parts of the vehicle though, most of them are not produced in the US but are imported and then assembled locally ([Coffin and Horowitz, 2018](#)). Nonetheless, if car manufacturers decided to increase the production of EVs, imports would indeed increase too. Figure 5 shows the imports of batteries for electric vehicles in the US. Data show how imports for most types of batteries remain stable after 2010, with large variations only for lithium-ion after 2015. CAFE standards do not seem to affect the batteries for EVs market, at least not in the short term. Indeed, EVs still face many obstacles compared to classic ICEVs, such as the presence of few charging stations and limited mile range. Thus, they still represent a small share of the overall car market ([Coffin and Horowitz, 2018](#)).

This preliminary evidence suggests that the US automobile industry has made investments to meet the new CAFE standards through the improvement of efficiency of already existing technologies (ICEs) rather than a shift to new electric models (EVs). This idea is corroborated by the number of AFV models that use a mix of gasoline and alternative fuels (Figure 2). To confirm this preliminary evidence, I analyse both the Motor Vehicle Parts Manufacturing industry (NAICS 3363), which addresses mostly ICEs production, and Electric Equipment Manufacturing industry (NAICS 3353), related to the production of electric motors.^{4 5}

⁴I do not explore the industry producing batteries for EVs (NAICS 3359) as all battery production for EVs was imported ([Coffin and Horowitz, 2018](#)) and I do not see any variation.

⁵My analysis is at the 4-digit level due to the lack of data. However, the choice of using specific job occupations related to car performance helps to narrow down the possible effects on ICE and EV component production. This division allows us to better understand whether car manufacturers have moved investments toward car electrification or have decided to improve already existing technologies for ICEs instead.

Figure 5: US imports of storage batteries for EVs, by battery type



Data source: United States International Trade Commission. Values are units of batteries imported

1.3 Identification strategy and data

1.3.1 Method: synthetic control

My objective is to study the response of the Motor Vehicle Parts Manufacturing industry (NAICS 3363) and the Electric Equipment Manufacturing industry (NAICS 3353) to the introduction of the new CAFE standards. As my analysis is at the industry-level, aggregated data do not provide enough control units (other industries not affected by the new emissions standards) to implement a standard difference-in-difference approach. Also, a proper counterfactual unit is hard to find amongst the other available US industries and could be more subject to their idiosyncratic characteristics. The SC manages to overcome this issue, creating a synthetic unit as control through a weighted average of other non-treated units. Nonetheless, it has other drawbacks that I address in this section and through robustness checks in the results. While other methodologies, e.g. the more standard difference-in-difference (DID), have been widely used in previous works on the subject (Zhang et al., 2018; Chakraborty and Chatterjee, 2017), the SC has been rarely used in the studies

regarding environmental regulations and pollution (Bueno and Valente, 2019). Furthermore, SC has usually been focused on geographical units (states, regions, etc.) while here I apply this method to the US manufacturing industries.

The first positive aspect of this methodology is that, differently from the DID, it allows the fixed effects to vary over time, thus providing more robustness to the model's main assumptions. The main assumption for the DID approach regards the existence of parallel trends (Cunningham, 2021). The problem with the DID approach is that even though we can test parallel trends *before* the treatment we cannot test for it *afterwards*. A variation of the unobserved factors may bias the validity of the DID model. We cannot practically test whether other industries have faced relevant changes, not accounted by observable factors, after 2010, making their number of engineers diverge from the motor vehicle industry anyway. The SC method instead accounts for this possibility as well. Furthermore, as underlined by Cunningham (2021), both DID and SC use weights to provide a counterfactual. While the former implicitly assigns equal weights to the units, the latter instead put them explicitly through a data-driven process, making the SC a more transparent approach.

The recent paper by Ferman, Pinto, and Possebom (2020) studies in-depth advantages and disadvantages of the SC and describes previous works using this method, underlining the differences in the number of covariates, size of donors pool, and pre-intervention length. Being a relatively recent method, there is often a lack of consensus about the choice of the variables necessary to build the synthetic unit and on the use of pre-intervention values of the outcome variable. As Cunningham (2021) points out in his book, a bias is still possible as the covariates can be endogenously chosen by the researcher (i.e. specification-searching). It is indeed true that weights are automatically (and optimally) assigned to minimise the related distant function, so the researcher has no control over it; nonetheless, different sets of covariates would provide different weights, thus allowing the hacking of the model to provide results to better suit one's priors. Ferman, Pinto, and Possebom (2020) try to address this problem: they focus on one usual SC specification that involves the use of pre-treatment outcome lags as matching variables to compute the weights. By running Monte Carlo and real data sets simulations, they provide evidence for the SC to be robust to specification searching when the number of pre-treatment periods goes to infinity together with the use of pre-treatment outcome lags values. Nonetheless, as they also point out, most SC applications have a limited number of pre-intervention periods, leaving room for specification searching opportunities, i.e. the choice of the covariates may provide different results and lead to a bias

in their choice. Thus, their recommendation for the use of the SC is “*focusing on the specification that uses all the pre-treatment outcome lags as matching variables unless there’s a strong prior belief that it is crucial to balance on a specific set of covariates*” (Ferman, Pinto, and Possebom, 2020, p.514). Here I choose to use all pre-treatment outcome lags as predictors together with other covariates. Results do not seem to change with the number or kind of other predictors, as the main weights are given to the pre-treatment outcome lags, limiting the risk of “cherry-picking” that would bias the results.

1.3.2 Data

While previous literature supports the idea that CAFE standards have had an impact on technology improvement (Wang et al., 2021), this change does not allow us to understand how car production has changed to meet the new requirements. R&D expenditure alone does not specify how resources and investments are redistributed, or how jobs and activities are affected by the regulation. Indeed, the definition of research and development comprises a wide range of activities, not always related to the environment or improvement in fuel efficiency.⁶ Researchers, R&D managers, technicians, and clerical staff are considered part of R&D personnel, but they can cover different tasks and such aggregated variables may hide heterogeneous effects not related to the National Program intervention.⁷ To address this issue, I narrow down the analysis using the Standard Occupational Classification (SOC) from the Bureau of Labor to isolate the categories of workers that are most likely to be affected by the regulation. While it is true that spillover effects may occur at any level of R&D (e.g. more managers to improve the organisational structure of R&D groups) here I focus the study on engineering roles related to the improvement of vehicle efficiency and CO_2 reduction. More precisely, I use the SOC codes at the 6-digit level to identify the occupational category of mechanical engineers (SOC 17-2141) whose role is defined in the BLS as “*perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment*”.⁸ More interesting, the BLS specifies that for what concerns auto research engineers (a specific type of mechanical engineer), their role is to “*improve the performance of cars. These engineers work to improve traditional features of cars such*

⁶From the BERD Technical Notes: “*R&D is planned, creative work aimed at discovering new knowledge or devising new applications of available knowledge. This includes (1) activities aimed at acquiring new knowledge or understanding without specific immediate commercial applications or uses (basic research), (2) activities aimed at solving a specific problem or meeting a specific commercial objective (applied research), and (3) systematic use of research and practical experience and resulting in additional knowledge, which is directed to producing new or improved goods, services, or processes (development)*”(https://nces.nsf.gov/pubs/nsf22329#technical-notes_definitions).

⁷From the BERD Technical Notes:\csq@oqmarkhttps://nces.nsf.gov/pubs/nsf22329#technical-notes_definitions\csq@oqmark

⁸From the BLS website: https://www.bls.gov/oes/current/oes172141.htm.

as suspension, and they also work on aerodynamics and new possible fuels".⁹ In this framework, analysing the number of mechanical engineers within the Motor Vehicle Parts Manufacturing industry allows me to isolate the effect of the regulation on one occupational category which is supposed to be highly involved in the design and development of new technologies regarding fuel efficiency and emissions.

The regulation should indeed affect mostly car manufacturers defined within the Motor Vehicle Manufacturing (3361) industry. Unfortunately, data for mechanical engineers is not present for this industry for the interested period. Nonetheless, the Final Ruling document itself underlines how other supplying industries will be highly affected as well, in particular Motor Vehicle Body and Trailer Manufacturing (3362) and Motor Vehicle Parts Manufacturing (3363). The latter manufactures a variety of internal parts for motor vehicles, especially the ones related to ICEs, together with brake systems, transmission, power trains, etc. Both EPA and NHTSA stress the key role that improvements in gasoline engines and transmission will play in this transition to more sustainable transportation. Even though the BLS database only provides a differentiation amongst the industries at the 4-digit level (thus not being able to distinguish between the production of engines or brake systems), the whole industry is likely to be affected by new investments in the improvement of fuel efficiency. Moreover, the role of mechanical engineers is likely to have a higher relevance for the development and design of ICEs rather than other parts of the vehicle such as seating and interiors.

Data from the BLS for mechanical engineers allows me to have a sample of 18 industries in a period of 17 years, from 2002 to 2018. The number of control units follows the standard approach to the SC (Abadie et al., 2010) and Ferman et al. (2020). Using the cross-reference documentation from the NAICS Association website (US Census Bureau, 2022), I exclude other industries that may be affected by the regulation or that are interconnected to the 3363 industry. Following conclusions from Ferman et al. (2020), I choose to use all pre-treatment outcome variables as predictors to build the synthetic unit, i.e. the number of mechanical engineers from 2003 to 2009.¹⁰ As for the covariates, I use the sectoral amount of dollars spent on labor compensation in the industry, the total employment, the total sectoral output, and the number of firms, available on the BLS database.¹¹ Those variables do not seem to affect the analysis, which is robust even when excluding them.

⁹From the BLS website page on mechanical engineers:<https://www.bls.gov/ooh/architecture-and-engineering/mechanical-engineers.htm#tab-2>.

¹⁰I do not use the year 2002 in the pre-treatment as it is the base year, i.e. every observation takes a value equal to 100.

¹¹Sectoral output and labor compensation are expressed in millions of US current dollars and represent the value and the expenditure for the whole industry. The employment represents the overall employment in the industry.

As stated on the NAICS Association website, the Motor Vehicle Parts Manufacturing industry (3363) is mainly involved in the production of gasoline and internal combustion engines.¹² There is no mention of electric vehicles or electric motors. Their production is instead related to the Electrical Equipment Manufacturing industry (NAICS 3353). Differently from the previous industry though, the NAICS 3353 serves multiple different economic activities, not only electric motors for car manufacturers.¹³ Changes in high-skilled employment could be unrelated to motor vehicles. I therefore again use specific jobs that are related to the production of EVs within the Electrical Equipment Manufacturing industry to identify whether the change in CAFE standards might have been translated into investments towards vehicles electrification.

The BLS provides a list of occupations that are significantly involved in EV manufacturing and design (Hamilton, 2011). Table 1 displays the occupations together with the description of their tasks related to EVs and their numbers within the industry. While the BLS list includes occupations for different stages of the production process, here I only display jobs that are related to the design and development of EVs and more specifically, with electric motors and electrical systems. The BLS description helps to better understand what is the role that each of these occupations has in the EVs production process and within the Electronic Equipment Manufacturing industry (NAICS 3353). Given the descriptions from the BLS, the occupations that are more related to the development and design of electric motors for EVs can be narrowed down to Electrical Engineers (SOC code 17-2071) and Mechanical Engineers (SOC code 17-2141). This is corroborated by their high concentration within the NAICS 3353 industry, of 3% and 1.9%, respectively. For example, a chemical engineer's tasks may be related to the production of batteries for electric motors but the NAICS 3353 industry employs few, as it is clear by the low numbers of those type of engineers in the industry. Industrial engineers have a high concentration in the industry too (1.8%) but they are more involved in the management of people and technology, rather than in the development of one single product. The underlining idea is that electrical and mechanical engineers in the NAICS 3353 are the engineering occupations most likely to be affected by a sudden increase of demand of electric motors for EVs since their roles are central in the development of the product.

¹²NAICS website: <https://www.naics.com/naics-code-description/?code=3363>

¹³NAICS website: <https://www.naics.com/naics-code-description/?code=3353>

Table 1: Jobs involved in EVs design and development in the Electrical Equipment Manufacturing industry (NAICS 3353), average 2002-2018

SOC Code	Occupation Title	Job duties for EVs	Total	Percentage
17-2041	Chemical Engineers	New batteries design and improvement of current batteries technologies	70	0
17-2071	Electrical Engineers	Design and development of electrical components (from battery to engine)	4381	3
17-2072	Electronics Engineers	Design and development of electrical components (control systems and additional components)	1319	0.9
17-2112	Industrial Engineers	Management of people, use of technology, and improvement of production methods	2569	1.8
17-2131	Materials Engineers	Development, processing, and testing of materials used in EVs	94	0.1
17-2141	Mechanical Engineers	Design and development of engines, electric motors, transmissions, etc. in EVs	2814	1.9
17-3013	Mechanical Drafters	Production of visual guidelines that illustrate the construction methods for mechanical components	721	0.5
17-3027	Mechanical Engineering Technicians	Assistance to engineers with solving technical problems in research and development	606	0.4
27-1021	Commercial and Industrial Designers	Design of the style, function, quality, and safety of vehicles	86	0.1

¹ Source: US Bureau of Labor Statistics. Total employment is expressed in number of jobs while the percentage represents the number of jobs over total employment.

1.4 Results

1.4.1 Results for mechanical engineers in the Motor Vehicle Parts Manufacturing Industry (3363)

In Figure 6, I plot the number of mechanical engineers in the motor vehicle parts industry and the average of the other controls. It is clear how the absolute numbers are far away from the two, differently from previous studies using SC (Abadie et al., 2010, 2015). As mentioned also by Arkhangelsky et al. (2021) in their work on synthetic difference-in-difference, one drawback of the SC is that it requires levels to overlap in the pre-treatment period. To overcome this issue, here I use the number of mechanical engineers with the base year 2002 equal to 100 (the starting period of the analysis). Figure 7 shows the result: now the two levels are more comparable and they allow us to focus on the actual variation in the numbers. Here it is possi-

ble to see how although the two lines have different levels even before the period, between 2002 and 2009 they have similar trends, with a strong divergence after 2010.

Figure 6: Mechanical engineers in the Motor Vehicle Parts Manufacturing industry compared to the average of the other 17 industries (thousands of employees)

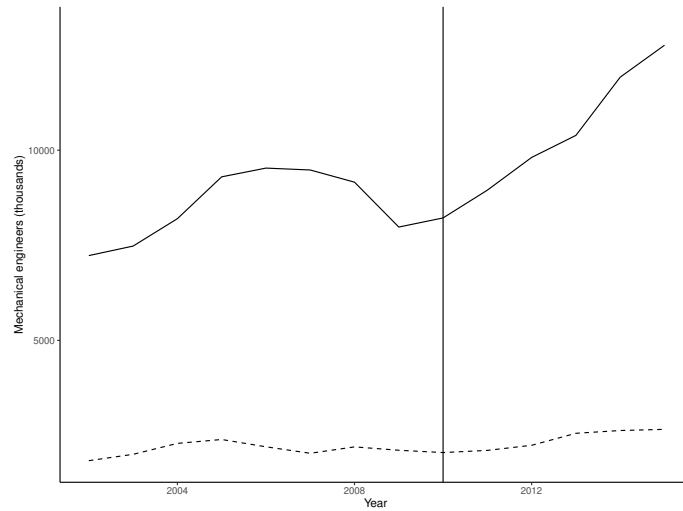


Figure 7: Mechanical engineers in the Motor Vehicle Parts Manufacturing industry compared to the average of the other 17 industries (base year 2002)

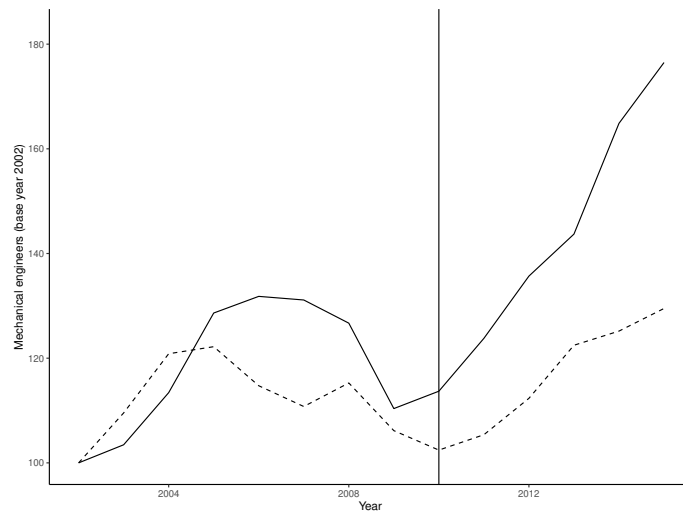
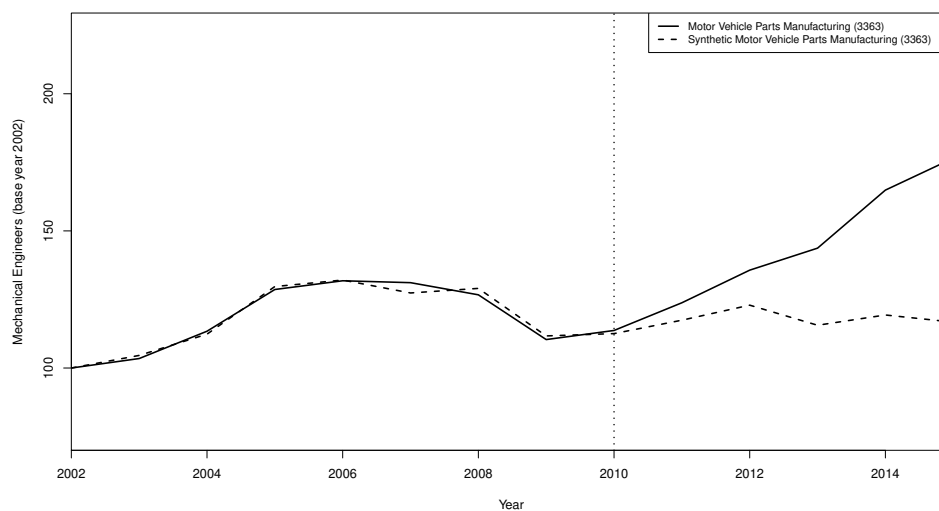


Figure 8 shows the results from the SC. The method manages to create a synthetic control that seems to fit the real industry before the intervention took place. The two numbers diverge only after 2010 when the CAFE standards were announced.

Figure 8: SC for mechanical engineers in the Motor Vehicle Parts Manufacturing industry (base year 2002 = 100)



Even considering the period involving the Great Crisis (2007-2008), which significantly affected US employment, the SC manages to provide a good fit for the pre-treatment period of mechanical engineers. This may be due that those negative effects do not differentiate amongst the analysed industries, so they all follow the same trends.

Table 2 provides the comparison between the synthetic unit and the average of the control industries: although the synthetic does not manage to match the real unit more accurately, it provides indeed a better fit for the chosen predictors in the pre-treatment period with respect to a simple average that we would experience with a simple difference-in-difference. Only exception regards the number of firms but the SC automatically assigns zero weight to this covariate as it does not provide a good fit. Full tables are in the appendix. This is especially valid for the pre-treatment outcome values, represented here by the number of mechanical engineers between 2003 and 2009. Including all the lagged values restricts indeed the possibility of discretionary choices for the covariates, as in this case relies mostly on a data-driven process. This is corroborated by the fact that results do not vary even when the covariates are removed or changed. Even when using different predictors, such as the number of establishments for each industry or the price index for the industry, while keeping the lagged values, results remain the same. In Table 3, I display the weights given to each control industry to build the synthetic unit. These weights are assigned according to the predictors chosen for the analysis, establishing how close is every single industry to the treated one. The fact that only a few industries have weights assigned to them while all the others have zero is perfectly in line with the basic idea of the SC for which different control units must have different weights. If

the predictors (in this case the pre-treatment outcome values and the four covariates) show a relevant distance between the specific control unit and the treated, the former is not included in the synthetic and receives weight equal to zero. This is also in line with previous works on SC (Abadie et al., 2010, 2015; Cunningham, 2021; Arkhangelsky et al., 2021).

Table 2: Mechanical engineers predictor means for the pre-treatment period (2002-2010)

	NAICS 3363		Average 17 control industries
	Treated	Synthetic	
Labor compensation (millions of current USD)	36,997	26,158	13,818
Employment (thousands of jobs)	594,724	557,047	229,112
Sectoral output (millions of current USD)	176,380	132,129	84,337
Number of firms	4,307	7,579	5,326
Number of mechanical engineers 2003	103	104	110
Number of mechanical engineers 2004	113	112	121
Number of mechanical engineers 2005	128	130	122
Number of mechanical engineers 2006	132	132	115
Number of mechanical engineers 2007	131	127	111
Number of mechanical engineers 2008	127	129	115
Number of mechanical engineers 2009	110	112	106

Table 3: Industries weights in the synthetic NAICS 3363

	Weights	Industries
1	0.02	Other Wood Product Manufacturing
2	0.00	Converted Paper Product Manufacturing
3	0.03	Petroleum and Coal Products Manufacturing
4	0.00	Pharmaceutical and Medicine Manufacturing
5	0.78	Plastics Product Manufacturing
6	0.00	Rubber Product Manufacturing
7	0.04	Iron and Steel Mills and Ferroalloy Manufacturing
8	0.13	Steel Product Manufacturing from Purchased Steel
9	0.00	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing
10	0.00	Commercial and Service Industry Machinery Manufacturing
11	0.00	Metalworking Machinery Manufacturing
12	0.00	Communications Equipment Manufacturing
13	0.00	Electric Lighting Equipment Manufacturing
14	0.00	Household Appliance Manufacturing
15	0.00	Aerospace Product and Parts Manufacturing
16	0.00	Medical Equipment and Supplies Manufacturing
17	0.00	Other Miscellaneous Manufacturing

I then run the same SC analysis for the other 17 control industries, to check whether the same gap between the synthetic and the real unit happens for other industries too (defined as placebo tests by Abadie et al. (2010)). Figure 9 shows how the 3363 industry is the one showing the higher divergence after the treatment period. Following previous literature (Abadie et al., 2010; Cunningham, 2021), I discard those industries that show a pre-treatment gap extremely large, more than 5 times the one for the Motor Vehicle Parts Manufacturing industry. The remaining ones are those for which the method exhibits a proper pre-treatment fit. Computing the post/pre-treatment MSPE ratio for all the industries involved in the analysis (Figure 10), the treated unit is the one with the highest value (meaning the divergence between synthetic and real is extremely larger after the treatment year than before). If one had to compute the probability of being the first in a sample of size 18, it would be $1/18 = 0.055$, close to the 5% significance level.

Figure 9: Mechanical engineers gaps in 3363 and placebo gaps in 10 control industries (discards industries with pre-treatment MSPE fifteen times higher than 3363's).

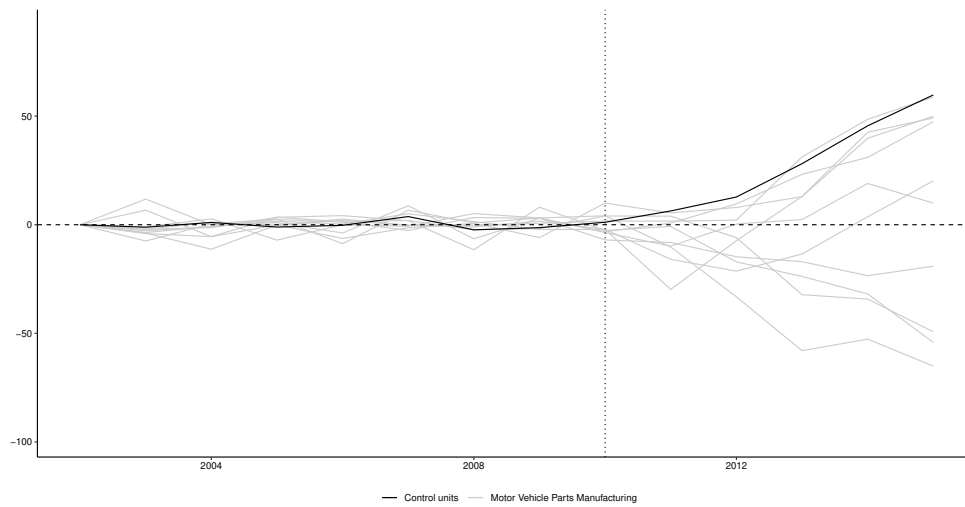
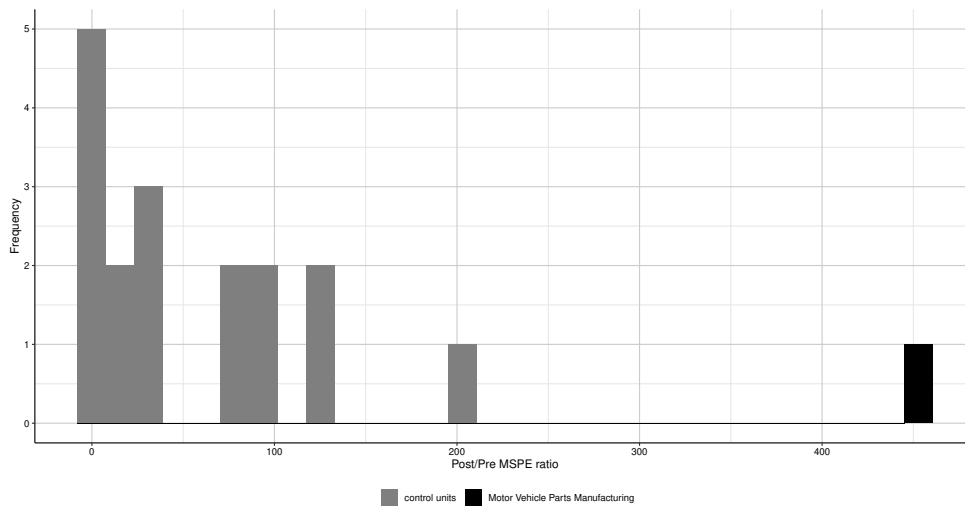


Figure 10: Ratio of post/pre-treatment MSPE: 3363 and 17 control industries.



1.4.2 Results for mechanical and electrical engineers in the Electronic Equipment Industry (3353)

The results from the previous section suggest a reallocation of resources in the motor vehicle industry toward the improvement of car performance. Although I am not analysing the direct impact on car manufacturers, this change is expressed in car suppliers. This improvement suggest investments towards already existing technologies, such as ICEs, rather than the electrification of vehicles.

Using the number of both mechanical and electrical engineers, I then proceed with the same method used in the previous section to understand whether there are similar effects in the industry supplying EVs, i.e. the Electrical Equipment Manufacturing Industry (3353). In this case, the data available for electrical engineers

reduces the sample number from 18 to 15, keeping the same time span from 2002 to 2018. I keep the same number of covariates and pre-treatment outcome lagged values, namely the number of electrical engineers from 2003 to 2009. Figure 11 shows the result. Different from the number of mechanical engineers in the NAICS 3363, the SC here does not show a strong divergence after the intervention year. There is a light discrepancy but the two lines (the real unit and the synthetic one), almost follow similar trends up until 2015. The number of electrical engineers increased after 2010 but it does not seem to be different in the Electric Equipment Manufacturing industry compared to the controls. Table 4 shows the pre-treatment values for the treated unit, the synthetic, and the simple average of the controls. Although not exactly the same as the treated one, the synthetic unit values for the covariates before 2010 are still better predictors than the average of the other 14 industries. The only exception, as before, regards the number of firms (which is then given weight equal to zero in the analysis). In Table 5 are displayed the weights assigned to the control industries.

Figure 11: SC for electrical engineers in the Electrical Equipment Manufacturing (3353) industry (base year 2002 = 100)

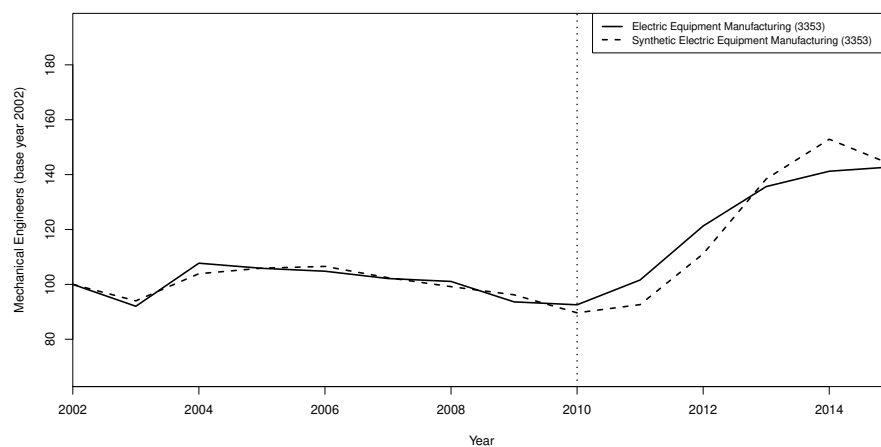


Table 4: Electrical engineers predictor means for the pre-treatment period (2002-2010)

	NAICS 3353		Average 14 control industries
	Treated	Synthetic	
Labor compensation (millions of current USD)	8,029	11,898	13,462
Employment (thousands of jobs)	137,892	187,515	228,320
Sectoral output (millions of current USD)	32,934	54,596	90,759
Number of firms	1,985	7,188	5,762
Number of electrical engineers 2003	92	95	97
Number of electrical engineers 2004	107	105	93
Number of electrical engineers 2005	105	106	83
Number of electrical engineers 2006	104	107	79
Number of electrical engineers 2007	102	102	80
Number of electrical engineers 2008	101	100	82
Number of electrical engineers 2009	93	95	78

As a placebo test, I run the same SC on the other control industries. Figure 12 shows the gap between the treated and the synthetic units for the control. The SC for the Electrical Equipment Manufacturing industry does not show any particular

difference after 2010 when compared to the other controls, as instead was the case of the Motor Vehicle Parts Manufacturing industry. When computing the post/pre-treatment MSPE ratio (the difference between the synthetic and real units after and before the intervention), the NAICS 3353 industry remains similar to the others.

Table 5: Industries weights in the synthetic NAICS 3353

	Weights	Industries
1	0.00	Converted Paper Product Manufacturing
2	0.00	Petroleum and Coal Products Manufacturing
3	0.12	Pharmaceutical and Medicine Manufacturing
4	0.00	Plastics Product Manufacturing
5	0.00	Rubber Product Manufacturing
6	0.23	Iron and Steel Mills and Ferroalloy Manufacturing
7	0.18	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing
8	0.00	Commercial and Service Industry Machinery Manufacturing
9	0.35	Metalworking Machinery Manufacturing
10	0.00	Computer and Peripheral Equipment Manufacturing
11	0.00	Communications Equipment Manufacturing
12	0.11	Electric Lighting Equipment Manufacturing
13	0.00	Medical Equipment and Supplies Manufacturing
14	0.00	Other Miscellaneous Manufacturing

Figure 12: Electrical engineers gaps in 3353 and placebo gaps in 5 control industries (discards industries with pre-treatment MSPE fifteen times higher than 3353's).

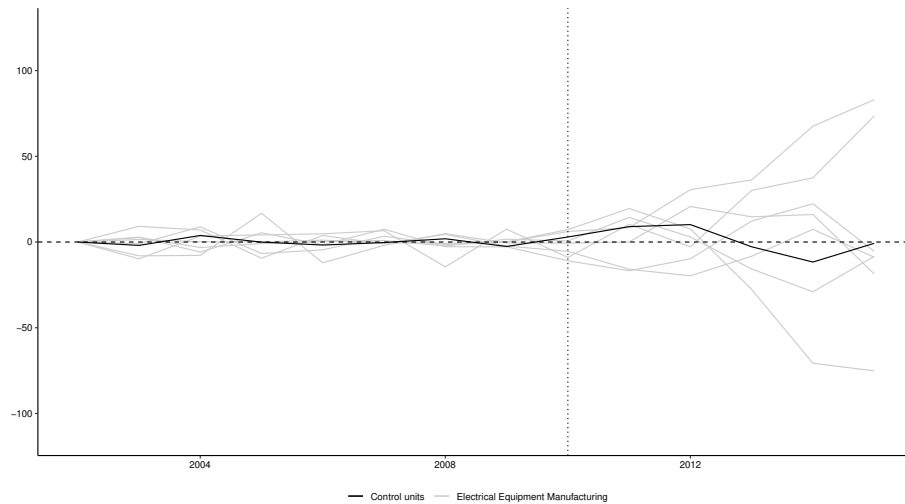
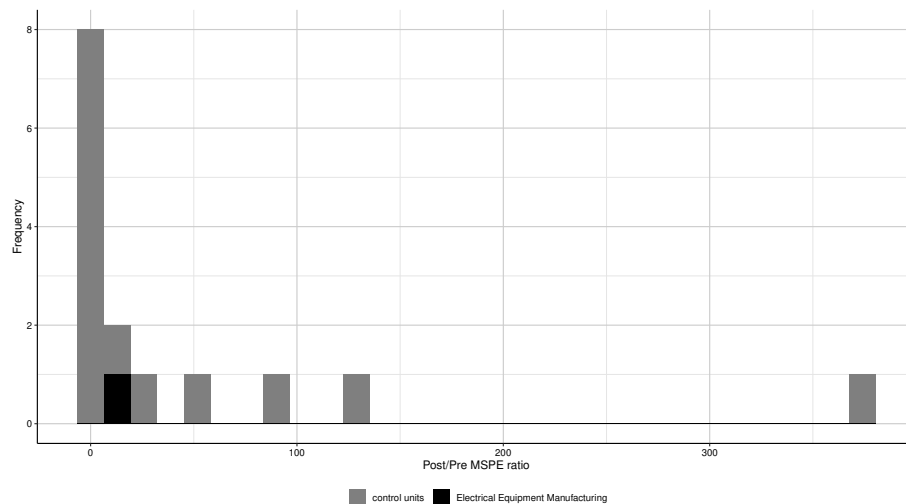


Figure 13: Ratio of post/pre-treatment MSPE: 3353 and 14 control industries



When running the same SC for mechanical engineers in the Electrical Equipment Manufacturing industry, results are still not significant. Data allows me to keep the sample size to 18 industries for the same period (2002-2018). Nonetheless, in the SC there is still no evidence of any particular divergence between the number of mechanical engineers of the synthetic unit and the real one (Figure 14). They both show a steady increase without major changes for the period. The predictive power of the covariates for the synthetic unit is weaker than in the previous applications; nonetheless, the method still provides a better fit than the simple average for most covariates, especially the pre-treatment outcome values from 2003 to 2009 (Table 6).

Figure 14: SC for mechanical engineers in the Electrical Equipment Manufacturing (3353) industry (base year 2002 = 100)

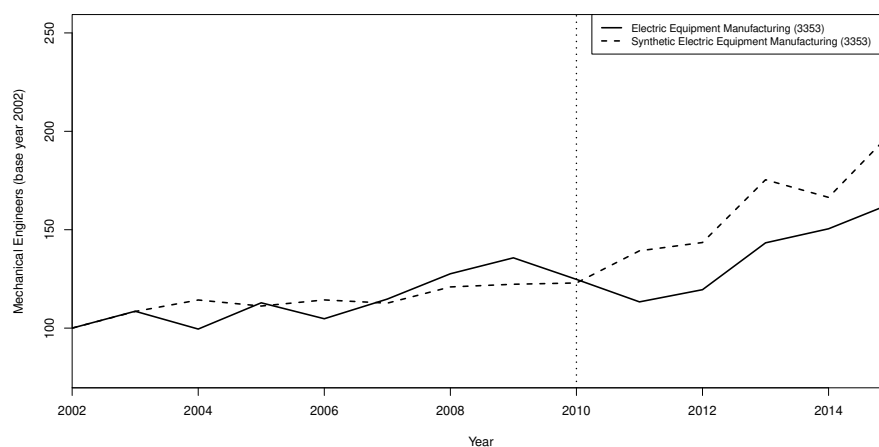


Table 6: Mechanical engineers predictor means for the pre-treatment period (2002-2010)

	NAICS 3353		Average 17 control industries
	Treated	Synthetic	
Labor compensation (millions of current USD)	8,029	12,790	13,818
Employment (thousands of jobs)	137,892	161,446	229,112
Sectoral output (millions of current USD)	32,934	85,815	84,337
Number of firms	1,985	945	5,326
Number of mechanical engineers 2003	108	108	109
Number of mechanical engineers 2004	99	114	120
Number of mechanical engineers 2005	112	111	122
Number of mechanical engineers 2006	104	114	114
Number of mechanical engineers 2007	114	112	110
Number of mechanical engineers 2008	127	120	115
Number of mechanical engineers 2009	135	122	106

Table 7: Industries weights in the synthetic NAICS 3353

	Weights	Industries
1	0.00	Other Wood Product Manufacturing
2	0.00	Converted Paper Product Manufacturing
3	0.00	Petroleum and Coal Products Manufacturing
4	0.50	Pharmaceutical and Medicine Manufacturing
5	0.00	Plastics Product Manufacturing
6	0.00	Rubber Product Manufacturing
7	0.00	Iron and Steel Mills and Ferroalloy Manufacturing
8	0.10	Steel Product Manufacturing from Purchased Steel
9	0.00	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing
10	0.00	Commercial and Service Industry Machinery Manufacturing
11	0.00	Metalworking Machinery Manufacturing
12	0.07	Communications Equipment Manufacturing
13	0.00	Electric Lighting Equipment Manufacturing
14	0.33	Household Appliance Manufacturing
15	0.00	Aerospace Product and Parts Manufacturing
16	0.00	Medical Equipment and Supplies Manufacturing
17	0.00	Other Miscellaneous Manufacturing

The different placebo tests corroborate the idea that no particular change in the number of mechanical engineers took place after 2010 in the treated industry when compared to the other controls (Figure 15). Computing the post/pre-treatment MSPE ratio for all the industries (Figure 16), the NAICS 3353 industry shows no significant variation in the outcome variable values between the pre and post-treatment periods (compared to the controls).

Figure 15: Mechanical engineers gaps in 3353 and placebo gaps in 17 control industries (discards industries with pre-treatment MSPE fifteen times higher than 3353's).

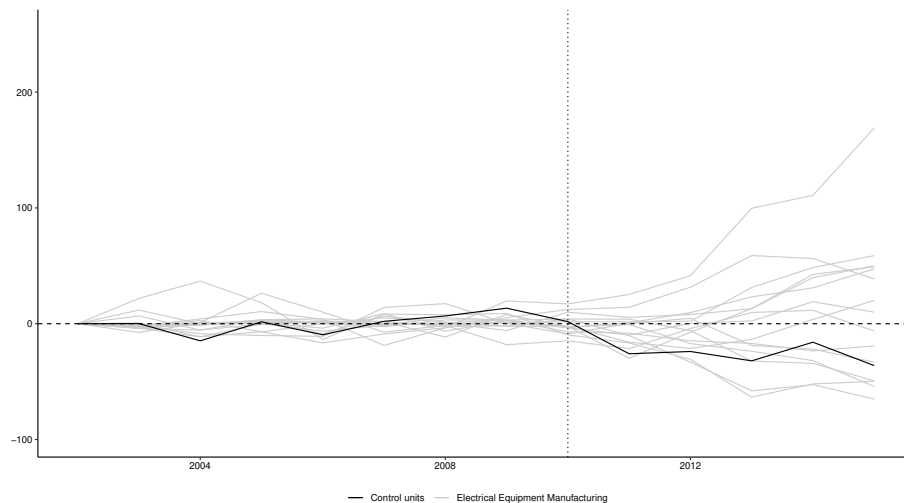
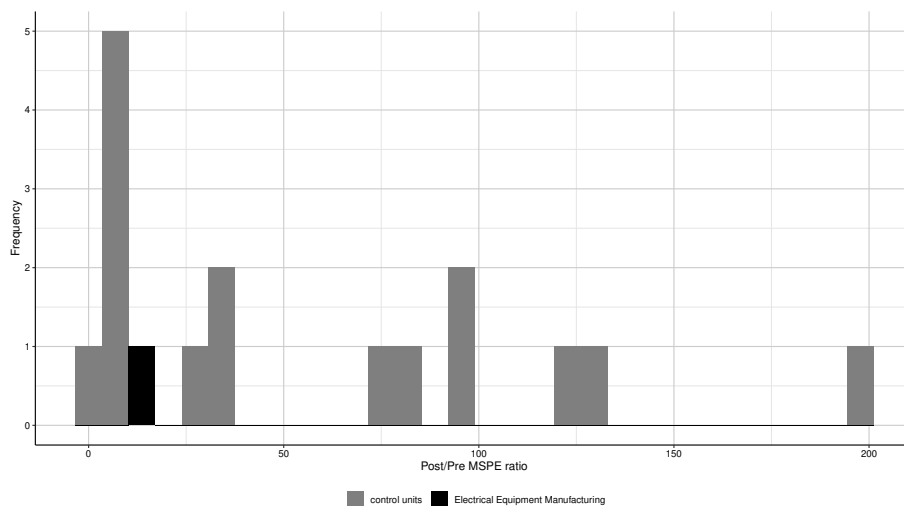


Figure 16: Ratio of post/pre-treatment MSPE: 3353 and 17 control industries



Here results suggest that no relevant change in the number of electrical or mechanical engineers took place in the Electric Equipment Manufacturing industry after 2010. The baseline assumption is that relevant investments by car manufacturers towards electrification would have probably increased the demand for electric motors in the industry. Consequently, firms would have most likely increased the number of jobs related to that task, here represented by electrical and mechanical engineers. There is no evidence that such change happened in the industry.

1.5 Discussion

While CAFE standards have been proven to help innovation, as supported by the works by [Wang and Miao \(2021\)](#) and [Bento et al. \(2015\)](#), they seem to come with limitations too. My analysis suggests how technology improvements in the US are in the form of conservative innovation, preferring the use of ICEs, compared to vehicle electrification. Although AFVs based on ICEs are indeed more environmentally sustainable, they do not count as clean innovation. In their work, [Aghion et al. \(2016\)](#) describe those patents as “grey innovation”, which is improving the fuel efficiency of the vehicle but that cannot be considered as a pure clean one. In their paper they show how those innovations follow a path dependency, i.e. firms which have previously produced innovation in clean (dirty) technologies when facing higher fuel prices, are going to continue innovating in the same type of technology ([Aghion et al., 2016](#)). Although they analyse a change in fuel prices rather than performance-based standards, these results may also hold for a “command-and-control” type of regulation. Given the small share of companies in the US developing electric vehicles in 2010, improvements in fuel efficiency are most likely going through innovation in ICEVs. While this may be beneficial for fuel consumption, it may limit the expected

reduction of local air pollution. Other studies have underlined the limited impact of fuel economy standards on local pollutants and air quality (Dowlatabadi et al., 1996; Austin and Dinan, 2005). Moreover, Portney et al. (2003) suggest how CAFE standards may produce a “rebound effect”, for which better fuel efficiency for ICEVs may take drivers to run more miles, with the risk of increasing the amount of overall tailpipe emissions. The results of this paper corroborate this conclusion and show how CAFE standards, by improving already existing technologies, may fall short of the mark when trying to reduce local emissions. Stronger incentives for the electrification of cars might be required for a substantial shift of the industry to pure clean technologies.

1.6 Conclusions

This paper is one of the first to explore the impact of environmental performance-based standards on innovation through the role of high-skilled labour. Empirical evidence from the analysis shows a relevant increase in the number of mechanical engineers in the industry supplying ICEs to car makers. There is no significant evidence of a similar increase in the number of similar occupations in the industry supplying electric motors. This suggests that, at least in the short term, car manufacturers responded to higher CAFE standards by investing more in already existing fuel-based technologies rather than moving towards electrification of cars. This may be due to the obstacles that technologies for EVs still face today compared to ICEs systems, including infrastructures, mile range, charging times, etc. The limited investments in electrification might reduce the expected environmental benefits of these standards. A more detailed analysis at the firm-level in the industry would help corroborate these results, differentiating among firms’ activities and investments in green innovation.

Chapter 2

2 Refugee centres and local economies: evidence from Italian municipalities

This paper studies the impact of different types of Italian Asylum Seeker Reception Centres (ASRC) on Italian municipalities' finances. We differentiate between centres that provide integration courses and job formation (SAI) and emergency centres whose main purpose is to give basic needs to the refugees (CAS). We find significant differences between the two types of centres on local public spending. SAI centres increase social spending related to the centre but do not significantly affect other items in municipalities' balance sheets. On the other hand, CAS centres increase spending on police and education, while reducing the expenses for tourism.

Keywords: Asylum seekers, reception centres, public finances, education, migration, local investments

JEL: K37, H52, H71, H72, 015

2.1 Introduction

The problem of refugees has been a central issue within the European Union for many years, especially for the Mediterranean countries, such as Italy, Greece, and Spain. The global political scenario in the past decades has been strongly influenced by the problem of migration, both in the US and Europe (Bracco et al., 2018). The issue of refugees in particular might have relevant economic, social, and political consequences, not only for the refugees but also for the hosting community. Forced migrants can increase local spending for welfare, health, and education (Chevalier et al., 2023; Ruist, 2015), with positive spillovers for economic growth (Mahia et al., 2020). Although nationally relevant, these effects of refugee inflows might have a stronger impact on the local communities and the spending behaviours of local governments. Local administrations have a central role in the provision of the public good, with benefits both in terms of efficiency and welfare gains. Local governments are believed to be more (or at least as equally) efficient than the central government in providing local public goods (Tiebout, 1956; Oates, 1999). Decentralisation becomes even more relevant when considering highly heterogeneous local districts (Besley and Coate, 2003). Recent empirical works for the Italian context show evidence of less inefficient behaviour spurring from fiscal decentralisation (Bucci et al., 2024; Turati et al., 2012) and positive spillover effects (Ferraresi et al., 2018).

In this context, I study how different models of governance of refugee reception centres affect local demographics and public spending, using Italy as a case study. The Italian peninsula is an interesting case study for its strategic position in the Mediterranean Sea. The country has been for several years at the centre of this debate, for being often “the first country of entry“, receiving most of the refugees from North Africa. In 2017, Italy was the second EU country, after Germany, for the number of asylum applications ([Campesi, 2018](#)). To address this growing phenomenon, different Italian governments have tried implementing reception systems. Previous literature studied the impact of Italian refugee centres and their relation with crime ([Luca and Proietti, 2022](#)) and political outcomes ([Bratti et al., 2020](#); [Campo et al., 2021](#); [Pulejo, 2021](#)). [Dotsey and Lumley-Sapanski \(2021\)](#) shows how, for Italian reception facilities, the different design of the centre has a relevant impact on refugees’ employment and housing outcomes. Most of the previous literature for Italy does not differentiate between the different designs and services provided by the centre or do not compare the different approaches that the administration might choose.

Here I focus on two different types of reception systems still present in the territory: Integrated Reception System (SAI) centres and Centres of Extraordinary Reception (CAS). The former type is based on municipalities’ active action and cooperation with NGOs and provides services for integration and education (e.g. language courses and legal counselling), often involving local associations and communities. This system might represent a simple form of multi-level governance ([Campomori and Ambrosini, 2020](#)), where the municipality’s administration runs the project through cooperation with NGOs and local associations. The latter is established and run by the central government, with the cooperation of private entities or NGOs, and does not usually provide the same services. This system represents instead a top-down approach, where the central government establishes and controls the centre, without a particular role of the municipality involved ([Marchetti, 2014](#)).

An interesting question is how different reception systems (SAI and CAS) distinctly affect host communities’ population. Like many developed countries, Italy has experienced a relevant urbanisation process, with a large divide between urban and rural areas, in terms of population and economic development ([Rizzo, 2016](#)). For Italy, the foreign population might play a relevant role in contrasting negative demographic trends ([Strozza et al., 2016](#)). Most of the municipalities hosting SAI centres have low levels of urban development, together with decreasing demographic and economic trends. Refugee centres represent a viable solution to address this negative pattern for those rural and isolated communities. [Gargiulo \(2017\)](#) shows how Italian munic-

ipalities can use local residency status strategically, both in terms of economics and cultural identity.

To analyse the impact of the refugee centres on local demographics and public spending, I make use a matched event study in the fashion of [Callaway and Sant'Anna \(2021\)](#). Not all refugee centres are opened in the same year and with the same treatment, creating a lot of heterogeneity in the treatment. The difference-in-difference with multiple time periods, conditioned on observed covariates, addresses this particular setting. I find evidence of SAI centres significantly increasing municipalities' population in the years after the opening. I do not find similar evidence for CAS centres. This is a purely mechanical effect mainly due to the different nature of these two systems. SAI centres are intended to provide integration of the refugees into the community, thus they need to register as residents in the hosting municipality. CAS centres are emergency-oriented, so the hosting time should be limited and provide the basic needs while waiting for the approval of the asylum request. These two effects on the local demographic might have non-negligible effects though. The higher the number of residents, the higher the economic activity of the community and the local public spending. In a second part of our analysis, I explore how the arrival of a new center affects local public spending differentiating between CAS and SAI. This effect is evident in the increase of total current public spending for cities with a SAI centre. The increase is mainly driven by spending on social and cultural activities. Even when controlling for funding from the central government, the increase remains statistically relevant. On the other hand, my results show a decrease in the size of public spending for municipalities with a CAS. There is evidence of a significant reduction in spending for goods and services related to tourism, culture, and education. These results might improve the understanding of the outcomes of the Italian reception system for refugees and provide useful insights for policymakers.

2.2 Institutional background and Italy's legislation on refugees

2.2.1 The Protection System for Asylum Seekers and Refugees (SPRAR) and the MLG approach

Italy's legislation regarding migration and asylum policies has been historically fragmented and based on an emergency approach, notwithstanding its structural feature ([Marchetti, 2014](#)). The number of asylum seekers in Italy had a stable pattern until the 1990s, when Western European countries experienced a surge of migrants from East-Europe due to fall of the Berlin Wall and the Balkan crisis ([ANCI, 2006](#)). Moreover, the entry into force of the Dublin Convention in 1997 established the 'first

entry principle', leaving the burden of asylum seekers identification and registration on first-entry countries such as Italy, Spain and Greece (Lott, 2023). This created the need for Italy to establish a more homogeneous reception system for asylum seekers and migrants.

In this early context, the Italian system started to develop different phases in the reception process. In 1995, the Puglia Law established *First Aid and Assistance centres* (CPSA), with a logic of first aid and assistance and that are located close to the arrival of the migrants (now often addressed as "hotspots") (Ricard-Guay, 2019). In the following years, they were later complemented by *Identification centres* (CIE) in 2002, developed into *Reception centres for Asylum Seekers* (CARA) in 2008 (Campesi, 2018). The CARA centres represent the first-phase of reception with a "containment" purpose. These facilities have the objective to identify illegal migrants and provide them with basic assistance (health and psychological), for a limited amount of time necessary to start the asylum procedure. These first-line centres are government-run and have been criticised for low quality standards and overcrowding (Ricard-Guay, 2019). The second type follows a "dispersal" approach, where NGOs and local municipalities cooperates to open small reception centres and projects across the whole country. They are the second-line reception facilities, where asylum seekers are provided with social, legal, and health assistance, with the purpose of their social and economic integration (Catarci, 2016). The first initial project in 1999, called "Azione Comune" (Common Action), lasted from 1999 to 2000. It was then developed into the "Programma Nazionale di Asilo" or PNA (National Asylum Programme) from 2001 to 2003, and then was eventually institutionalised in 2002 with law n°189/2002 (Bossi and Fini, 2002), creating the *Protection System for Asylum Seekers and Refugees* (SPRAR). Through the collaboration between the Ministry of the Interior and ANCI (the National Association of Italian Municipalities), this system aims at establishing a decentralised network between Italian municipalities providing services to asylum seekers and refugees for education and integration (ANCI, 2006). The SPRAR approach, notwithstanding its limits, has been addressed by the UNHCR as a good reception system, for it provides integration and educational support at the individual level (Catarci, 2016).

SPRAR centres (now referred to as *Integrated Asylum System* or SAI), represent a good example of MLG. Funding for the projects comes for the 80% from the "National fund for asylum policies and services", established by the Ministry of the Interior using European funds, and for the 20% from the local municipality's resources (ANCI, 2006). It is important to underline that the participation to the system is voluntary and the application comes directly from the municipality and

that is strongly encouraged by the Ministry of the Interior (Campomori and Ambrosini, 2020). Nonetheless, even though the local authority is the actual owner of the single project, in most cases the management is delegated to solidarity organisations and associations from the third sector (e.g. NGOs providing services to refugees), which played a relevant role in the previous informal system too (ANCI, 2006). In this most common scenario, the NGOs are chosen by the municipality to manage the facility and the activities on behalf of the municipality itself, becoming the actual manager of the centre (*“ente gestore”*). The centre and all the activities around it become then expression of the local administration's set of choices, rather than a public good provided by the central government. This is also an expression of the “horizontal dimension” of MLG, where the cooperation between public and nonpublic actors (i.e. NGOs) is enhanced to address humanitarian crisis (Ambrosini, 2021).

2.2.2 Centres of Extraordinary Emergency (CAS) and the centralist approach

The Italian reception system experienced additional pressure following the “Arab Spring” in 2011 and the subsequent increase of asylum seekers crossing the Mediterranean Sea in the following years (Campesi, 2018). This new emergency led to the multi-level agreement between State, Regions and Local Authorities in 2014 establishing a parallel and exceptional system to address the crisis. This brought up the creation of *centres of Extraordinary Reception* (i.e. CAS), which are second-line reception centres set up by the Ministry of the Interior through its local representatives (*“prefetture”*). Differently from the SPRAR, these centres do not require municipalities' approval, and their management can be outsourced to NGOs and private actors through public tenders (Ricard-Guay, 2019). Although the CAS projects are assigned through a public competition, evidence shows how the management of these emergency centres lacks proper standards, with low-quality services and poor management. Moreover they are often allocated in remote and isolated areas, enhancing contrasts with the local population (ANCI et al., 2017). While for the opening of the SPRAR, municipalities are required to submit a project proposal, providing integration services above certain standards, CAS centres do not have to meet these criteria (Campesi, 2018), with a more “bed, bath, and bread” approach (Campomori and Ambrosini, 2020). Given the nature of the centres and the crisis facing Italy, many municipalities opposed the opening of the centres in their own territory. Even though only a few of them were successful in blocking the opening of the CAS, the protests highlighted the municipality's opposition to the centre and their refusal to cooperate for the social integration of the refugees (Campomori and Ambrosini, 2020). These centres represent a more centralist or top-down approach, where coordination between different levels of government is absent and the central

authority imposes its decision on the local one (Scholten et al., 2018). These different dynamics are likely to have relevant effects on both local demographics and the administration's spending decisions.

I exploit the presence of both systems to evaluate their different impact on local economies, looking at different items of local public spending. I provide evidence of the opposite effects that local-integrated and centralist non-integrated systems have on local economies.

2.3 Data and descriptive analysis

2.3.1 Data on centres

For the data regarding the ASRCs, I rely on the data provided by OpenPolis foundation, which collected data from the Ministry of the Interior and other institutional sources¹⁴. Data for SAI and CAS centres includes the location of the facility, with the municipality's identification code (ISTAT), the starting and ending date of the project¹⁵, the number of refugees hosted and the facility's capacity. We integrated missing data with the reports by ANCI and the Ministry of the Interior¹⁶ and with data provided by Luca and Proietti (2022)¹⁷. Their data involves also municipalities' physical characteristics, such as surface, degree of urbanisation, etc. The data for the centres starts from 2001, although most of them were approved by the Ministry of the Interior only from 2006 (Marchetti, 2014). We include those informal projects from 2002, although just a few municipalities were implementing them.

In 2021, according to the report from the National Association of Italian Municipalities (ANCI) and the Ministry of the Interior, the municipalities hosting one or more SAI projects were 634¹⁸ (ANCI, 2022). Most of them are in internal and rural areas, with a lower level of urbanisation and negative demographic, economic, and social trends (Table 9). These are realities that are more likely to welcome projects that can enhance their development. On the other side, CAS centres are (relatively) more present in cities with higher urbanisation and are more likely to be easier to reach (plains territories rather than mountainous or uphill). This difference is also underlined in the geographical area of the municipalities, with CAS centres being

¹⁴Centri d'Italia: <https://centriditalia.it/home>

¹⁵For SAI centres we have the actual opening and closing date of centre, while for CAS facilities, the dataset provides information regarding the signature of the agreement and its ending. To our knowledge, there is no certain information regarding the time between the signature of the agreement and the opening of the centre, though we believe that given the emergency feature of the projects, this delay should not be as strong as to bias our analysis. We still run different analyses, changing the timing of the contract's starting date with similar results.

¹⁶Rete SAI: <https://www.retesai.it/la-storia/>

¹⁷We are grateful to Davide Luca for the data and the support

¹⁸In our analysis, we exclude municipalities with both SAI and CAS centres, keeping only those who have either one type or the other

Location of refugees centres, 2021

Figure 17: CAS centers

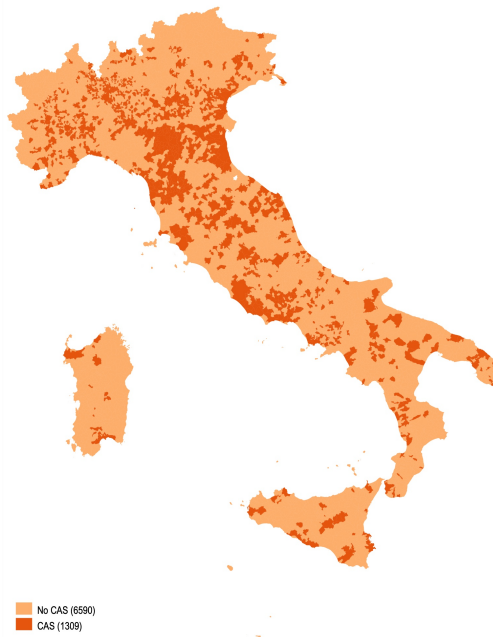


Figure 18: SAI centers



Table 8: Demographics and social characteristics of municipalities by type of refugee centre, 2021

	Type of refugee center		Test
	CAS	SAI	
N	1,877 (83.0%)	384 (17.0%)	
Municipality's population	6,841.422	8,366.284	0.038
Number of facilities in the municipality	2.411	2.677	0.142
Capacity of the center(s)	25.016	17.093	<0.001
Number of daily refugees in the center(s)	19.032	12.447	<0.001
Municipality's geographical area			
Center	288 (15.4%)	34 (9.0%)	<0.001
Islands	74 (4.0%)	56 (14.8%)	
North-East	504 (27.0%)	16 (4.2%)	
North-West	784 (41.9%)	102 (26.9%)	
South	219 (11.7%)	171 (45.1%)	
Comuna's altimetric zone			
Inland hills	601 (32.3%)	137 (36.1%)	<0.001
Coastal hills	108 (5.8%)	59 (15.5%)	
Inland mountain	468 (25.1%)	85 (22.4%)	
Coastal mountain	15 (0.8%)	7 (1.8%)	
Plains	670 (36.0%)	92 (24.2%)	
Comuna's degree of urbanisation			
Low	728 (39.1%)	181 (47.6%)	0.005
High	264 (14.2%)	53 (13.9%)	
Medium	870 (46.7%)	146 (38.4%)	
Comuna's mountain index			
Non-mountainous	1,087 (58.4%)	188 (49.5%)	0.003
Partially mountainous	151 (8.1%)	45 (11.8%)	
Fully mountainous	624 (33.5%)	147 (38.7%)	

more present in the industrial North regions, while SAI are more present in the South (Figures 17 and 18). Although there seems to be no difference in the size of

Data on centres, 2002-2021

Figure 19: Capacity of the centres

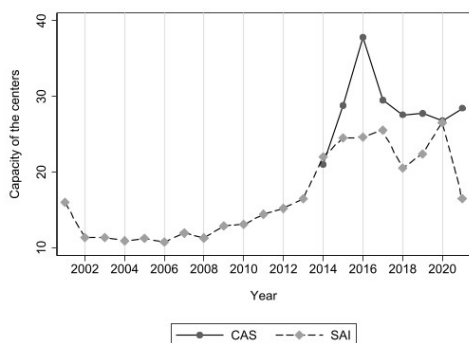
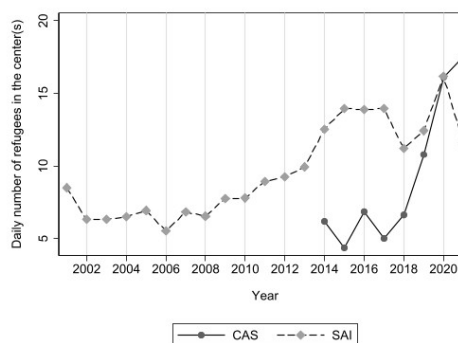


Figure 20: Daily refugees



the municipality’s population or the number of facilities, a substantial difference involves the capacity and the number of refugees in the centre, which is higher for CAS. Figure 19 shows how from their introduction in 2014, those facilities were supposed to host a larger number of refugees compared to SAI centres. From 2014 to 2019 actual numbers of beneficiaries are lower for CAS compared to SAI but there is a steep increase (Figure 20). This supports the idea that the emergency temporary system has been gradually preferred to the more integrated one.

2.3.2 Data on public finances and covariates

For what concerns data on municipalities’ public finances, from 1998 to 2014, I make use of the data from the Department of Internal and Territorial Affairs, of the Ministry of the Interior¹⁹. I rely on the Minister of the Economy and Finance for the years from 2015 to 2021^{20 21}. I am analysing here only the “financial commitments” (*impegni*, i.e. the amounts that the local government is formally committing to spend but that has not been paid yet. The main focus of the research is to analyse what are local governments’ spending choices and how are they affected by the presence of the centres, without looking at actual outcomes, which are left for future research.

I use other covariates (e.g. dummies for election years and reforms affecting municipalities, municipality’s tax base and number of residents with an employee contract, population size) from different ministerial sources such as the Department of Internal and Local Affairs²², and the Ministry of Economics and Finance²³.

¹⁹Department of Internal and Territorial Affairs: <https://finanzalocale.interno.gov.it/apps/floc.php/in/cod/4>

²⁰Ministry of Economics and Finance: <https://openbilanci.it>

²¹It is important to underline that municipalities were affected by a territorial reform which forced them to change the expenditure functions from 2015 (Bolgherini et al., 2018). I run the same analysis in the pre-reform period (1998-2014) for SAI centres and in the post-reform period for both CAS and SAI (2015-2021), finding similar results.

²²Department of Internal and Territorial Affairs: <https://dait.interno.gov.it/elezioni/open-data>

²³Department of Local Finances: <https://www.mef.gov.it/documenti-pubblicazioni/open-data/index.html>

Table 9: Summary statistics for the sample, 2021

	Summary
N	4,766
Municipality's geographical area	
Center	618 (13.0%)
North-East	904 (19.0%)
North-West	2,207 (46.3%)
South	1,037 (21.8%)
Metropolitan city	
0	4,081 (85.6%)
1	685 (14.4%)
Municipality's degree of urbanisation	
Low	2,240 (47.0%)
High	540 (11.3%)
Medium	1,986 (41.7%)
Municipality's altimetric zone	
Inland hills	1,540 (32.3%)
Coastal hills	321 (6.7%)
Inland mountain	1,449 (30.4%)
Coastal mountain	48 (1.0%)
Plains	1,408 (29.5%)
Municipality's climatic zone	
B ($600 \leq \text{day-degrees} < 900$)	13 (0.3%)
C ($900 \leq \text{day-degrees} < 1400$)	333 (7.0%)
D ($1400 \leq \text{day-degrees} < 2100$)	817 (17.1%)
E ($2100 \leq \text{day-degrees} < 3000$)	3,005 (63.1%)
F ($\text{day-degrees} \geq 3000$)	598 (12.5%)
Spending on management and control administration	4,285.525
Spending on justice	9.041
Spending on local police	502.126
Spending on education	1,656.705
Spending on culture	444.679
Spending on sport	242.340
Spending on tourism	206.608
Spending on transport	3,756.728
Spending on the environment	2,979.777
Spending on social	2,237.940
Spending on economic development	955.467
Spending on production	158.242
Total spending	17,161.302
Total tax revenues	26,058.134
Revenues from current contributions and transfers	5,982.261
Total non-tax revenues	2,874.140
Foreign local population	774.694
African foreign local population	189.195
Municipality's population	7,415.843

At the end of the data collection, I rely on a balanced panel of 4766 Italian municipalities over 19 years, from 2002 to 2021²⁴. Most of the municipalities in our sample are small-sized, with an average population of less than 8000 people, a low or medium degree of urbanisation, and non-metropolitan cities (Table 9). They are mostly from the South or the North-West. Most municipalities' current spending addresses local issues such as administration, education (mostly for primary schools), transport, social, and environment-related activities (e.g. recycling).

2.4 Identification strategy and methodology

Previous works have often relied on standard difference-in-differences with two-way fixed effects (TWFE) methods to evaluate the impact of policy interventions, comparing the difference between treated and untreated units before a specific treatment at time t and the difference between treated and untreated units after the treatment at time t . Nonetheless, there are drawbacks to using it when units are treated at different points in time and with different effects. The standard approach compares

²⁴I only have missing data for the year 2015

not only treated and untreated, but also treated and already treated, i.e. those units who received the treatment at a previous point in time. Thus, the average treatment on treated (ATT) might not consider treatment effect dynamics. Previous literature has extensively studied the case of treatment effect heterogeneity and variations in treatment timing (de Chaisemartin and D’Haultfœuille, 2020; Sun and Abraham, 2021). Therefore, I apply a matched event study, following Callaway and Sant’Anna (2021). Differently from the canonical difference-in-difference, it generalises the ATT to define what they call a group-time average treatment effect:

$$ATT(g, t) = E[Y_t(g) - Y_t(0) | G = g]$$

where the ATT represents the average effect for those units in group g at time t . Units belonging to the group g are those units who received the treatment in a specific timing g . When we assume the parallel trends assumption for the “never-treated units”, as it is the case of this work, for all $t \geq g$, we have that:

$$ATT(g, t) = E[Y_t - Y_{g-1} | G = g] - E[Y_t - Y_{g-1} | C = 1]$$

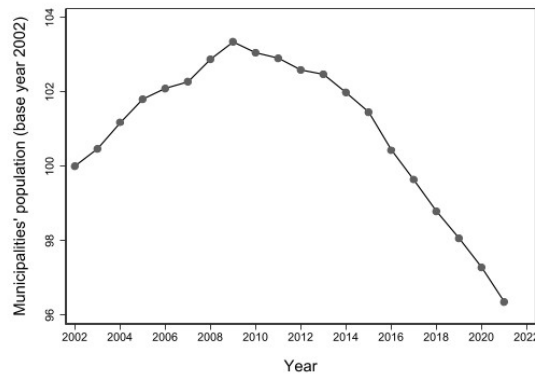
meaning that for any period after the treatment for the group g , the ATT at time t is the difference for each cohort between the treated in group g and the control. In this case, given the relevance of the covariates, I use inverse propensity weighting (IPW) to recover the final ATT, i.e. using the covariates to compute the probability of receiving the treatment (given the covariates) and use it as a weight for the ATTs.

2.4.1 Population dynamics and propensity score matching

As previously mentioned, population dynamics might play a role in refugee centres outcomes. Using population data from ISTAT, figure 21 shows a declining trend after 2009 in population size for municipalities in the sample. Decomposing for geographical and social characteristics, it appears that most of the negative demographic trend is driven by those municipalities from the South (Figure 22 with low levels of urban development (Figure 23), situated in internal and mountainous areas (Figures 25 and 24). These are the same municipalities that are more likely to apply for a SAI centre, as it might help revitalise the local economy and population.

Given this substantial heterogeneity in those social and geographical characteristics, I restrict the sample using a propensity score matching (PSM) (Rosenbaum and Rubin, 1985) based on those relevant characteristics (e.g. zone, area, region, climate, etc.). The main assumption here is that municipalities’ location and climatic features may influence the choice of opening a refugee centre but are not affected by the

Figure 21: Population trend (base year 2002)



Population trends by characteristics

Figure 22: Population trends by geographic area

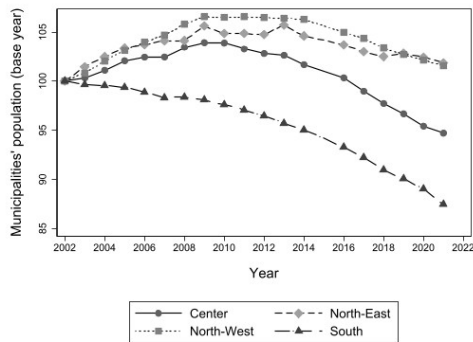


Figure 23: Population by urbanisation level

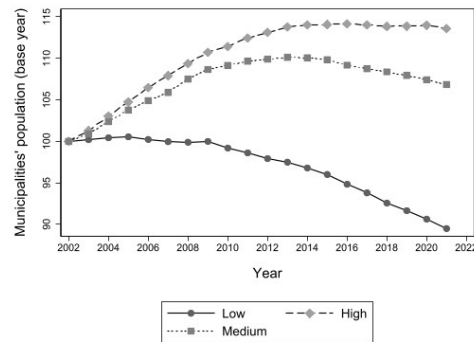


Figure 24: Population trends by mountain index

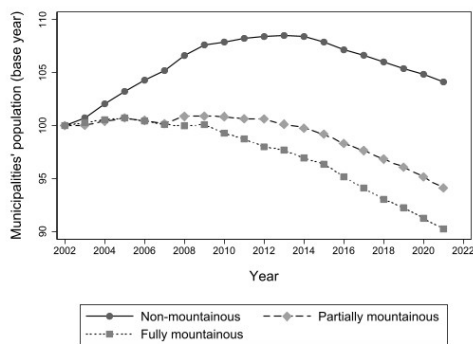
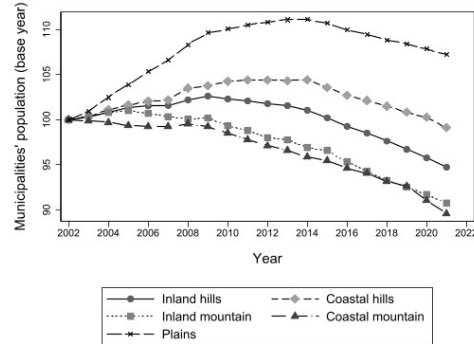


Figure 25: Population by zone



treatment itself in the post-treatment period (Austin, 2011). From this skimming, I end up having 233 treated municipalities matched with 233 controls for SAI centres (Table 10). For CAS instead, I have 977 treated matched with 979 controls (Table 11). I restrict the sample to municipalities with a population below 5000 since they are the ones more likely to be impacted by the refugee centres. From the restricted sample, I managed to have comparable treated and untreated units, based on their geographical and urban features. As shown in the tables, the p-values are highly

non-significant, showing how the two groups are now comparable. Additionally, for the event study I control for pre-treatment values of observed covariates, i.e. total revenues, transfers from the central government, population (native and foreign), mayor's characteristics (gender, age, political colour, etc.), municipality's tax-base, and number of residents with an employee contract.

Table 10: Sample using propensity-score-matching - SAI centres

	SAI center		Test
	Untreated	Treated	
N	233 (50.0%)	233 (50.0%)	
Municipality's geographical area			
Center	27 (11.6%)	28 (12.0%)	0.997
Islands	21 (9.0%)	23 (9.9%)	
North-East	7 (3.0%)	7 (3.0%)	
North-West	66 (28.3%)	66 (28.3%)	
South	112 (48.1%)	109 (46.8%)	
Municipality's degree of urbanisation			
Low	140 (60.1%)	145 (62.2%)	0.850
High	12 (5.2%)	10 (4.3%)	
Medium	81 (34.8%)	78 (33.5%)	
Metropolitan city			
0	194 (83.3%)	194 (83.3%)	1.000
1	39 (16.7%)	39 (16.7%)	
Municipality's altimetric zone			
Inland hills	96 (41.2%)	95 (40.8%)	0.998
Coastal hills	29 (12.4%)	29 (12.4%)	
Inland mountain	70 (30.0%)	73 (31.3%)	
Coastal mountain	5 (2.1%)	5 (2.1%)	
Plains	33 (14.2%)	31 (13.3%)	
Municipality's climatic zone			
B ($600 \leq \text{day-degrees} < 900$)	3 (1.3%)	3 (1.3%)	0.994
C ($900 \leq \text{day-degrees} < 1400$)	37 (15.9%)	35 (15.0%)	
D ($1400 \leq \text{day-degrees} < 2100$)	72 (30.9%)	70 (30.0%)	
E ($2100 \leq \text{day-degrees} < 3000$)	99 (42.5%)	104 (44.6%)	
F ($\text{day-degrees} \geq 3000$)	22 (9.4%)	21 (9.0%)	

Table 11: Sample using propensity-score-matching - CAS centres

	CAS center		Test
	Untreated	Treated	
N	979 (50.1%)	977 (49.9%)	
Municipality's geographical area			
Center	129 (13.2%)	148 (15.1%)	0.142
Islands	38 (3.9%)	33 (3.4%)	
North-East	194 (19.8%)	227 (23.2%)	
North-West	520 (53.1%)	469 (48.0%)	
South	98 (10.0%)	100 (10.2%)	
Municipality's degree of urbanisation			
Low	536 (54.7%)	554 (56.7%)	0.641
High	43 (4.4%)	38 (3.9%)	
Medium	400 (40.9%)	385 (39.4%)	
Metropolitan city			
0	879 (89.8%)	872 (89.3%)	0.701
1	100 (10.2%)	105 (10.7%)	
Municipality's altimetric zone			
Inland hills	322 (32.9%)	329 (33.7%)	0.988
Coastal hills	38 (3.9%)	39 (4.0%)	
Inland mountain	349 (35.6%)	347 (35.5%)	
Coastal mountain	6 (0.6%)	7 (0.7%)	
Plains	264 (27.0%)	255 (26.1%)	
Municipality's climatic zone			
B ($600 \leq \text{day-degrees} < 900$)	3 (0.3%)	3 (0.3%)	
C ($900 \leq \text{day-degrees} < 1400$)	44 (4.5%)	40 (4.1%)	
D ($1400 \leq \text{day-degrees} < 2100$)	111 (11.3%)	120 (12.3%)	
E ($2100 \leq \text{day-degrees} < 3000$)	653 (66.7%)	664 (68.0%)	
F ($\text{day-degrees} \geq 3000$)	167 (17.1%)	150 (15.4%)	

2.5 Results

2.5.1 Population

In this section, I present the results of the analysis. First of all, I show how SAI and CAS have different population dynamics. Figures 26 and 27 display the matched event study for the overall municipality's population. While for CAS centres there seems to be no significant effect, for SAI centres the impact is positive and relevant. Figure 29 shows how this effect is mainly driven by a significant increase in the foreign population. No similar effects appear in CAS municipalities for African population²⁵ In tables 12 and 13, I show the ATT related to populations for CAS and SAI. Following Callaway and Sant'Anna (2021), I present the ATTs for the simple weighted average (column 1) and the averages across different groups and cohorts (columns 2-4). I also show the difference of the coefficients for the pre-treatment period, to check for the parallel trends assumption. For SAI municipalities' populations, while the pre-treatment period shows no difference, the post-period is instead positively and strongly significant, with an ATT positive and statistically relevant. This increase ranges between 0.8 and almost 2%, for the different ATTs.

²⁵Here I compare African population (ln) for CAS centres and total foreign population for SAI centres. Refugees from African countries represent the majority of guests in CAS centres, due to the emergency period they have been opened for. The same analysis for foreign population in CAS municipalities did not show major variances after the intervention but violated the parallel trend hypothesis in the pre-treatment period. On the other side, due to the lack of data, it is not possible to perform the same analysis for African population in SAI municipalities. Results and tables can be found in the appendix.

Results for populations (ln)

Figure 26: Event study on population - CAS centres

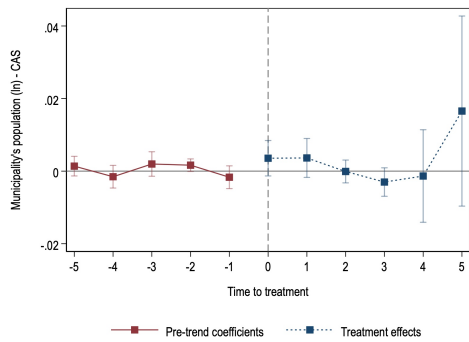


Figure 27: Event study on population - SAI centres

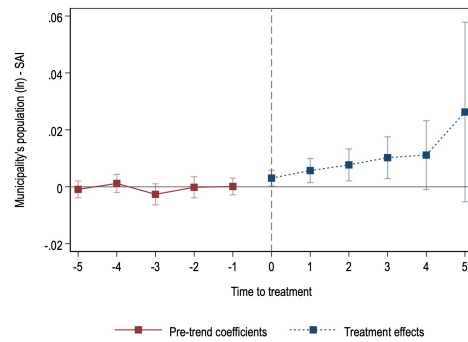


Table 12: Results for CAS - population

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.0017	0.0012	0.0030	0.0032
	(0.002)	(0.002)	(0.002)	(0.003)
Pre Average				0.0004
				(0.001)

Table 13: Results for SAI - population

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.0085**	0.0068**	0.0197***	0.0107**
	(0.003)	(0.002)	(0.004)	(0.004)
Pre Average				-0.0005
				(0.001)

Figure 28: Event study on African population - CAS centres

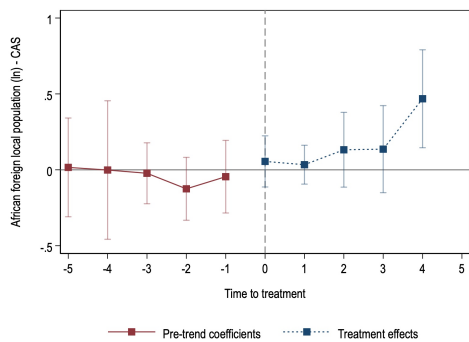


Figure 29: Event study on foreign population - SAI centres

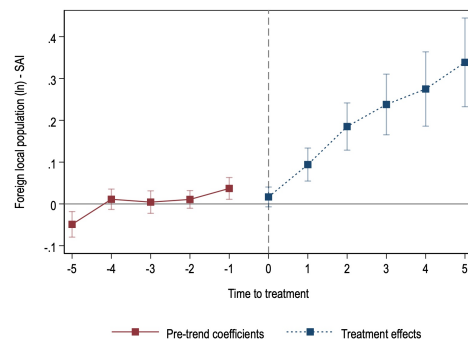


Table 14: Results for CAS - African population

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.0262	-0.0065	0.0557	0.1092
	(0.051)	(0.045)	(0.056)	(0.061)
Pre Average				0.0300
				(0.060)

Table 15: Results for SAI - foreign population

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.1753*** (0.030)	0.1474*** (0.021)	0.0783 (0.055)	0.1912*** (0.028)
Pre Average				0.0029 (0.007)

2.5.2 Current spending

The increase in the population size of municipalities is a crucial difference between the two types of centres. Nonetheless, it remains an obvious conclusion due to the requirement for refugees of the SAI centre to register into the municipality, to enhance integration. This feature is not present in the CAS centres, due to its temporary design, and this is underlined but the lack of effects on population for the affected municipalities. As a second step, I analyse the impact that the centres have on local public spending. These effects might indeed be channelled through the increase in population size. Figures 30-35 show the results. SAI centres have a significant and positive impact on total spending, mostly driven by transfers (Figure 35) and spending on goods and services (Figure 33). There is no such effect for spending on personnel. For CAS centres, the only significant effect involves transfers for the first period, with an average positive increase in the following years although not significant. There is weak evidence of a reduction in total current spending, mostly driven by a decrease in goods and services (Figure 32).

Results for total current spending (ln)

Figure 30: Event study on total current spending - CAS centres

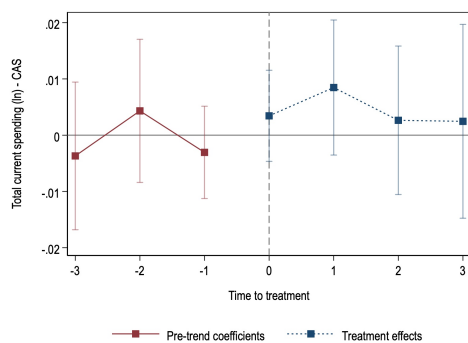
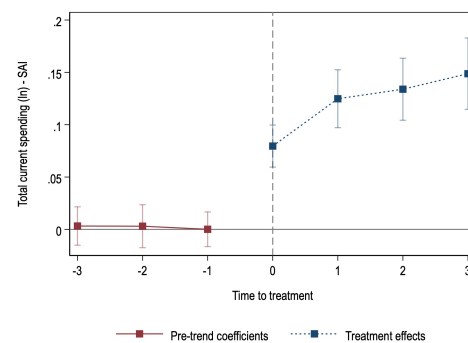


Figure 31: Event study on total current spending - SAI centres



2.5.3 Total spending net of government funding for SAI municipalities

The results for the SAI centres, both in terms of population and current spending show interesting dynamics regarding the integrated refugee centres. A possible drawback to these conclusions might come from the funding that the municipality receives

Table 16: Results for CAS - total current spending

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.0057 (0.007)	0.0032 (0.006)	0.0088 (0.015)	0.0043 (0.006)
Pre Average				-0.0008 (0.003)

Table 17: Results for SAI - total current spending

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.1274*** (0.019)	0.1222*** (0.013)	0.0920*** (0.020)	0.1218*** (0.013)
Pre Average				0.0021 (0.005)

Figure 32: Event study on current spending, goods - CAS centres

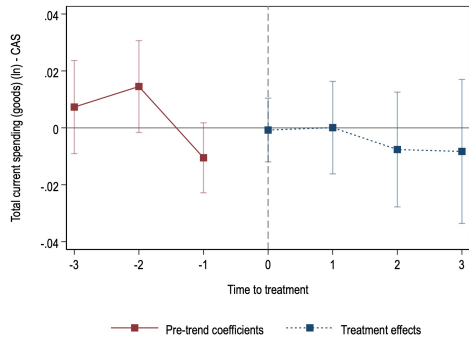


Figure 33: Event study on current spending, goods - SAI centres

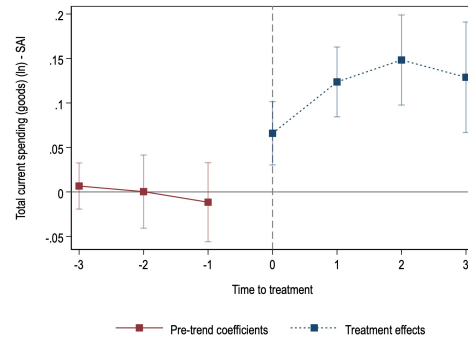


Table 18: Results for CAS - total current spending (goods and services)

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	-0.0018 (0.009)	-0.0045 (0.008)	0.0039 (0.013)	-0.0041 (0.008)
Pre Average				0.0038 (0.005)

Table 19: Results for SAI - total current spending (goods and services)

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.1144*** (0.027)	0.1138*** (0.022)	0.0452* (0.022)	0.1167*** (0.021)
Pre Average				-0.0015 (0.010)

Table 20: Results for CAS - total current spending (transfers)

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.0265 (0.019)	0.0265 (0.019)	-0.0427 (0.035)	0.0265 (0.019)
Pre Average				0.0137 (0.013)

from the central government, as part of the investments that the Ministry of Interior uses for the reception system. This is the 80% contribution from the aforementioned

Figure 34: Event study on current spending, transfers - CAS centres

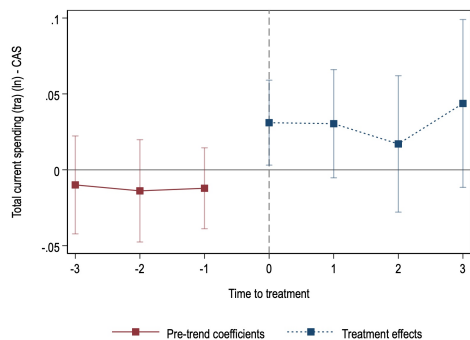


Figure 35: Event study on current spending, transfers - SAI centres

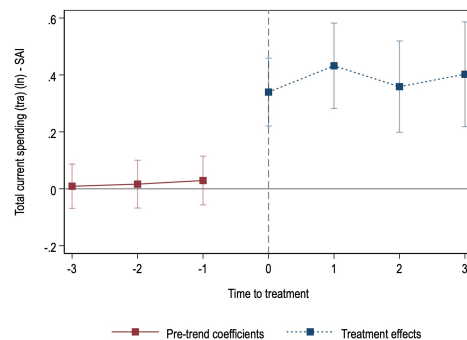


Table 21: Results for SAI - total current spending (transfers)

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.4364*** (0.083)	0.3689*** (0.069)	0.4493*** (0.092)	0.3833*** (0.071)
Pre Average				0.0181 (0.021)

government fund. According to the legislation defining the SPRAR system, from 2005 to 2018, the contribution from the central government for the projects had a maximum amount of 35 euros per refugee per day²⁶ (Ricard-Guay, 2019). Even if I am using total transfers and transfers from the State for the event study, it is not clear how these funds might arrive at the municipality and how they are registered into the balance sheets. They are likely to be included in these items. As a simple robustness exercise, I compute the revenues that the municipality should receive from the central government using the number of available places in the centres, i.e. 35 euros per bed in the centre times 365. These numbers are likely to be overestimated since the number of refugees might as well be below the maximum capacity of the centre and funds might not arrive on time for each year. The system frequently changed the way it structured these funds, going from one year programme to two or three years (ANCI, 2022). Nonetheless, even when including those overestimated computations, results for SAI total current spending remain statically significant for years after the opening of the facility (figure 37 and table 22). The negative effect on the first year might be due to the delay in the payment from the government.

2.5.4 Decomposing public spending: social, public safety, culture, tourism

Results that control for government funds support the idea that the centre pushes for more public spending from the local administration with their own resources.

²⁶This maximum contribution was further reduced by a new government in 2018 after national elections which saw a substantial increase in anti-immigration parties, i.e. Northern League (Ricard-Guay, 2019)

Results excluding possible government funds

Figure 36: Data on daily refugee costs

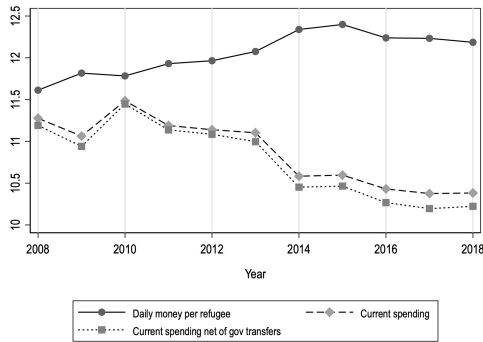


Figure 37: Event study on current spending, net of government transfers - SAI centres

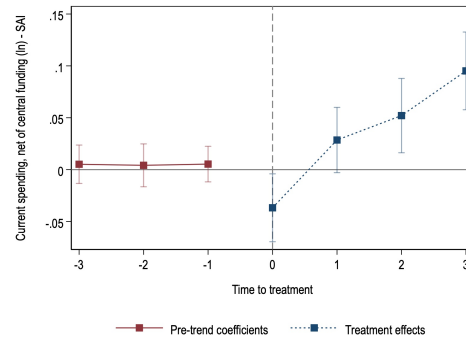


Table 22: Results for SAI - total current spending (net of government transfers)

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.0643*** (0.019)	0.0680*** (0.013)	-0.0006 (0.027)	0.0347* (0.014)
Pre Average				0.0049 (0.005)

The interesting question regards how those resources are distributed. Analysing the different items in municipalities' balance sheet, it is clear how most of this increase comes from spending on social needs for the population. In this item are included expenses for kindergarten, the elderly, and for people in need, including foreigners. The increase is statistically relevant and positive (figure 39, table 23) and it is mainly driven by spending in goods and services (figure 41, table 24) and transfers (figure 40, table 25). As mentioned above, SAI centres are municipalities' projects but they are often run by NGOs and local or religious associations, which are financed by transfers from the public administration. Goods and services might represent instead the municipality's own contribution to the project. This does not involve any variation in personnel, suggesting a use of their own resources for any tasks related to the centre (see Appendix, figure 113, table 46). Given the different nature of the centre, CAS municipalities show no significant change in their own spending on social activities (figure 38).

Table 23: Results for SAI - current spending on social, total

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.9076*** (0.086)	0.8228*** (0.077)	0.8060*** (0.107)	0.8391*** (0.085)
Pre Average				0.0119 (0.019)

It is clear how this additional expenditure for SAI municipalities is likely to be

Figure 38: Event study on current spending on social - CAS centres

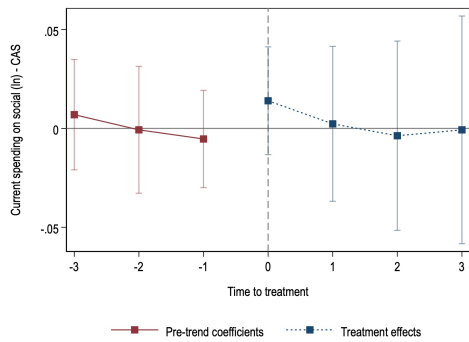


Figure 39: Event study on current spending on social - SAI centres

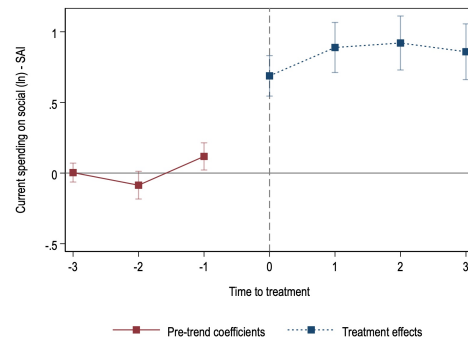


Figure 40: Event study on current spending on social, transfers - SAI centres

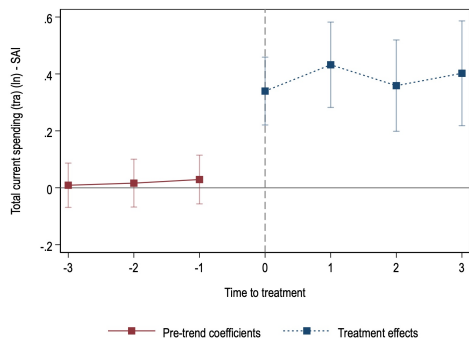


Figure 41: Event study on current spending, goods and services - SAI centres

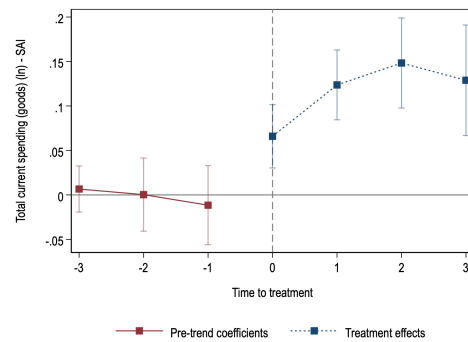


Table 24: Results for SAI - current spending on social, goods and services

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.6976*** (0.114)	0.6587*** (0.102)	0.6669*** (0.181)	0.6821*** (0.105)
Pre Average				-0.0332 (0.031)

Table 25: Results for SAI - current spending on social, transfers

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.8310*** (0.118)	0.6840*** (0.100)	0.8668*** (0.114)	0.7212*** (0.104)
Pre Average				-0.0248 (0.031)

driven by social spending around the centre, either from the transfers to the local NGOs running the project or for related spending on goods and services. Controlling for government funding, this additional expenditure appears to be coming from the municipality own resources. The follow-up question is to understand whether this increase in the total current spending has other spillovers on other items. First of all, I run the event study with the total current spending net of social spending (figure 43). Although much less significant, there is still a positive effect of SAI centres on

municipalities' budgets (figure 26, column 4 for the event study)²⁷.

Results excluding social spending

Figure 42: Current spending net of social

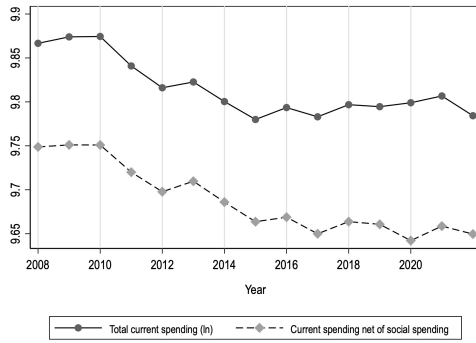


Figure 43: Event study on total current spending, net of social spending - SAI centres

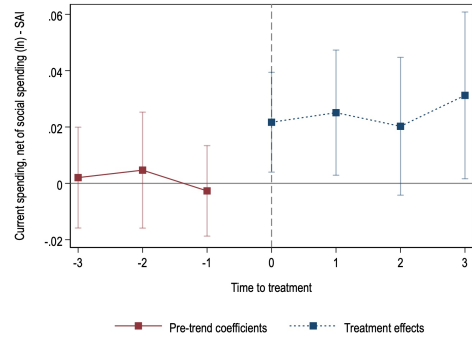


Table 26: Results for SAI - total current spending, net of social spending

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.0098 (0.013)	0.0157 (0.011)	-0.0010 (0.018)	0.0246* (0.010)
Pre Average				0.0014 (0.005)

After having analysed the total current spending, I move into analysing single items within the total public spending. I look at spending on local police, education, culture, tourism, and transport. From the analysis, there are no significant effects for the overall spending on police or education, neither for CAS nor SAI municipalities²⁸. There are instead positive effects on culture for SAI municipalities (figures 44 and and a negative trend for tourism in CAS municipalities (figure 45), although not significant. I then try to understand whether these changes focus more on goods and services or transfers. The negative trend for CAS is still not significant when looking at goods and services or transfers for tourism. For SAI centres, the main increase in culture is driven by transfers (figure 46) which are likely to be addressed towards cultural local associations and NGOs.

2.6 Discussion

By differentiating between CAS (Centri di Accoglienza Straordinaria) and SAI (Sistema di Accoglienza e Integrazione) centres, the analysis highlights that the degree

²⁷Results on single group-specific and calendar-time effects can be found in the appendix. Although the average is not statistically significant, depending on the opening year of the centre and the calendar year, there are significant variations.

²⁸see Appendix, fig. 75, 83 for SAI centres, and fig. 74, 82 for CAS centres.

Figure 44: Event study on current spending on culture - SAI centres

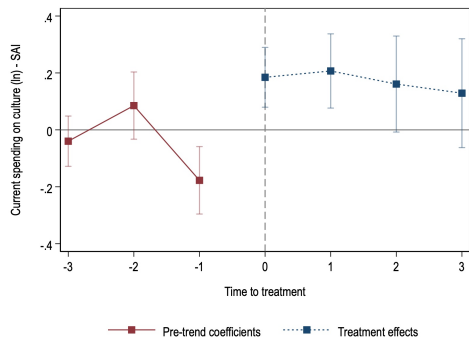


Figure 45: Event study on current spending on tourism - CAS centres

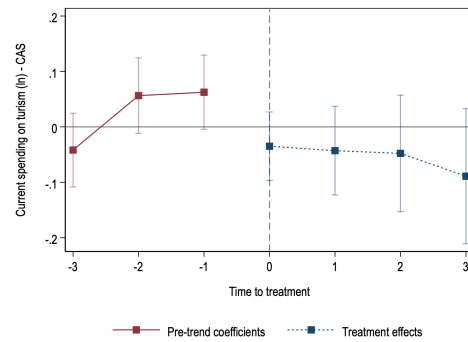


Figure 46: Event study on current spending on culture, transfers - SAI centres

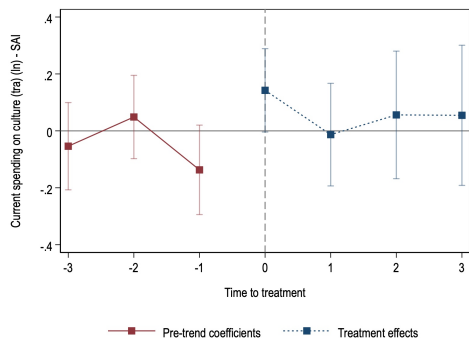


Figure 47: Event study on current spending on tourism, goods and services - CAS centres

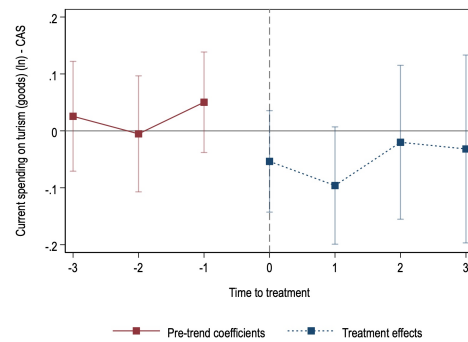


Table 27: Results for SAI - current spending on culture

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.0829 (0.073)	0.1164 (0.064)	0.1013 (0.081)	0.1704** (0.062)
Pre Average				-0.0439 (0.025)

Table 28: Results for CAS - current spending on tourism

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	-0.0606 (0.039)	-0.0619 (0.039)	-0.0661 (0.039)	-0.0537 (0.038)
Pre Average				0.0257 (0.019)

of integration support provided by these SAI centres plays a crucial role in shaping their economic impact.

SAI centres, which offer comprehensive integration services such as language courses, job training, and legal support, and are managed by local NGOs in cooperation with the local administration are associated with an increase in social and cultural spending within municipalities. The type of spending suggests this variation to be due to

the activities involving the centre. This increase is driven predominantly by transfers, which are likely to be directed to local NGOs and cultural associations. Even when controlling for government funds or expenditures directly related to the centre, there are still significant spillover effects on other items in municipalities' balance sheets, i.e. cultural activities. This might suggest that the presence of these centres can create positive spillovers into the local economy and society as a whole. This could have long-term benefits for local cohesion and development. Although these results do not provide any evidence of benefits in terms of welfare, they show relevant positive variations in public spending which could have non-negligible effects on the local community.

On the other hand, CAS centres, which are primarily designed to provide basic needs with minimal integration services, show a different trend. There is evidence of a reduction in spending on tourism in municipalities hosting CAS centres, although this trend is not statistically significant. This could be indicative of a broader disengagement from economic activities that attract external visitors, such as tourism, as the focus shifts to managing the immediate needs of refugees. The absence of integration support in CAS centres may limit their ability to create positive economic externalities in the local community, which could explain the observed reductions in spending on non-essential services like tourism. CAS centres, with their focus on basic services, might inadvertently dampen economic activity by redirecting public spending away from areas such as tourism.

From a policy perspective, these results highlight the potential benefits of investing in integration-focused refugee centres. These centres could also have positive economic impacts for the host communities, other than providing better services to refugees. These results might have relevant policy implications related to the type of refugee centre implemented, favoring models that emphasize integration and local involvement.

Lastly, while the analysis offers valuable insights, it is important to acknowledge that some of the effects, particularly regarding tourism spending, are not statistically significant. This could be due to the limited time horizon of the analysis or the relatively small size of some municipalities. Results become significant after 4 or 5 periods, although with larger standard deviations. Further research on the tourism sector in the affected municipalities could help shed some light on the underlying dynamics.

2.7 Conclusions

This is the first paper to empirically study the effects of different types of reception facilities for asylum seekers in Italy on municipalities' population and local finances. The results show how the presence of refugee centres that provide integration of the migrants, i.e. SAI centres, can boost not only municipalities' population but also public spending. This spending is mostly driven by an increase in transfers and goods and services. Transfers can be addressed towards families, firms, or local associations, suggesting a positive effect on the local economy. This spending increase is robust even when controlling for funds from the central government. On the other side, the presence of refugee centres with less integration, i.e. CAS centres, suggests a reduction in spending. Results for populations are negative but not highly significant. These conclusions might shed some light on the design of refugee centres and suggest relevant policy implications for the management of the refugee crisis.

Chapter 3

3 The political impact of refugee centres: evidence from Italian municipalities

This chapter examines the political repercussions of opening refugee centers on the likelihood of incumbent mayors being re-elected in Italian municipalities. Focusing on two types of centers—the System for the Protection of Asylum Seekers and Refugees (SAI) and the Extraordinary Reception Centers (CAS)—I analyse how these facilities impact voters' behavior, especially in light of the integration services provided by SAI centers and the more temporary role of CAS centers. The main results suggest that SAI centers, which promote integration, are positively associated with mayors' re-election prospects in regions with high social capital, particularly in Northern Italy. CAS centers, in contrast, are found to have minimal impact on re-election chances, except in certain areas where they may slightly increase support for right-wing parties. I also provide evidence of possible bias in the location of this second type of centres due to political strategic behaviour of central governments.

Keywords: Asylum seekers, reception centres, local elections, migration, political strategic behaviour

JEL: K37, H52, H71, H72, 015

3.1 Introduction

The establishment of refugee centers in Italian municipalities has introduced notable economic and social shifts, as discussed in the previous chapter. However, the political dimensions of this issue might play a relevant role too. In this chapter, I investigate how different types of refugee centers affect the political dynamics at the local level, particularly focusing on the likelihood of incumbent mayors being re-elected. The System for the Protection of Asylum Seekers and Refugees (SAI) centers aim to integrate asylum seekers into the local community through structured support services, potentially fostering a positive perception among residents. Conversely, Extraordinary Reception Centers (CAS) are often seen as temporary measures, with limited integration efforts and centralized management by the national government. These structural differences may contribute to varied public responses, which, in turn, influence electoral outcomes.

Using a two-way fixed effects model, I examine the effect of refugee centers on electoral results, expanding on the existing body of literature that connects refugee

policies with local political and social responses. My results show how integrated refugee centres, i.e. SAI centres, have positive and significant effects on mayors' reelection in the North of Italy. This is the area of Italy with the highest level of social capital. A similar effect does not show in the South of Italy, where levels of social capital are lower. On the other way, CAS centres do not play a relevant role in the analysis of mayor's reelections. Moreover, I study whether the allocation of these centres might be determined by the central government with a strategic political behaviour. Evidence shows that the opening of CAS centres is significantly and negatively correlated with the presence of mayors from the same party as the central government. This result is robust even when considering different regions. The opposite is true for SAI centres, especially in the North of Italy, where municipalities are more likely to open a SAI centres if they have a mayor of the same political colour of the government. The analysis underlines the relevant difference between these two hosting approaches and how they might differ according to the region in which they are implemented. The political impact of the refugee centres seems then to be determined not only by the design but also by the social and geographical context.

This analysis also relates to a strand of literature which studies the impact of refugees on political outcomes (Dustmann et al., 2019; Steinmayr, 2020) and natives' sentiment towards immigrants and minorities (Hangartner et al., 2019). Other works closely related to this concern the impact of refugee centers in Italy and national support for far-right parties. Bratti et al. (2020) and Campo et al. (2024) find a positive and strong correlation with the presence of temporary refugee centers (CAS) and share of votes for far-right anti-immigration parties at national elections. Using data for the other type of centers, more integration-oriented (SPRAR or SAI), Gamalerio et al. (2023) find instead opposite results, with far-right parties having lower shares of votes in municipalities with SPRAR projects. Closer to this analysis, Pulejo (2021) studies how SPRAR centers affect municipalities' political representation, finding an increase in the presence of far-right representatives in local councils in municipalities with a SPRAR center. I add to these results by studying instead the outcomes of local elections. Previous studies analysed Italian local elections and voting behaviour. De Benedetto and De Paola (2016) studied how incumbency might affect voters' turnout, with significant differences between North and South of Italy. De Benedetto and De Paola (2019) look at the effects of the two-terms limit for Italian mayors on turnout and quality of candidates. Here I focus on mayors' probability of being reelected with a refugee center opened the term before the local elections. My results corroborate the findings by Gamalerio et al. (2023) and Campo et al. (2024) that SAI and CAS have opposite effects on political outcomes, increasing or

decreasing the support for anti-immigration parties. I find that the positive effect of SAI centres on re-elections are significant when analysing regions with higher civic capital, i.e. the Northern region. Similar effects are not present in the South of Italy. I also contribute to previous studies which analyse the relation between national and local politics ([Limosani and Navarra, 2001](#)) by focusing on possible political bias in the allocation of CAS centres from the central government to municipalities with mayors of the same party or coalition.

3.2 Institutional framework and data

3.2.1 Local elections

Municipal elections in Italy occur every five years, with a fixed schedule unless early elections are triggered by events such as a mayor's resignation. In these cases, the election timing for that municipality resets independently of other municipalities that complete their legislative term. Eligible voters are automatically registered in the municipal registry if they are 18 or older on election day. Voting is conducted using traditional paper ballots, with polling stations managed by local authorities, often set in schools or public buildings.

Since 1993, Italy has operated under a municipal electoral system introduced by Legislative Decree 81 (March 25, 1993), which established the direct election of mayors and a plurality voting rule. This system varies by municipality size. In municipalities with fewer than 15,000 residents, elections employ a single-ballot plurality system, where the winning candidate receives a majority premium, controlling at least two-thirds of the council seats. Each mayoral candidate is associated with a single list of councilor candidates, allowing voters to select one councilor preference within that list. This setup ensures the elected candidate's council list reflects the majority premium based on voter preferences ([De Benedetto and De Paola, 2019](#)). In larger municipalities, a dual-ballot system is used if no candidate secures an absolute majority in the first round. Only the top two candidates proceed to a second round, with the winner receiving a majority premium of at least 60% of the council seats. The mayoral and councilor elections occur simultaneously. Each mayoral candidate may be linked to multiple lists, and voters can split their votes, choosing one candidate for mayor and a separate list of councilors (referred to as a "split vote") ([De Benedetto and De Paola, 2019](#)).

Another relevant aspect of local elections involves the number of consecutive terms mayors can have. Until 2014, all Italian mayors could not run for more than two

consecutive terms, although council and executive committee members may serve indefinitely. Since 2014, a legislative amendment (Law No. 56) allowed mayors in municipalities with populations below 3,000 to run for a third term, addressing the challenge of attracting qualified candidates in smaller municipalities. This law also adjusted council sizes, mandating 10 councilors in municipalities under 3,000 residents and 12 councilors in municipalities with populations between 3,001 and 10,000.

In Italy, municipal administrations oversee a range of essential functions that directly impact citizens' daily lives. These responsibilities include managing public utilities—such as local roads, water, sewage, and waste collection—as well as providing public housing, transportation, nursery schools, and elderly care. Given the significance of these services, citizens are generally highly invested in the composition and performance of municipal councils, which is reflected in their active participation in local elections (De Benedetto and De Paola, 2016). Within the context of the Protection System for Asylum Seekers and Refugees (SPRAR) who became the Integrate Asylum System (SAI), municipal administrations are also responsible for the management of the refugee centre and the relations with the local community. The positive (or negative) outcomes of the centre might have non-negligible effects on mayor's chances of winning another term.

3.2.2 National elections

To analyse the impact that refugee centres have on local elections, it is relevant to understand what has been the political effect at the national level. Following Bratti et al. (2020), I collect data on two national elections, 2013 and 2018, which are the most relevant for the analysis on refugee centres. In 2013, the coalition with the highest number of votes was the centre-left led by the Democratic Party (*Partito Democratico* or PD) with 29.6%, followed by the centre-right led by The People of Freedom (*Il Popolo della Libertà* or PDL) with 29.2% and the populist party Five Star Movement (*Movimento 5 Stelle*, or M5S) with 25.66%²⁹. Between 2013 and 2018, the centre-left government was the one in charge of dealing with the refugee crisis, opening many CAS centres, especially in the North of Italy.

Figures 49 and 50 show the national political scenario and the number of centres, between 2013 and 2017. In 2018 national elections, the situation saw a substantial shift of votes to anti-immigration and nationalist party The League (*La Lega*, formally known as the *The Northern League*), which went from only 4.1% in 2013 to almost

²⁹Data on national elections are available on the Eligendo archives by the Home Office: <https://elezionistorico.interno.gov.it/index.php?tpel=C&dtel=24/02/2013&es0=S&tpa=I&lev0=0&levsut0=0&ms=S&tpe=A>

Figure 48: Number of municipalities with at least one refugee centre, 2006-2021

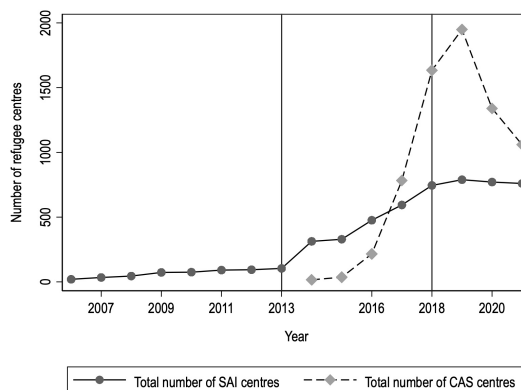


Table 29: Municipalities with at least one refugee centres, 2012-2021

Year	Type of refugee center		
	CAS	SAI	Both CAS & SAI
2012	0	94	0
2013	0	104	0
2014	11	308	5
2015	29	322	7
2016	176	436	40
2017	628	439	155
2018	1,305	416	329
2019	1,595	435	354
2020	1,084	515	256
2021	827	528	232

Data from Centri d'Italia <https://centriditalia.it/home>. The table shows the number of municipalities with at least one refugee centre. Each municipality might have more than one centre. I divide the number between type of centres and whether municipalities have both types. I represent only municipalities with less than 5000 residents.

18%, with the total votes for the centre-right coalition up to 37%. This change is stronger in the North of Italy, where The League had its roots since its foundation in the late 1980s. This is also the area where most of CAS centres were opened between 2013 and 2017 (figures 52-54). Although a few SAI (formally SPRAR) centres were already open in 2008, they saw a substantial increase from 2013 (figure 48). Given the lack of capacity of local administration to address the increasing number of refugees, they were integrated with CAS centres from 2014. CAS centres saw a rapid increase in their numbers compared to SAI centres, with many municipalities affected since 2017, right before the national elections (table 29). The M5S too saw an increase in the share of votes up to almost 33%, with a stronger effect in the South. The centre-left coalition led by the PD shrank its share down to less than 23%.

In my study, I also control for the results of national elections and differentiate the effects between North and South of Italy.

Figure 49: Map of Italy in 2013 - refugee centers and 2013 national election results

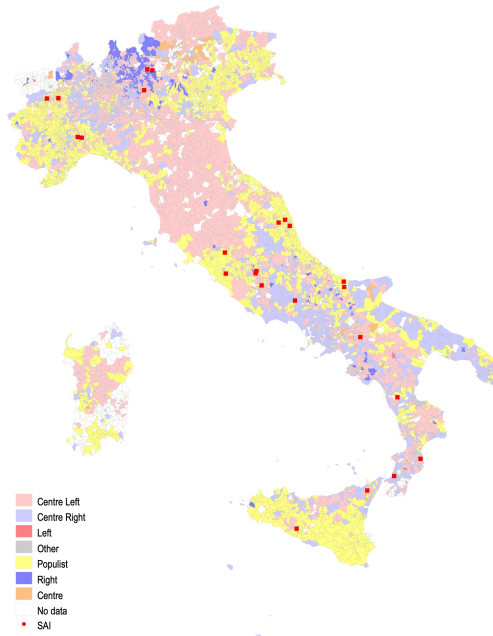


Figure 50: Map of Italy in 2017 - refugee centers and 2013 national election results

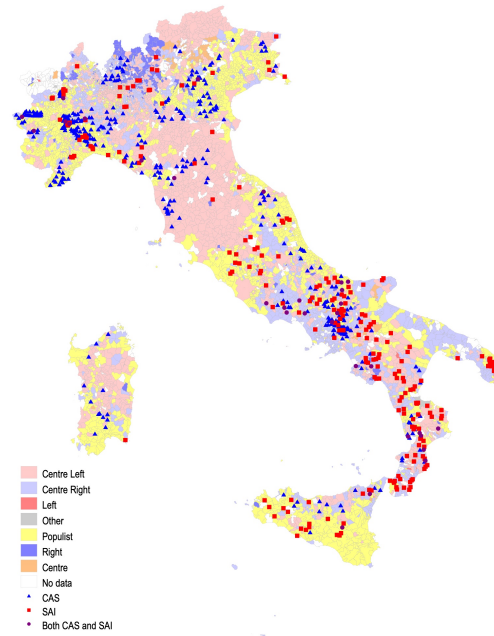
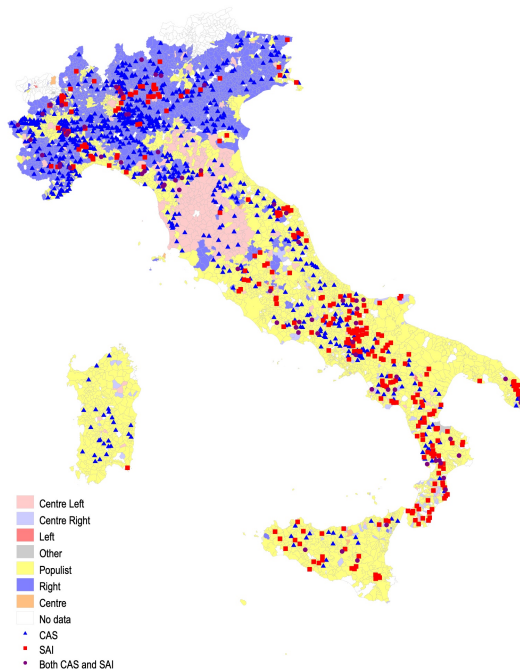


Figure 51: Map of Italy in 2018 - refugee centers and 2018 national election results



3.3 Data and descriptive analysis

For the data regarding the ASRCs, I rely on the same data from the previous chapter provided by OpenPolis foundation³⁰. In this framework, an additional feature of this dataset is the availability of the starting date of refugee centre for both SAI

³⁰Centri d'Italia: <https://centriditalia.it/home>

Figure 52: North of Italy in 2013 - refugee centers and 2013 national election results

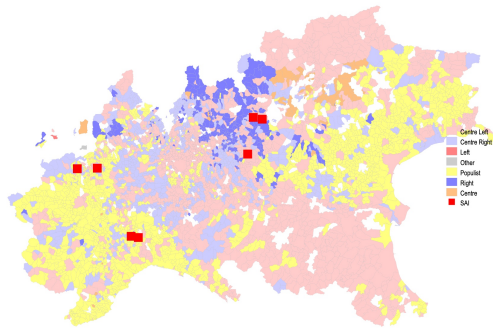


Figure 53: North of Italy in 2017 - refugee centers and 2013 national election results

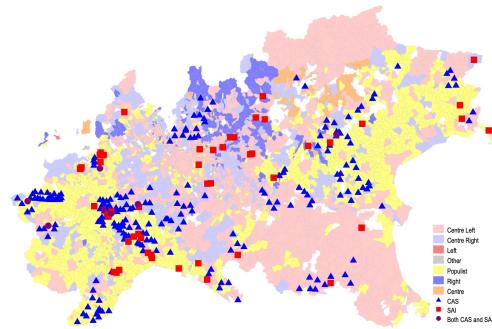


Figure 54: North of Italy in 2018 - refugee centers and 2018 national election results

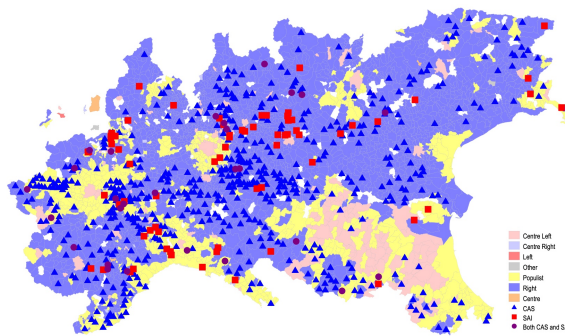


Figure 55: South of Italy in 2013 - refugee centers and 2013 national election results

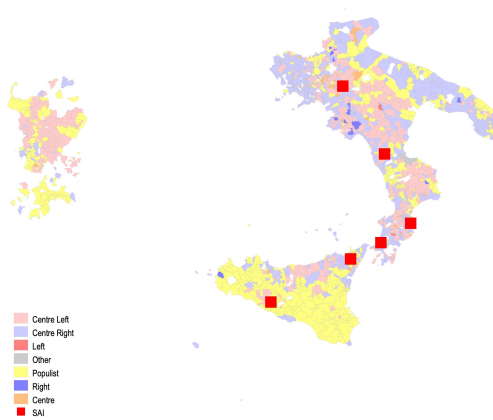
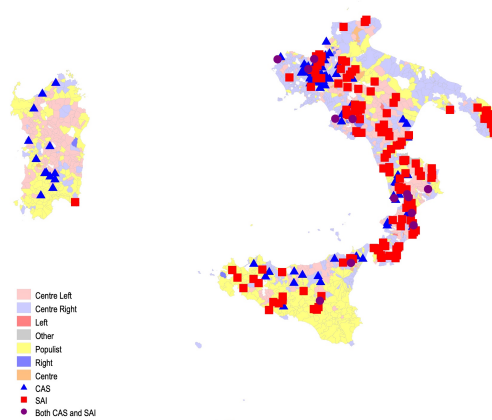


Figure 56: South of Italy in 2017 - refugee centers and 2013 national election results



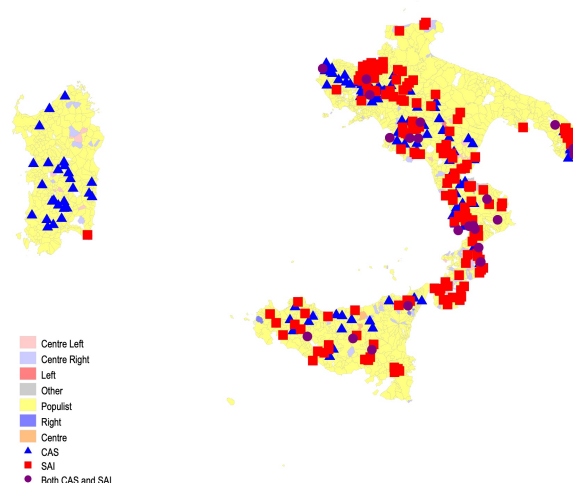
and CAS³¹.

Data for both local representatives and national elections at the municipality level come from the Ministry of Interior³². I have information on mayors' gender, educa-

³¹As mentioned earlier, For SAI centres I have the actual opening and closing date of centre, while for CAS facilities, the dataset provides information regarding the signature of the agreement and its ending. In this context, given also the extraordinary emergency-oriented feature of CAS centres, it is plausible that the opening of the centre would not require excessive amount of time. I consider the opening between two weeks and one month after the signing of the contract.

³²Department of Internal and Territorial Affairs: <https://dait.interno.gov.it/elezioni/open-data>

Figure 57: South of Italy in 2018 - refugee centers and 2018 national election results



tion, profession, age, and the political coalition that supported them for the election from 1998 to 2021. From the national elections, for each municipality I have the number of eligible voters, actual voters (male and female), votes for each party and candidates.

3.4 Identification strategy and methodology

For the first analysis, I rely on a simple two-way fixed effect (TWFE) where the sample is restricted only to election years. One municipality can have more than one election. The dependent variable is a dummy that takes value one if the incumbent mayor secures a second-term, zero otherwise. The independent variable is another dummy which indicates whether that mayor opened a refugee centre in the previous term. I control for voters turnout, number of eligible voters, number of male and female voters, mayor's characteristics, i.e. gender, age, education attainment, professional title, and political affiliation³³. I restrict the time-frame of the analysis from 2014 to 2021, since the majority of refugee centres opened during this period (table 29). Given Italy's legislation on local elections, I consider only mayors who are in their first term. The only exception is the municipalities below 3,000 residents, for which the two-terms limit does not apply since 2014 (De Benedetto and De Paola, 2019). The function for the study has the following form:

$$Y_{it} = \alpha + \beta * D_{it-1} + \mu_i + \lambda_t + X'_{it} + \epsilon_{it}$$

where Y_{it} represent the reelection dummy for municipality i and election year t , D_{it-1} is the dummy stating whether the municipality had a refugee centre opened

³³Most of Italian municipalities' mayors are independent or difficult to relate to a single party or coalition. Nonetheless, there are significant differences between CAS and SAI municipalities that I address by controlling for mayor's political affiliation.

Table 30: Descriptive statistics mayors' - 2013

	Type of refugee center		Test
	CAS	SAI	
N	1,827 (83.0%)	373 (17.0%)	
Local representative's age	53.225	52.233	0.084
Electorate	5,271.099	5,472.668	0.634
Local representative's education attainment			
Post-graduate/PhD	5 (0.3%)	2 (0.6%)	0.337
Degree	824 (46.7%)	181 (52.2%)	
Elementary school	11 (0.6%)	2 (0.6%)	
Middle school	123 (7.0%)	19 (5.5%)	
Secondary school	780 (44.2%)	137 (39.5%)	
Professional diploma	21 (1.2%)	6 (1.7%)	
Local representative's professional title			
Architect	17 (5.9%)	2 (2.9%)	0.096
Lawyer	40 (13.9%)	17 (24.6%)	
Graduate	103 (35.8%)	18 (26.1%)	
Surveyor	28 (9.7%)	4 (5.8%)	
Engineer	24 (8.3%)	7 (10.1%)	
Teacher	9 (3.1%)	1 (1.4%)	
Physician	26 (9.0%)	12 (17.4%)	
Professor	16 (5.6%)	5 (7.2%)	
Accountant	25 (8.7%)	3 (4.3%)	
Political orientation			
Independent	1,357 (74.3%)	300 (80.4%)	0.005
Left	191 (10.5%)	35 (9.4%)	
Liberal	46 (2.5%)	13 (3.5%)	
Right	233 (12.8%)	25 (6.7%)	
Political colour of winning party			
Centre	22 (1.2%)	1 (0.3%)	0.092
Centre-Left	731 (40.0%)	155 (41.6%)	
Centre-Right	367 (20.1%)	75 (20.1%)	
Left	0 (0.0%)	1 (0.3%)	
Populist	649 (35.5%)	134 (35.9%)	
Right	58 (3.2%)	7 (1.9%)	

Department of Internal and Territorial Affairs: <https://dait.interno.gov.it/elezioni/open-data>. The political colour of winning party represents the coalition which secured the highest number of votes in the municipality in the 2013 national election. The political representation instead represents the coalition supporting the mayor at the last local election. I represent only municipalities with less than 5000 residents. These are the municipalities that will open either a CAS or a SAI centre between 2002 and 2021. I keep only observations for which I have data for all the time-frame.

the term before the election ³⁴, μ_i and λ_t are municipality and election-time fixed effects, respectively. X'_{it} represents the vector of the aforementioned covariates.

In tables 30 and 31 I show mayor's characteristics between municipalities that will experience the opening a refugee centre after 2014, comparing them between 2013 and 2018. In 2013, future CAS-treated municipalities were not substantially different from future SAI-treated in terms of mayor's education level, age or profession, size of the electorate or the outcome at the national elections of 2013 (i.e. "political colour of winning party"). They were different in terms of mayor's political orientation, with mayors of future CAS-treated municipalities being more right-leaning than those with SAI. This suggests that although there is evidence of a relevant change in municipalities for what concerns national elections between 2013 and 2018, the two groups were substantially different for mayor's political colour (although the

³⁴I do not consider centres opened two terms before, I study only the effect on the first election after the opening

Table 31: Descriptive statistics mayors' - 2018

	Type of refugee center		Test
	CAS	SAI	
N	1,837 (83.2%)	370 (16.8%)	
Local representative's age	53.205	52.238	0.108
Electorate	5,280.929	5,225.422	0.894
Local representative's education attainment			
Post-graduate/PhD	13 (0.7%)	2 (0.6%)	0.003
Degree	822 (46.5%)	207 (58.0%)	
Elementary school	7 (0.4%)	0 (0.0%)	
Middle school	125 (7.1%)	14 (3.9%)	
Secondary school	779 (44.1%)	130 (36.4%)	
Professional diploma	20 (1.1%)	4 (1.1%)	
Local representative's professional title			
Architect	28 (6.7%)	3 (3.1%)	0.226
Lawyer	64 (15.2%)	25 (26.0%)	
Graduate	161 (38.3%)	29 (30.2%)	
Surveyor	36 (8.6%)	7 (7.3%)	
Engineer	34 (8.1%)	8 (8.3%)	
Teacher	18 (4.3%)	3 (3.1%)	
Physician	36 (8.6%)	12 (12.5%)	
MP	1 (0.2%)	1 (1.0%)	
Professor	12 (2.9%)	3 (3.1%)	
Accountant	30 (7.1%)	5 (5.2%)	
Political orientation			
Independent	1,535 (83.6%)	327 (88.4%)	<0.001
Left	136 (7.4%)	26 (7.0%)	
Liberal	51 (2.8%)	13 (3.5%)	
Right	115 (6.3%)	4 (1.1%)	
Political colour of winning party			
Centre	1 (0.1%)	1 (0.3%)	<0.001
Centre-Left	177 (9.6%)	15 (4.1%)	
Centre-Right	8 (0.4%)	8 (2.2%)	
Left	0 (0.0%)	1 (0.3%)	
Populist	740 (40.3%)	272 (73.5%)	
Right	911 (49.6%)	73 (19.7%)	

Department of Internal and Territorial Affairs: <https://dait.interno.gov.it/elezioni/open-data>. The political colour of winning party represents the coalition which secured the highest number of votes in the municipality in the 2018 national election. The political representation instead represents the coalition supporting the mayor at the last local election. I represent only municipalities with less than 5000 residents. These are the municipalities that will open either a CAS or a SAI centre between 2002 and 2021. I keep only observations for which I have data for all the time-frame.

majority of them is independent).

To address this issue, as a second step, I consider also this political difference in the allocation of both SAI and CAS centre. Although the decision of opening a SAI centres comes from the local administration, there is no certainty for what concerns the political outcome of the project in terms of local elections. If a mayor can be associated to a national party (i.e. not independent) this could affect his or her reelection chances, given voters' perception regarding the overall party's reputation. The relevance between national MPs and local councils behaviour has been previously studied (Limosani and Navarra, 2001). On the other way, the central government is the one in charge of assigning the CAS centres through public competitions. The assignment can be considered a quasi-random experiment (Campo et al., 2021), so there should not be any self-selection or selection bias in this analysis. Nonetheless, if these centres are perceived as a negative asset for the community, a positive (neg-

ative) relation between the central government and the local administration could positively (negatively) affect the incumbent’s chances at the upcoming election, e.g. if the CAS centre has been opened by a left-wing government, a mayor from the same party could be negatively affected by the presence of the centre too.

I then run a similar TWFE restricting instead to the pre-election year and using only the first term in which a refugee centre has been opened for the treated. As before, the same municipalities can have multiple elections included in the sample, but treated municipalities are limited to only one election. The function takes the following form:

$$Y_{it} = \alpha + \beta * D_{it} + \mu_i + \lambda_t + X'_{it} + \epsilon_{it}$$

which is similar as the one before, only now Y_{it} represents the refugee centre dummy for municipality i and year t , while D_{it} is the dummy stating whether the mayor has been supported for her election by the same coalition as the one in government. As additional step, I run another model where the independent variable is the most voted coalition or party in the last national election. National and local politics are substantially different, considering also how many mayors in Italy are not associated to a national party but are rather running as independent. Nonetheless, this analysis might also help understand whether the municipality’s political stance might affect the choice of CAS location.

Differently from the first analysis, in this regression the dependent variable is the opening of a refugee centre in that term, either CAS or SAI, which takes values one or zero. For the treated units, I restrict the analysis to only the terms in which a CAS or SAI centres has been opened. For the treated municipality, I exclude all the terms after the first opening of the centre. The main independent variable signals whether the incumbent mayors have been supported for their election by a list, a party, or a coalition which is part of the current government. The dummy “government-mayor” takes value of one whether the mayor has the same political colour of the central government, zero otherwise. Using the same controls as the previous analysis, I also divide results by regional area (North, centre, South) and whether the central government is centre-left. In the time-frame considered (2014-2021) the majority of the governments were led by the central-left party PD, with support by either the centre-right party People of Freedom (from February 2014 to June 2018)³⁵ or the populist party Five Star Movement (from September 2019 to February 2021). The anti-immigration government formed by *The League* and the *5MS* after the national

³⁵Italian Government official website: <https://www.governo.it/it/i-governi-dal-1943-ad-oggi/xvii-legislatura-dal-15032013/governo-renzi-dal-22022014/329>

elections of the 2018 lasted only one year, taking office in June 2018 and resigning in August 2019. Although during this year, the League-Five Star Movement government substantially changed part of the refugee system, lowering the government contribution for refugee centres and reviewing the system ([Senato della Repubblica, 2018](#)), this last coalition does not provide enough data due to the short time span. I restrict the additional analysis to centre-left governments which cover most of the period.

3.5 Results

3.5.1 Results for mayor's reelection

In this section, I present the results for the first analysis. Tables 32 and 33 present the results for all Italy. Columns (1) represent a simple TWFE with municipality and time-fixed effects, columns (2) represent the same model conditional on municipality and mayor's covariates. CAS openings are positively correlated with the chances of the mayor to be reelected, even when including these controls³⁶. SAI openings do not seem to have the same effects instead (table 33). Given Italy's heterogeneous composition in terms of economic, social, and political variables, I divide the analysis by geographical areas, focusing on the North-South division³⁷. Although the strong presence of CAS centres in Northern municipalities, results are no longer significant in this subsample (table 34), while SAI centres become highly significant and robust to controls (table 35), with a much larger coefficient than the one for CAS opening for all Italy. For what concerns the South of Italy, coefficients are smaller and non significant, for both types of centres (tables 36-37).

These first results help understand how refugee centres might have different or similar effects depending also on geographic location within the Italian territory. CAS centres were institutionalised and started to be opened during the centre-left government in the period 2015-2018, with the highest of municipalities with a CAS centre in 2017 ([Campo et al., 2021](#)). Most of them were opened in the Northern region, which represents also the stronghold for the anti-immigration party The League. Previous results by [Bratti et al. \(2020\)](#) show how proximity to a refugee centre increases support for right-wing parties. On the other hand, for what concerns SAI centres, although the majority of SAI centres were opened in the South of Italy, their presence in the North as well remains non-negligible, representing more than 30% of the total (table 29). There is evidence of decreasing support of far-right

³⁶The conditional TWFE coefficient is significant with a p-value of 0.054, slightly above 5% but still quite robust

³⁷Results for the centre of Italy are almost never statistically significant. See Appendix.

Table 32: CAS centres impact on mayor's reelection - Italy

	(1)	(2)
	Mayor's re-election	Mayor's re-election
CAS opening	0.0939*** (0.0298)	0.0609* (0.0316)
Turnout		0.147 (0.312)
Electorate		0.000304** (0.000125)
Male voters		-0.000381 (0.000381)
Female voters		-0.000279 (0.000303)
Mayor's characteristics	No	Yes
Previous mayor's characteristics	No	Yes
N	8174	6440
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Adjusted-R squared	0.430	0.506

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 33: SAI centres impact on mayor's reelection - Italy

	(1)	(2)
	Mayor's re-election	Mayor's re-election
SAI opening	0.0957 (0.0610)	0.0759 (0.0652)
Turnout		0.374 (0.341)
Electorate		0.000136 (0.000175)
Male voters		-0.0000658 (0.000523)
Female voters		-0.000527 (0.000431)
Mayor's characteristics	No	Yes
Previous mayor's characteristics	No	Yes
N	6210	4871
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Adjusted-R squared	0.421	0.498

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 34: CAS centres impact on mayor's reelection - North of Italy

	(1)	(2)
	Mayor's re-election	Mayor's re-election
CAS opening	0.0944*** (0.0362)	0.0350 (0.0383)
Turnout		0.0612 (0.385)
Electorate		0.000697*** (0.000188)
Male voters		-0.00112* (0.000633)
Female voters		-0.000182 (0.000451)
Mayor's characteristics	No	Yes
Previous mayor's characteristics	No	Yes
N	4946	4010
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Adjusted-R squared	0.423	0.504

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 35: SAI centres impact on mayor's reelection - North of Italy

	(1)	(2)
	Mayor's re-election	Mayor's re-election
SAI opening	0.257** (0.113)	0.244** (0.115)
Turnout		0.609 (0.463)
Electorate		0.000848** (0.000372)
Male voters		-0.00177* (0.00105)
Female voters		-0.000448 (0.000823)
Mayor's characteristics	No	Yes
Previous mayor's characteristics	No	Yes
N	3447	2780
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Adjusted-R squared	0.412	0.494

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 36: CAS centres impact on mayor's reelection - South of Italy

	(1)	(2)
	Mayor's re-election	Mayor's re-election
CAS opening	0.131*	0.0853
	(0.0789)	(0.0913)
Turnout		1.139
		(0.774)
Electorate		0.0000136
		(0.000215)
Male voters		-0.000337
		(0.000604)
Female voters		0.0000824
		(0.000466)
Mayor's characteristics	No	Yes
Previous mayor's characteristics	No	Yes
N	1802	1264
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Adjusted-R squared	0.464	0.510

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 37: SAI centres impact on mayor's reelection - South of Italy

	(1)	(2)
	Mayor's re-election	Mayor's re-election
SAI opening	0.0681	0.00546
	(0.0799)	(0.0947)
Turnout		1.389*
		(0.763)
Electorate		-0.000174
		(0.000248)
Male voters		0.0000715
		(0.000809)
Female voters		-0.000547
		(0.000586)
Mayor's characteristics	No	Yes
Previous mayor's characteristics	No	Yes
N	1695	1210
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Adjusted-R squared	0.458	0.510

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

parties for SAI centres compared to CAS, with positive effects for more moderate parties such as Forza Italia and PD (Gamalerio et al., 2023). The positive impact that SAI centres have in the North of Italy and the absence of significant impact of CAS on local elections might underline significant differences between national and local politics.

3.5.2 Results for CAS and SAI political allocation

In this section, I extend the analysis by focusing on a possible relation between the opening of the refugee centre and the political colour of both the mayor and the municipality. Using the pre-election year, I study whether the opening of a CAS or SAI centre may be correlated with the political stance that the mayor or the municipality has compared to the current central government. The dependent variable is a dummy taking value of one if the refugee centre has been opened in that term and zero otherwise. The main independent variable is a dummy taking value of one whether the mayor in that term has won the election with the support of the same coalition as the current government. To provide an example, between 2013 and 2017 the main coalition in government was formed by the centre-left (PD) and the centre-right (Forza Italia). If one mayor has secured the first term with the support of one of these two parties the dummy takes value of one. Tables 38 and 39 present the results for the analysis for Italy for CAS and SAI, respectively. Columns (1) and (2) represent the model where the main independent variable is the mayor's coalition. In columns (3) and (4) the main variable is instead the municipality's most-voted list in last election (either 2013 or 2018).

In table 38 for CAS, the coefficients in columns (1) and (2) are negative and highly statistically significant, while the results for the national elections results are smaller and non statistically relevant. Mayor's affiliation seems to have a non-negligible impact on CAS allocation, while the colour of the municipality does not appear to matter as well. This impact seems to be driven mainly by the municipalities in the North (table 40), while in the South is still negative and significant even if less strong (table 42). In table 39 for SAI centres in Italy the effects are still negative but non significant. They become relevant when restricting the Northern region. More interesting, the coefficient here is highly positive (table 41, column (2)). The opening of a SAI centre seems to be positively correlated with the affiliation of the mayor with the current government. For municipalities in the South, this effect becomes instead negative and significant, although not as before (table 43).

Figures 58 and 59 show the distribution of CAS and SAI centres compared to mayor's

Table 38: CAS political allocation - Italy

	(1)	(2)	(3)	(4)
	CAS opening	CAS opening	CAS opening	CAS opening
Mayor same as gov	-0.137*** (0.0183)	-0.0875*** (0.0201)		
Municipality same as gov			-0.00939 (0.0172)	-0.0276 (0.0175)
Turnout		-0.730** (0.297)		-0.626** (0.297)
Electorate		0.000252*** (0.0000802)		0.000340*** (0.0000783)
Male voters		0.000175 (0.000245)		0.000130 (0.000247)
Female voters		-0.000784*** (0.000209)		-0.000930*** (0.000207)
Mayor's characteristics	No	Yes	No	Yes
N	3385	3125	3385	3125
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.599	0.618	0.586	0.614

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 39: SAI political allocation - Italy

	(1)	(2)	(3)	(4)
	SAI opening	SAI opening	SAI opening	SAI opening
Mayor same as gov	-0.0149 (0.0134)	-0.0162 (0.0145)		
Municipality same as gov			-0.0159 (0.0111)	-0.0173 (0.0118)
Turnout		-0.143 (0.185)		-0.130 (0.184)
Electorate		-0.000147** (0.0000662)		-0.000133** (0.0000655)
Male voters		0.000469** (0.000200)		0.000441** (0.000199)
Female voters		-0.000365* (0.000187)		-0.000376** (0.000187)
Mayor's characteristics	No	Yes	No	Yes
N	2496	2303	2496	2303
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.518	0.523	0.518	0.524

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 40: CAS political allocation - North of Italy

	(1)	(2)	(3)	(4)
	CAS opening	CAS opening	CAS opening	CAS opening
Mayor same as gov	-0.150*** (0.0266)	-0.0848*** (0.0294)		
Municipality same as gov			-0.00555 (0.0259)	-0.0232 (0.0254)
Turnout		-1.532*** (0.414)		-1.489*** (0.416)
Electorate		0.000177 (0.000137)		0.000305** (0.000131)
Male voters		0.00110** (0.000451)		0.000963** (0.000452)
Female voters		-0.00154*** (0.000337)		-0.00164*** (0.000337)
Mayor's characteristics	No	Yes	No	Yes
N	1669	1560	1669	1560
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.628	0.663	0.614	0.659

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 41: SAI political allocation - North of Italy

	(1)	(2)	(3)	(4)
	SAI opening	SAI opening	SAI opening	SAI opening
Mayor same as gov	0.0177 (0.0140)	0.0310** (0.0155)		
Municipality same as gov			-0.0273** (0.0117)	-0.0263** (0.0122)
Turnout		-0.205 (0.184)		-0.249 (0.184)
Electorate		0.000233** (0.0000927)		0.000169* (0.0000897)
Male voters		-0.000240 (0.000305)		-0.000136 (0.000303)
Female voters		-0.000148 (0.000257)		-0.000163 (0.000257)
Mayor's characteristics	No	Yes	No	Yes
N	1063	990	1063	990
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.516	0.530	0.520	0.530

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Figure 58: CAS allocation and mayor's affiliation with the current government in 2017 - Italy

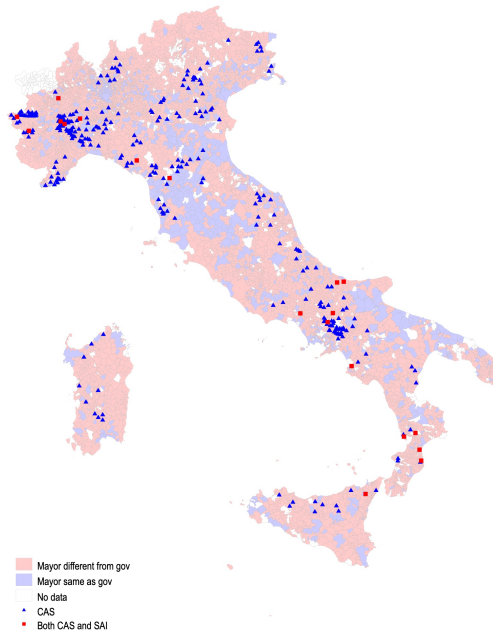
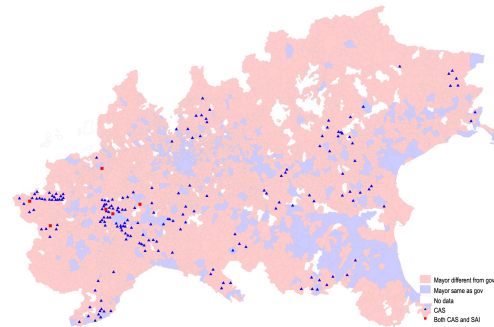


Figure 59: CAS allocation and mayor's affiliation with the current government in 2017 - North of Italy



political affiliation with the government. The majority of CAS centres seems to be located where the mayor has secured the term with the support of a coalition or a party different from the ones in government.

3.6 Discussion

From this study, refugee centres appear to have a non-negligible impact on local elections. This effect is heterogeneous depending on the design of the centre and across geographical areas. SAI centres can foster integration and help refugee integrate with the local community. They are managed by the local council and mostly financed by the central government through financial grants, resulting in possible positive spillovers for the economic resources of the local administration (Gamalerio et al., 2023). When considering their impact at the national level, they do not seem to help mayor's chances of reelection. Restricting only to the Northern region, they have instead a significant and positive impact (around 22%). This effect is almost null in the South. On the other side, CAS centres are temporary facilities with less integration and are government-run. While a weak but positive impact appears at the national level, their effect disappear for both North and South.

This division between the North and South of Italy has been addressed by other studies on political participation. There is evidence of a substantial difference in social or civic capital between the two areas, where the North has historically higher

Table 42: CAS political allocation - South of Italy

	(1)	(2)	(3)	(4)
	CAS opening	CAS opening	CAS opening	CAS opening
Mayor same as gov	-0.0621** (0.0294)	-0.0553* (0.0302)		
Municipality same as gov			0.0610* (0.0319)	0.0540 (0.0345)
Turnout		0.400 (0.497)		0.483 (0.497)
Electorate		0.000271** (0.000123)		0.000259** (0.000124)
Male voters		-0.00111*** (0.000292)		-0.00106*** (0.000294)
Female voters		0.000681** (0.000297)		0.000666** (0.000297)
Mayor's characteristics	No	Yes	No	Yes
N	1091	1004	1091	1004
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.544	0.563	0.544	0.562

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 43: SAI political allocation - South of Italy

	(1)	(2)	(3)	(4)
	SAI opening	SAI opening	SAI opening	SAI opening
Mayor same as gov	-0.0645** (0.0275)	-0.0507* (0.0293)		
Municipality same as gov			-0.00184 (0.0286)	0.00744 (0.0316)
Turnout		0.324 (0.440)		0.318 (0.442)
Electorate		-0.000184 (0.000125)		-0.000205 (0.000126)
Male voters		0.000459 (0.000325)		0.000427 (0.000325)
Female voters		-0.000310 (0.000300)		-0.000249 (0.000300)
Mayor's characteristics	No	Yes	No	Yes
N	995	919	995	919
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.536	0.544	0.531	0.541

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

levels compared to the South (Putnam, 1994; Guiso et al., 2004). Guiso et al. (2010) define social (or “civic”) capital as *those persistent and shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities*. Communities with higher levels of social capital show more interest in public issues, solidarity, higher presence of social and cultural associations, etc. This has effects on political processes too. De Benedetto and De Paola (2016) show how incumbency increases turnout in the South but decreases it the North. They relate this divergence to different levels of social capital, which influences political accountability. Voters with higher social capital are more likely to cast their vote more on the base of social welfare rather than personal interests (Nannicini et al., 2013). In the context of SAI centres, communities with higher values of social capital might value projects fostering integration and solidarity more positively than others. Evidence from Germany shows how higher civic engagement leads to better integration of refugees (Barreto et al., 2022). They might benefit more mayors in communities which have higher consideration of social issues such as international protection for refugees.

Moreover, low levels of civic capital can also produce more inefficiency and corruption (Putnam, 1994). The Integrated System of Asylum is sponsored and financed by the central government but it is run at the local level by NGOs and local associations, other than by the municipality. Not all SAI projects might provide the same quality of services and integration. Whether levels of civic capital are low, opportunities for clientelism and private gains are higher (De Benedetto and De Paola, 2016). The resources for the projects might be used for personal interests rather than for refugees integration, resulting in less efficient social outcomes that could instead benefit the community. There is evidence on how public procurement processes by governments are the ones most vulnerable to corruption (OECD, 2009). On refugee centres in Italy, Luca and Proietti (2022) provide interesting evidence of possible corruption in the assignment of the SAI projects. Their results show how municipalities with highest levels of Mafia infiltration are more likely to open a hosting facility. Although they run the analysis for all Italy, the highest levels of organised crime infiltration involve regions in the South, which are also the areas in which the majority of SAI centres opened. The positive social, economic, and political gains coming from these centres could be significantly reduced compared to other regions less exposed to corruption.

For what concerns the second analysis on refugee centres allocation, these results provide evidence on a possible strategic behaviour by the central government in the allocation of the CAS centres. In Italy, after several federal reforms, formal institu-

tional channels between central and regional governments have become weaker, while party politics have steadily increase its role in shaping territorial needs (Palermo and Wilson, 2014). Evidence from Italy shows how national politics can influence local politicians' behaviour (Limosani and Navarra, 2001). It is not implausible to believe that, in the assignment of the hosting facilities, the central government might decide to act strategically, given political opportunities.

The work by Campo et al. (2021) shows how CAS are treated as a quasi-random experiment, given their supposed random allocation through the so-called "dispersal policy". The number of asylum seekers is assigned to different provinces according to resident population-size. After that, CAS centres are assigned to specific municipalities by the local representative of the central State, i.e. prefectures. While the management of the centre is assigned through fast and simplified public procurement bids to private actors and NGOs (Ricard-Guay, 2019), the choice of the municipality itself is not clear and seems to be entitled to the local prefect. This role is directly appointed by the Minister of the Interior (Italian Legislative Decree n°266, 2000). There is no evidence of particular restrictions on the choice of the role. According to the NGO OpenPolis, numbers of prefects nominations may vary depending on the Ministers themselves. In Italy there are 102 prefectures and on average the Minister of the Interior appoint between 40 and 50 new prefects a year³⁸.

As the Prefectures represent the central government, their actions could follow ministerial directives and represent the Minister of the Interior's political view. The negative relation emerged by the analysis between mayors and government's political party suggests a possible bias in the location of the these centres. The coefficient remains negative and significant even when dividing between North and South. For the central government, it might be convenient to locate these centres in municipalities' of the opposite political party. As stated before, coordination with the local administration is not required for these emergency facilities (Campomori and Ambrosini, 2020). Moreover, this fast and emergency-oriented approach led to many CAS centers showing low quality standards and poor management (ANCI, 2022). The previous study, although quite simple, provide empirical evidence of this possible bias in the location of emergency hosting facilities.

On the other way, SAI centres are assigned through a public tender to which the municipalities are the ones applying. They can represent useful financial resources for the municipality itself and provide possible social and economic benefits. Nonethe-

³⁸OpenPolis: <https://www.openpolis.it/parole/chi-nomina-i-prefetti/>. When he was Minister of the Interior between 2018 and 2019, the leader of the right-wing populist party The League Matteo Salvini, appointed 70 new prefects, with an average of 56 prefects a year

less, evidence by (Gamalerio et al., 2023) shows how mayors are wary of applying in the last year before running for re-election for fear of political backlash. Governments have tried to provide incentives to municipalities for the implementation of the SAI system. According to Campomori and Ambrosini (2020), municipalities who applied for a SAI centres could be exempted from additional reception centres, i.e. CAS. Given the possibility of providing additional financial resources, it is plausible that the central government had a preference of involving in the SAI system municipalities with mayors from the same political party. This would explain the positive and significant relation from the previous analysis between mayors' affiliation with the central government and the opening of SAI centres.

3.7 Conclusions

The findings of this chapter underscore the political significance of refugee centers in Italian municipalities, revealing a complex relationship between center type, regional characteristics, and political outcomes. SAI centers, which emphasize integration, appear to enhance the re-election prospects of mayors in areas with high social capital, notably in Northern Italy. This positive effect may reflect the value that communities with robust civic engagement place on inclusive social policies. Conversely, CAS centers, which offer fewer integration opportunities and are often imposed by the national government, exhibit minimal influence on re-election chances. The regional heterogeneity observed in these effects suggests that the political implications of refugee centers are shaped not only by the facilities' characteristics but also by local civic capital and regional differences.

The study highlights the need for policymakers to consider the political and social contexts in which refugee centers operate. Integrative facilities such as SAI may foster local support when managed transparently and in alignment with local interests, whereas CAS centers might contribute to political tensions, especially in regions with low civic capital. Further research could focus more on the role of NGOs and the effectiveness of the refugees facilities in terms of welfare for both asylum seekers and the hosting community.

A Appendix Chapter 2

A.1 Images event study for population

Figure 60: Event study on total population - CAS centres

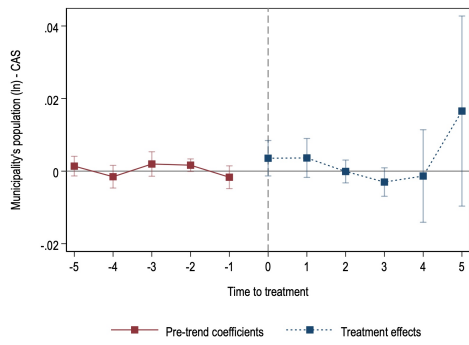


Figure 61: Event study on total population - SAI centres

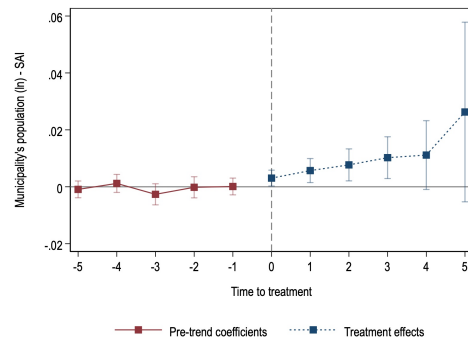


Figure 62: Event study on foreign population - CAS centres

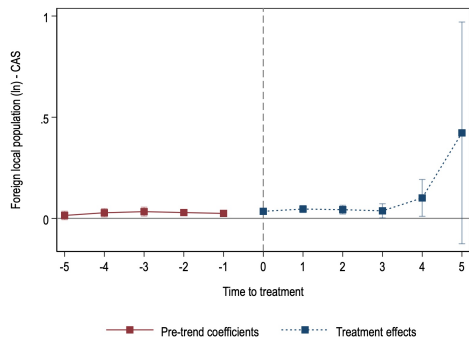


Figure 63: Event study on foreign population - SAI centres

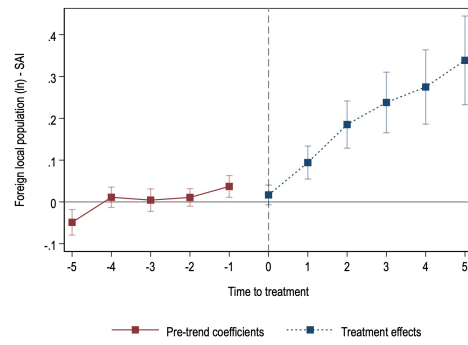


Figure 64: Event study on African population - CAS centres

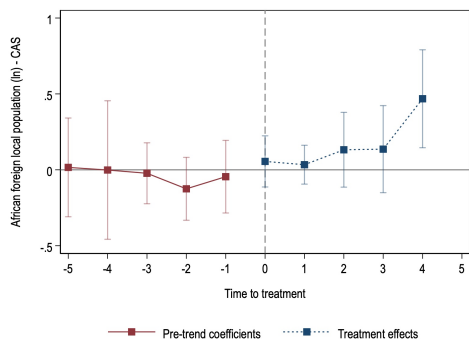
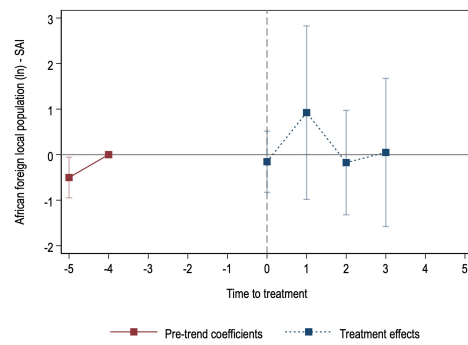


Figure 65: Event study on African population - SAI centres



A.2 Images event study for total spending

Figure 66: Event study on total current - CAS centres

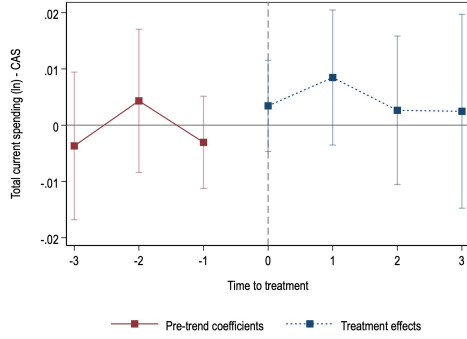


Figure 67: Event study on total current - SAI centres

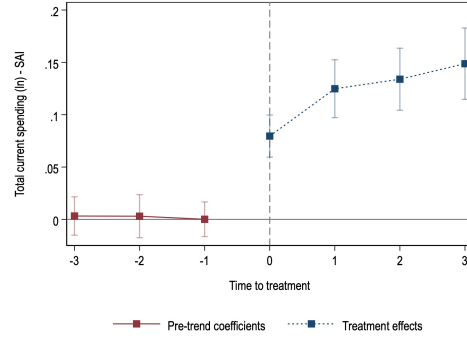


Figure 68: Event study on total current (goods and services) - CAS centres

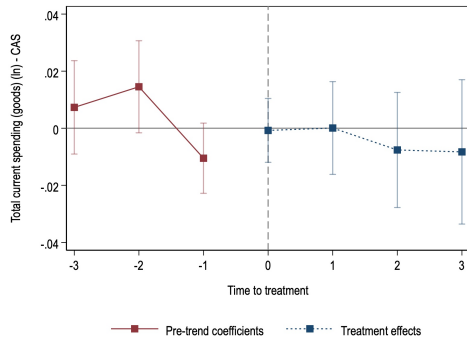


Figure 69: Event study on total current (goods and services) - SAI centres

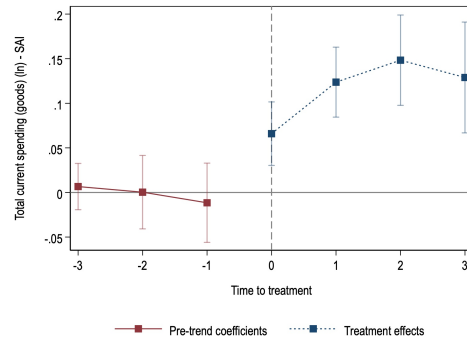


Figure 70: Event study on total current (transfers) - CAS centres

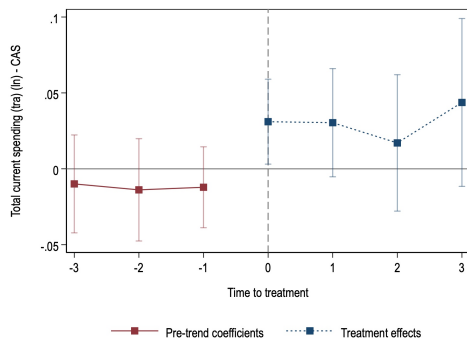
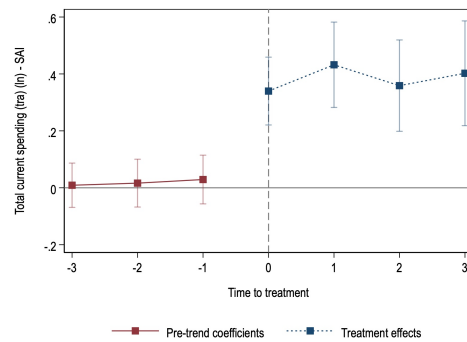


Figure 71: Event study on total current (transfers) - SAI centres



A.3 Images event study for total spending (net of government funding)

Figure 72: Event study on total current (net of gov funds) - SAI centres

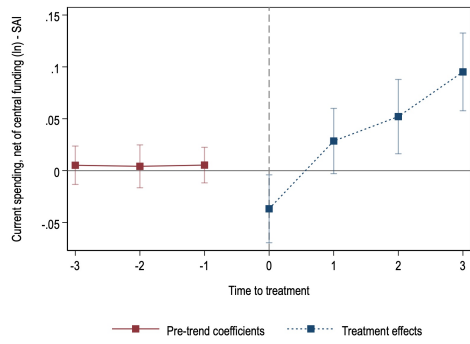
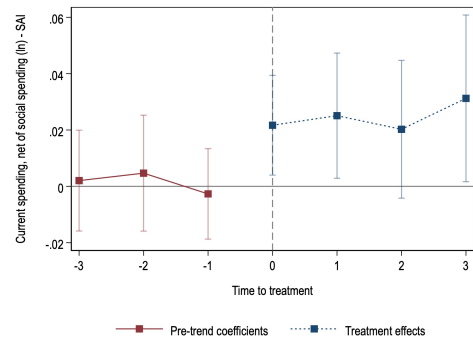


Figure 73: Event study on total current (net of social spending) - SAI centres



A.4 Images event study for current spending on police

Figure 74: Event study on current spending on police - CAS centres

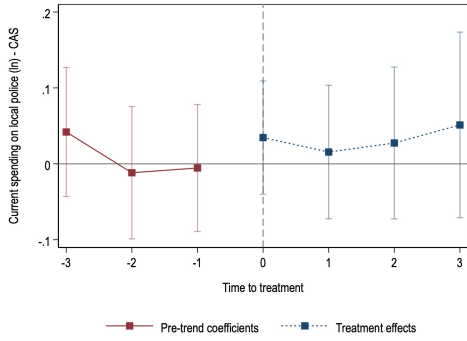


Figure 75: Event study on current spending on police - SAI centres

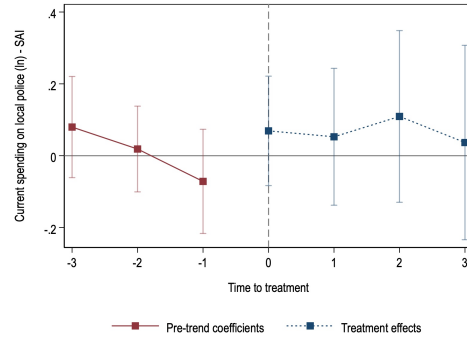


Figure 76: Event study on current spending on police (goods and services) - CAS centres

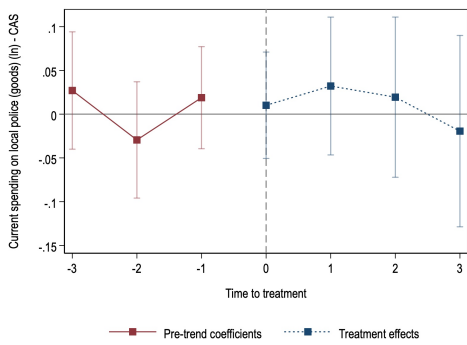


Figure 77: Event study on current spending on police (goods and services) - SAI centres

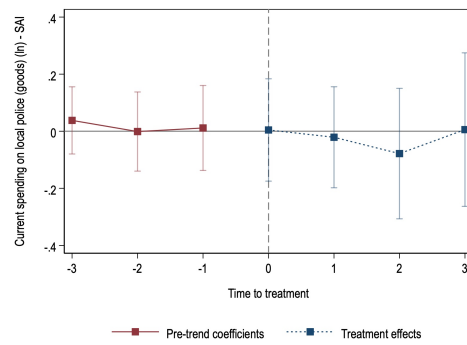


Figure 78: Event study on current spending on police (personnel) - CAS centres

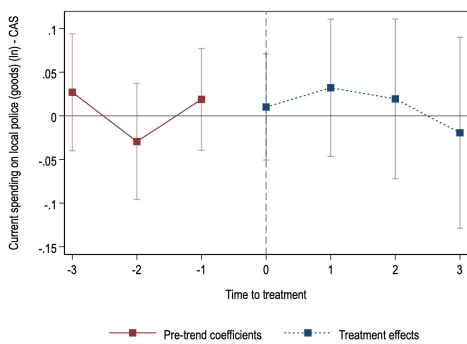


Figure 79: Event study on current spending on police (personnel) - SAI centres

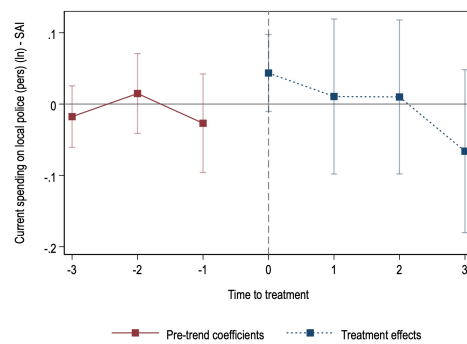


Figure 80: Event study on current spending on police (transfers) - CAS centres

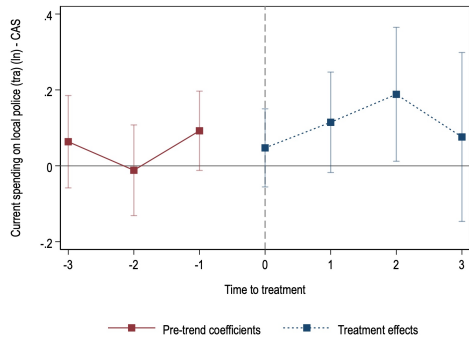
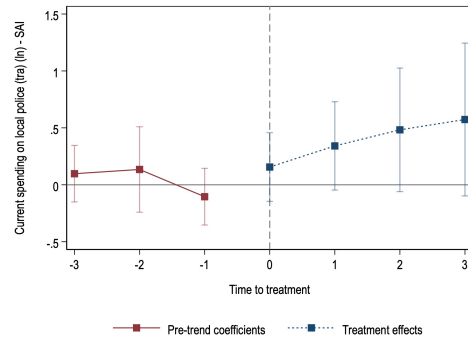


Figure 81: Event study on current spending on police (transfers) - SAI centres



A.5 Images event study for current spending on education

Figure 82: Event study on current spending on education - CAS centres

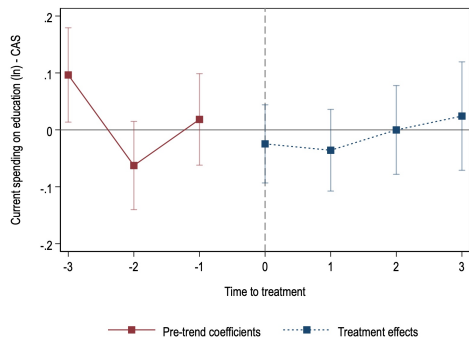
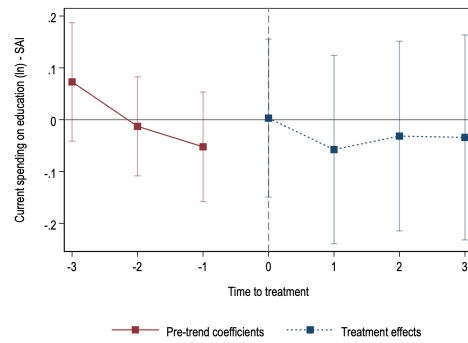


Figure 83: Event study on current spending on education - SAI centres



A.6 Images event study for current spending on culture

Figure 84: Event study on current spending on culture - CAS centres

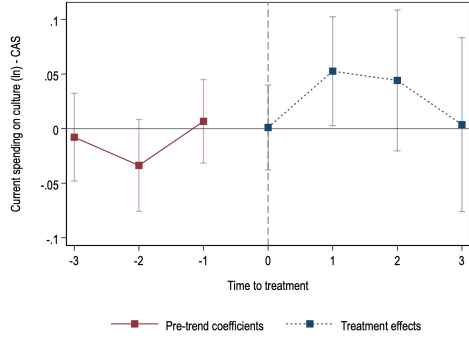


Figure 85: Event study on current spending on culture - SAI centres

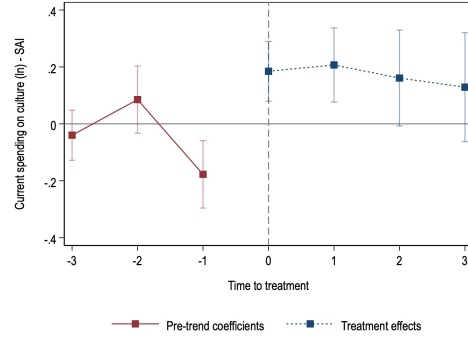


Figure 86: Event study on current spending on culture (goods and services) - CAS centres

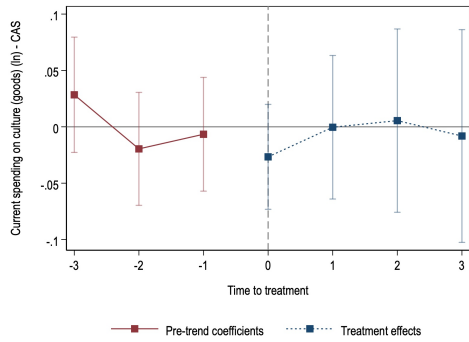


Figure 87: Event study on current spending on culture (goods and service) - SAI centres

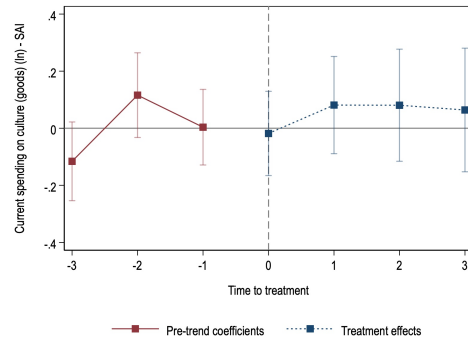


Figure 88: Event study on current spending on culture (personnel) - CAS centres

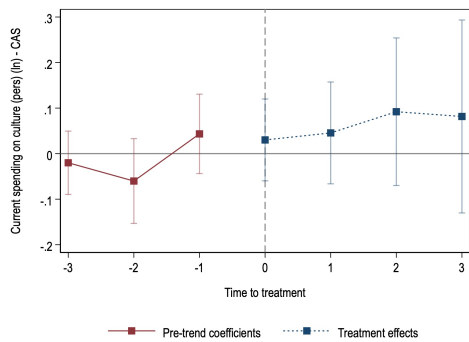


Figure 89: Event study on current spending on culture (personnel) - SAI centres

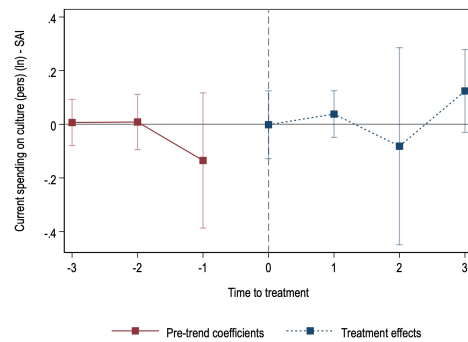


Figure 90: Event study on current spending on culture (transfers) - CAS centres

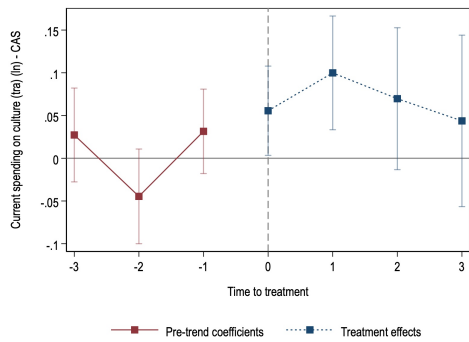
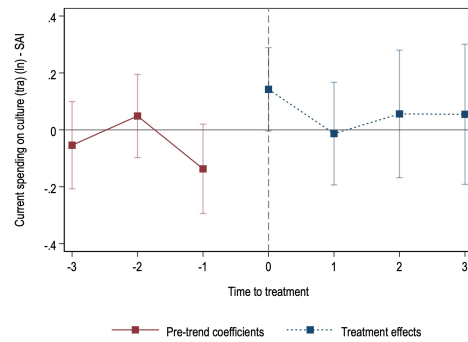


Figure 91: Event study on current spending on culture (transfers) - SAI centres



A.7 Images event study for current spending on tourism

Figure 92: Event study on current spending on tourism - CAS centres

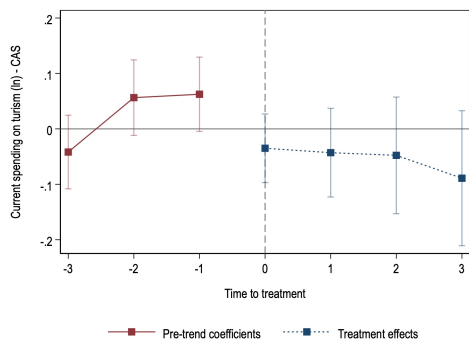


Figure 93: Event study on current spending on tourism - SAI centres

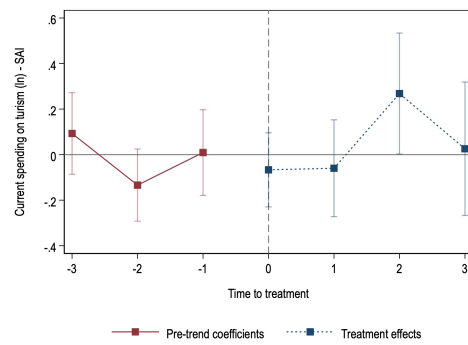


Figure 94: Event study on current spending on tourism (goods and services) - CAS centres

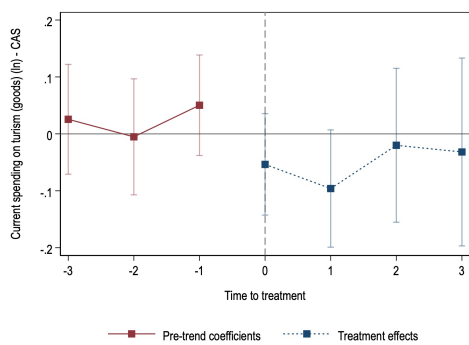


Figure 95: Event study on current spending on tourism (goods and service) - SAI centres

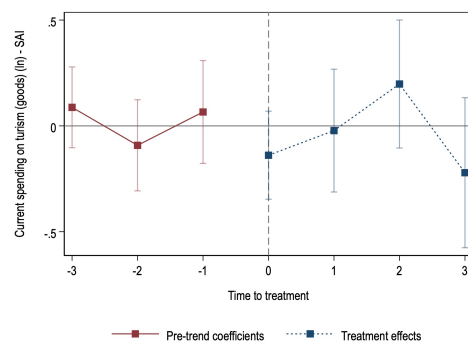


Figure 96: Event study on current spending on tourism (personnel) - CAS centres

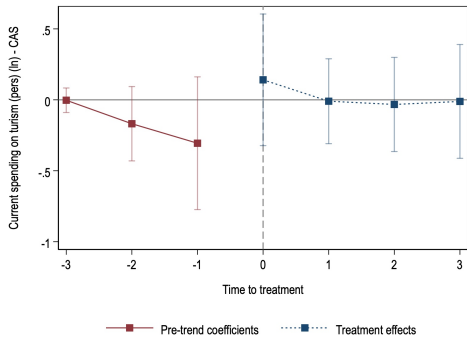


Figure 97: Event study on current spending on tourism (personnel) - SAI centres

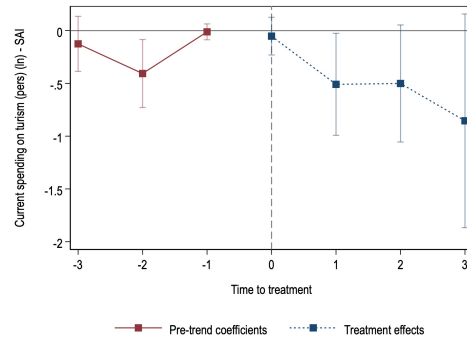


Figure 98: Event study on current spending on tourism (transfers) - CAS centres

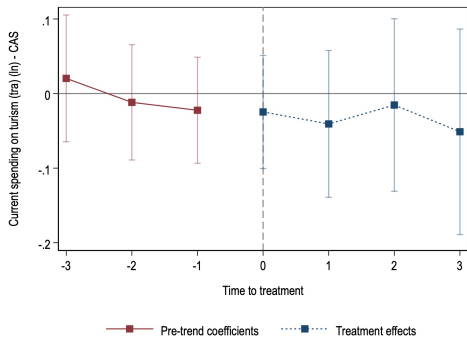
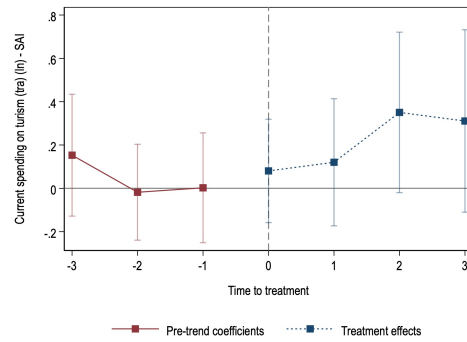


Figure 99: Event study on current spending on tourism (transfers) - SAI centres



A.8 Images event study for number of tourists and tourist reception facilities

Figure 100: Event study on the number of tourists - CAS centres

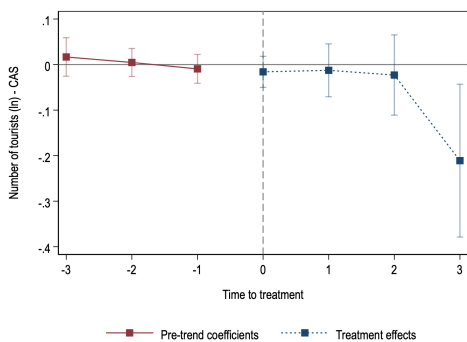


Figure 101: Event study on the number of tourists - SAI centres

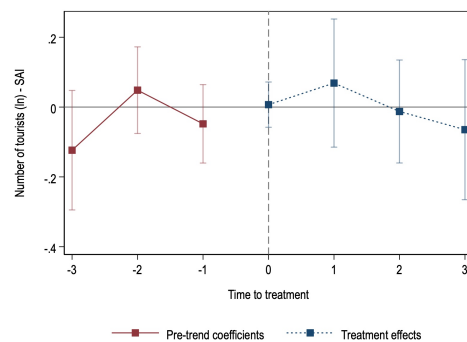


Figure 102: Event study on the number of tourist accommodations - CAS centres

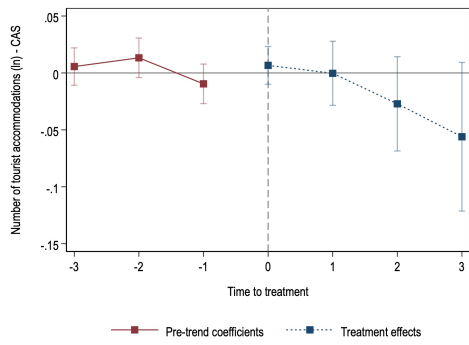


Figure 103: Event study on the number beds in tourists accommodations - CAS centres

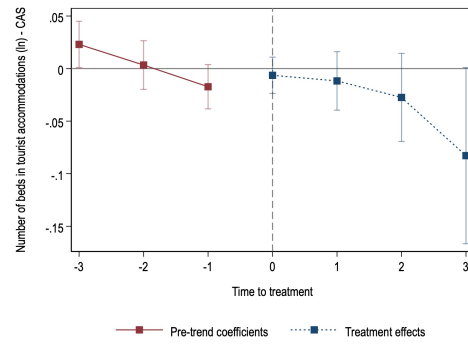


Figure 104: Event study on the number of non-hotels facilities - CAS centres

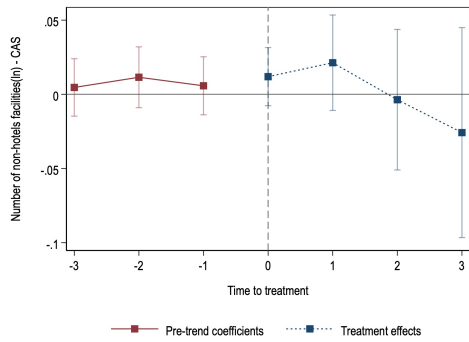


Figure 105: Event study on the number of beds in non-hotels facilities - CAS centres

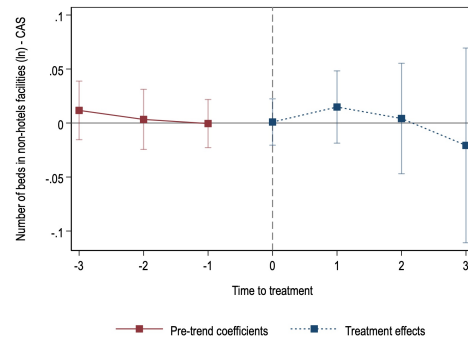


Figure 106: Event study on the number of hotels - CAS centres

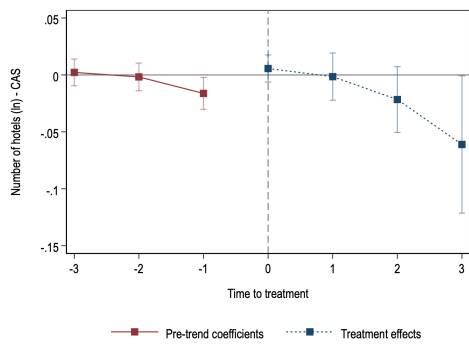
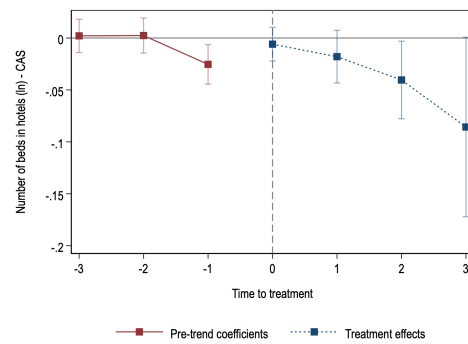


Figure 107: Event study on the number of beds in hotels - CAS centres



A.9 Images event study for current spending on social

Figure 108: Event study on current spending on social - CAS centres

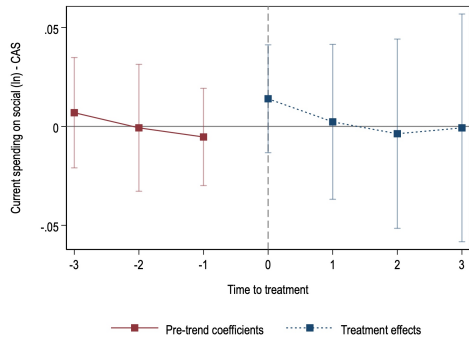


Figure 109: Event study on current spending on social - SAI centres

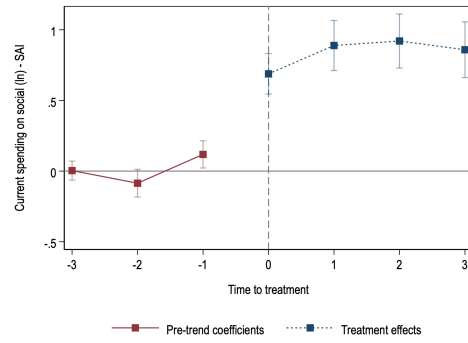


Figure 110: Event study on current spending on social (goods and services) - CAS centres

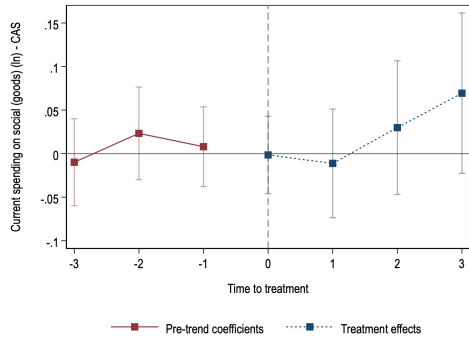


Figure 111: Event study on current spending on social (goods and service) - SAI centres

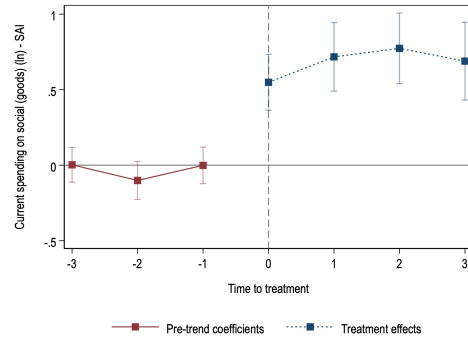


Figure 112: Event study on current spending on social (personnel) - CAS centres

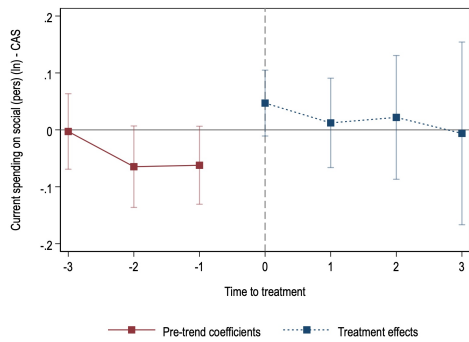
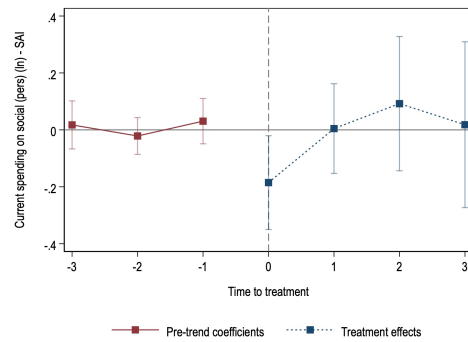


Figure 113: Event study on current spending on social (personnel) - SAI centres



A.10 Tables for total current spending

Figure 114: Event study on current spending on social (transfers) - CAS centres

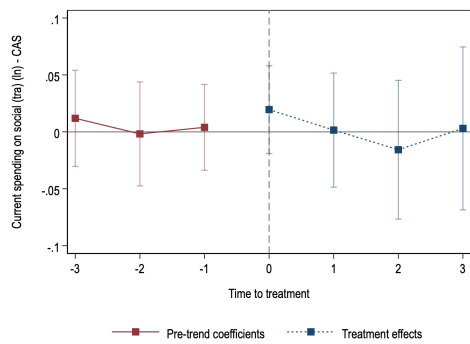
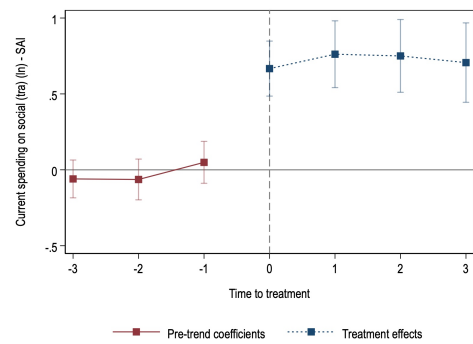


Figure 115: Event study on current spending on social (transfers) - SAI centres



A.11 Tables for total current spending on tourism

A.12 Tables for total current spending on social

Table 44: Results for SAI - total current spending, net of social spending

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.0098 (0.013)	0.0157 (0.011)	-0.0010 (0.018)	0.0246* (0.010)
Pre Average				0.0014 (0.005)
G2009		-0.1702 (0.245)		
G2011		-0.0666*** (0.012)		
G2013		-0.1134** (0.039)		
G2014		-0.0029 (0.025)		
G2015		-0.0370 (0.120)		
G2016		-0.0012 (0.028)		
G2017		0.0705** (0.023)		
G2018		0.0213 (0.018)		
G2019		0.0456 (0.040)		
G2020		0.0238 (0.020)		
G2021		-0.0490 (0.058)		
T2009			0.0130 (0.041)	
T2010			0.0237 (0.062)	
T2011			-0.0212 (0.047)	
T2012			-0.0801* (0.032)	
T2013			-0.0711 (0.065)	
T2014			0.0263 (0.017)	
T2015			0.0298 (0.025)	
T2016			0.0033 (0.021)	
T2017			0.0170 (0.017)	
T2018			0.0176 (0.015)	
T2019			0.0164 (0.015)	
T2020			0.0222 (0.027)	
T2021			-0.0051 (0.026)	
T2022			-0.0053 (0.017)	
Tm3				0.0020 (0.009)
Tm2				0.0047 (0.010)
Tm1				-0.0027 (0.008)
e = 0				0.0217* (0.009)
e = 1				0.0251* (0.011)
e = 2				0.0203 (0.012)
e = 3				0.0312* (0.015)

Table 45: Results for CAS - current spending on tourism

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	-0.0606 (0.039)	-0.0619 (0.039)	-0.0661 (0.039)	-0.0537 (0.038)
Pre Average				0.0257 (0.019)
G2014		0.0746 (0.112)		
G2016		-0.1776 (0.137)		
G2017		-0.0707 (0.101)		
G2018		-0.1028 (0.060)		
G2019		0.0385 (0.067)		
G2020		-0.0944 (0.077)		
G2021		-0.1544 (0.154)		
G2022		-0.2001 (0.262)		
T2014			0.0311 (0.113)	
T2015			-0.1318 (0.116)	
T2016			-0.1593 (0.118)	
T2017			-0.0694 (0.074)	
T2018			0.0043 (0.054)	
T2019			-0.0793 (0.047)	
T2020			-0.0202 (0.061)	
T2021			-0.1100 (0.063)	
T2022			-0.0606 (0.063)	
e = -3				-0.0418 (0.034)
e = -2				0.0564 (0.035)
e = -1				0.0625 (0.034)
e = 0				-0.0350 (0.032)
e = 1				-0.0429 (0.041)
e = 2				-0.0478 (0.054)
e = 3				-0.0890 (0.062)

Table 46: Results for SAI - current spending on social, personnel

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.0884 (0.099)	0.0407 (0.092)	0.0900 (0.062)	-0.0176 (0.075)
Pre Average				0.0088 (0.026)
G2009		0.1721 (0.172)		
G2011		0.0419 (0.033)		
G2013		1.1255 (0.676)		
G2014		0.2750 (0.172)		
G2015		-0.2594 (0.180)		
G2016		0.0077 (0.190)		
G2017		-0.1609 (0.137)		
G2018		-0.1877 (0.220)		
G2019		0.5170 (0.545)		
G2020		0.1502* (0.072)		
G2021		-0.1476 (0.265)		
T2009			0.0929 (0.082)	
T2010			0.1773* (0.086)	
T2011			0.1738* (0.073)	
T2012			0.0491 (0.084)	
T2013			0.0808 (0.120)	
T2014			-0.0750 (0.071)	
T2015			0.0033 (0.088)	
T2016			0.1344 (0.116)	
T2017			0.0979 (0.125)	
T2018			-0.0791 (0.148)	
T2019			0.0502 (0.164)	
T2020			0.1950 (0.162)	
T2021			0.2519 (0.204)	
T2022			0.1077 (0.224)	
Tm3				0.0174 (0.043)
Tm2				-0.0214 (0.033)
Tm1				0.0306 (0.041)
e = 0				-0.1852* (0.084)
e = 1				0.0045 (0.080)
e = 2				0.0921 (0.120)
e = 3				0.0181 (0.149)

Table 47: Results for SAI - current spending on social, transfers

	Simple weighted average	Group-specific effects	Calendar time effects	Event study
ATT	0.8310*** (0.118)	0.6840*** (0.100)	0.8668*** (0.114)	0.7212*** (0.104)
Pre Average				-0.0248 (0.031)
G2009		2.0306* (0.828)		
G2011		0.9720*** (0.169)		
G2013		1.2609 (0.741)		
G2014		1.1520*** (0.274)		
G2015		-0.1078 (0.082)		
G2016		1.2046*** (0.265)		
G2017		0.7835** (0.244)		
G2018		0.2435 (0.166)		
G2019		0.0886 (0.311)		
G2020		-0.0413 (0.184)		
G2021		-0.2025 (0.166)		
T2009			0.1591 (0.153)	
T2010			0.7191*** (0.135)	
T2011			1.1642*** (0.306)	
T2012			0.5926*** (0.161)	
T2013			1.1307 (0.676)	
T2014			1.2994*** (0.227)	
T2015			1.2006*** (0.258)	
T2016			1.0375*** (0.184)	
T2017			1.1141*** (0.174)	
T2018			0.9286*** (0.145)	
T2019			0.9714*** (0.145)	
T2020			0.5812*** (0.129)	
T2021			0.6105*** (0.132)	
T2022			0.6267*** (0.139)	
Tm3				-0.0600 (0.063)
Tm2				-0.0636 (0.068)
Tm1				0.0491 (0.070)
e = 0				0.6667*** (0.092)
e = 1				0.7615*** (0.112)
e = 2				0.7502*** (0.122)
e = 3				0.7063*** (0.133)

B Appendix Chapter 3

B.13 Tables on mayor's reelection

Table 48: CAS centres impact on mayor's reelection - North of Italy

	(1)	(2)
	Mayor's re-election	Mayor's re-election
CAS opening	0.0944*** (0.0362)	0.0350 (0.0383)
Turnout		0.0612 (0.385)
Electorate		0.000697*** (0.000188)
Male voters		-0.00112* (0.000633)
Female voters		-0.000182 (0.000451)
Mayor's characteristics	No	Yes
Previous mayor's characteristics	No	Yes
N	4946	4010
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Adjusted-R squared	0.423	0.504

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 49: CAS centres impact on mayor's reelection - South of Italy

	(1)	(2)
	Mayor's re-election	Mayor's re-election
CAS opening	0.131* (0.0789)	0.0853 (0.0913)
Turnout		1.139 (0.774)
Electorate		0.0000136 (0.000215)
Male voters		-0.000337 (0.000604)
Female voters		0.00000824 (0.000466)
Mayor's characteristics	No	Yes
Previous mayor's characteristics	No	Yes
N	1802	1264
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Adjusted-R squared	0.464	0.510

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 50: SAI centres impact on mayor's reelection - North of Italy

	(1)	(2)
	Mayor's re-election	Mayor's re-election
SAI opening	0.257** (0.113)	0.244** (0.115)
Turnout		0.609 (0.463)
Electorate		0.000848** (0.000372)
Male voters		-0.00177* (0.00105)
Female voters		-0.000448 (0.000823)
Mayor's characteristics	No	Yes
Previous mayor's characteristics	No	Yes
N	3447	2780
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Adjusted-R squared	0.412	0.494

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 51: SAI centres impact on mayor's reelection - South of Italy

	(1)	(2)
	Mayor's re-election	Mayor's re-election
SAI opening	0.0681 (0.0799)	0.00546 (0.0947)
Turnout		1.389* (0.763)
Electorate		-0.000174 (0.000248)
Male voters		0.0000715 (0.000809)
Female voters		-0.000547 (0.000586)
Mayor's characteristics	No	Yes
Previous mayor's characteristics	No	Yes
N	1695	1210
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Adjusted-R squared	0.458	0.510

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

B.14 Tables on refugee centres allocation

As a further step, I also restrict the analysis to a specific colour for the government, i.e. when the government is the one for the centre-left. In this case, I'm excluding the two years (2018-2019) in which the anti-immigration government was in charge.

Table 52: CAS political allocation - Centre of Italy

	(1)	(2)	(3)	(4)
	CAS opening	CAS opening	CAS opening	CAS opening
Mayor same as gov	-0.131*** (0.0484)	-0.0300 (0.0640)		
Municipality same as gov			0.0405 (0.0463)	0.00812 (0.0498)
Turnout		-0.738 (0.756)		-0.693 (0.750)
Electorate		0.0000942 (0.000166)		0.0000254 (0.000162)
Male voters		0.000639 (0.000758)		0.000641 (0.000759)
Female voters		-0.00113 (0.000692)		-0.00120* (0.000676)
Mayor's characteristics	No	Yes	No	Yes
N	625	561	625	561
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.602	0.616	0.594	0.616

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 53: SAI political allocation - Centre of Italy

	(1)	(2)	(3)	(4)
	SAI opening	SAI opening	SAI opening	SAI opening
Mayor same as gov	-0.0371 (0.0341)	-0.0450 (0.0462)		
Municipality same as gov			-0.0378 (0.0252)	-0.0455 (0.0289)
Turnout		-0.264 (0.388)		-0.157 (0.380)
Electorate		-0.0000742 (0.000163)		0.00000260 (0.000159)
Male voters		0.000843 (0.000576)		0.000773 (0.000574)
Female voters		-0.000801 (0.000629)		-0.000938 (0.000610)
Mayor's characteristics	No	Yes	No	Yes
N	438	394	438	394
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.519	0.544	0.522	0.547

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 54: CAS political allocation Center-Left Government - Centre of Italy

	(1)	(2)	(3)	(4)
	CAS opening	CAS opening	CAS opening	CAS opening
Mayor same as gov	-0.152** (0.0677)	0.0253 (0.0915)		
Municipality same as gov			0.0314 (0.0559)	-0.0341 (0.0597)
Turnout		-0.610 (0.973)		-0.647 (0.959)
Electorate		0.000216 (0.000213)		0.000221 (0.000210)
Male voters		0.000665 (0.000898)		0.000636 (0.000885)
Female voters		-0.00175** (0.000853)		-0.00171** (0.000793)
Mayor's characteristics	No	Yes	No	Yes
N	403	369	403	369
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.618	0.647	0.609	0.647

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 55: SAI political allocation Center-Left Government - Centre of Italy

	(1)	(2)	(3)	(4)
	SAI opening	SAI opening	SAI opening	SAI opening
Mayor same as gov	-0.0618 (0.0526)	-0.0604 (0.0598)		
Municipality same as gov			-0.0284 (0.0272)	-0.0256 (0.0295)
Turnout		-0.834* (0.441)		-0.740* (0.438)
Electorate		-0.0000160 (0.000222)		0.0000726 (0.000214)
Male voters		0.00142** (0.000635)		0.00138** (0.000638)
Female voters		-0.00178** (0.000806)		-0.00183** (0.000803)
Mayor's characteristics	No	Yes	No	Yes
N	266	244	266	244
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.522	0.584	0.520	0.583

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 56: SAI political allocation Center-Left or Center-Right Government - Italy

	(1)	(2)	(3)	(4)
	SAI opening	SAI opening	SAI opening	SAI opening
Mayor same as gov	-0.0119 (0.0207)	-0.0112 (0.0226)		
Municipality same as gov			-0.00536 (0.0140)	-0.00822 (0.0151)
Turnout		-0.223 (0.274)		-0.219 (0.274)
Electorate		-0.0000767 (0.000108)		-0.0000720 (0.000107)
Male voters		0.000521* (0.000288)		0.000512* (0.000287)
Female voters		-0.000564** (0.000283)		-0.000585** (0.000282)
Mayor's characteristics	No	Yes	No	Yes
N	1472	1384	1472	1384
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.520	0.527	0.519	0.527

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 57: CAS political allocation Center-Left Government - Italy

	(1)	(2)	(3)	(4)
	CAS opening	CAS opening	CAS opening	CAS opening
Mayor same as gov	-0.129*** (0.0266)	-0.0449 (0.0297)		
Municipality same as gov			-0.0336 (0.0210)	-0.0631*** (0.0210)
Turnout		-1.139*** (0.413)		-1.175*** (0.411)
Electorate		0.000390*** (0.000110)		0.000427*** (0.000106)
Male voters		0.0000781 (0.000332)		-0.0000163 (0.000331)
Female voters		-0.00103*** (0.000280)		-0.00107*** (0.000274)
Mayor's characteristics	No	Yes	No	Yes
N	2065	1934	2065	1934
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.606	0.635	0.598	0.637

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 58: SAI political allocation Center-Left Government - Italy

	(1)	(2)	(3)	(4)
	SAI opening	SAI opening	SAI opening	SAI opening
Mayor same as gov	-0.0119 (0.0207)	-0.0112 (0.0226)		
Municipality same as gov			-0.00536 (0.0140)	-0.00822 (0.0151)
Turnout		-0.223 (0.274)		-0.219 (0.274)
Electorate		-0.0000767 (0.000108)		-0.0000720 (0.000107)
Male voters		0.000521* (0.000288)		0.000512* (0.000287)
Female voters		-0.000564** (0.000283)		-0.000585** (0.000282)
Mayor's characteristics	No	Yes	No	Yes
N	1472	1384	1472	1384
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.520	0.527	0.519	0.527

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 59: CAS political allocation Center-Left Government - North of Italy

	(1)	(2)	(3)	(4)
	CAS opening	CAS opening	CAS opening	CAS opening
Mayor same as gov	-0.132*** (0.0360)	-0.0254 (0.0413)		
Municipality same as gov			-0.00246 (0.0305)	-0.0405 (0.0294)
Turnout		-2.071*** (0.555)		-2.117*** (0.555)
Electorate		0.000442** (0.000179)		0.000490*** (0.000165)
Male voters		0.000299 (0.000561)		0.000197 (0.000558)
Female voters		-0.00124*** (0.000423)		-0.00125*** (0.000418)
Mayor's characteristics	No	Yes	No	Yes
N	1066	1009	1066	1009
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.633	0.680	0.624	0.681

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 60: SAI political allocation Center-Left Government - North of Italy

	(1)	(2)	(3)	(4)
	SAI opening	SAI opening	SAI opening	SAI opening
Mayor same as gov	0.0267 (0.0237)	0.0650** (0.0264)		
Municipality same as gov			-0.0322* (0.0165)	-0.0340** (0.0169)
Turnout		-0.0698 (0.313)		-0.230 (0.310)
Electorate		0.000652*** (0.000178)		0.000487*** (0.000169)
Male voters		-0.000931* (0.000538)		-0.000798 (0.000536)
Female voters		-0.000303 (0.000410)		-0.000185 (0.000408)
Mayor's characteristics	No	Yes	No	Yes
N	660	625	660	625
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.515	0.550	0.519	0.547

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 61: CAS political allocation Center-Left Government - South of Italy

	(1)	(2)	(3)	(4)
	CAS opening	CAS opening	CAS opening	CAS opening
Mayor same as gov	-0.0439 (0.0469)	-0.0212 (0.0498)		
Municipality same as gov			0.0538 (0.0458)	0.0654 (0.0512)
Turnout		0.0593 (0.802)		0.0467 (0.800)
Electorate		0.000104 (0.000225)		0.0000712 (0.000226)
Male voters		-0.000781* (0.000456)		-0.000797* (0.000453)
Female voters		0.000685 (0.000481)		0.000815* (0.000489)
Mayor's characteristics	No	Yes	No	Yes
N	596	556	596	556
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.547	0.553	0.548	0.556

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 62: SAI political allocation Center-Left Government - South of Italy

	(1)	(2)	(3)	(4)
	SAI opening	SAI opening	SAI opening	SAI opening
Mayor same as gov	-0.0455 (0.0425)	-0.0350 (0.0456)		
Municipality same as gov			0.0120 (0.0408)	0.0348 (0.0466)
Turnout		0.611 (0.717)		0.577 (0.716)
Electorate		-0.000266 (0.000219)		-0.000305 (0.000222)
Male voters		0.000497 (0.000489)		0.000469 (0.000489)
Female voters		-0.000246 (0.000479)		-0.000156 (0.000491)
Mayor's characteristics	No	Yes	No	Yes
N	546	515	546	515
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted-R squared	0.539	0.554	0.537	0.554

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Bibliography

- Alberto Abadie, Alexis Diamond, Hainmueller, and Jens. Synthetic control methods for comparative case studies: Estimating the effect of California’s Tobacco control program. *Journal of the American Statistical Association*, 105(490):493–505, 6 2010. ISSN 01621459. doi: 10.1198/jasa.2009.ap08746.
- Alberto Abadie, Alexis Diamond, and Jens Hainmueller. Comparative Politics and the Synthetic Control Method. *American Journal of Political Science*, 59(2):495–510, 4 2015. ISSN 15405907. doi: 10.1111/ajps.12116.
- Sergio Afcha and Jose García-Quevedo. The impact of R&D subsidies on R&D employment composition. *Industrial and Corporate Change*, 25(6):955–975, 12 2016. ISSN 0960-6491. doi: 10.1093/icc/dtw008. URL <https://doi.org/10.1093/icc/dtw008>.
- Philippe Aghion, Antoine Dechezleprê, David Hé, Ralf Martin, John Van Reenen, Daron Acemoglu, Robin Burgess, Michael Greenstone, John Hassler, Rebecca Henderson, and Ken Judd. Carbon Taxes, Path Dependency, and Directed Technical Change: Evidence from the Auto Industry. Technical Report 1, 2016.
- Diane Alexander and Hannes Schwandt. The Impact of Car Pollution on Infant and Child Health: Evidence from Emissions Cheating. *Review of Economic Studies*, 89(6):2872–2910, 11 2022. ISSN 1467937X. doi: 10.1093/restud/rdac007.
- Maurizio Ambrosini. The battleground of asylum and immigration policies: a conceptual inquiry. *Ethnic and Racial Studies*, 44(3):374–395, 2021. ISSN 14664356. doi: 10.1080/01419870.2020.1836380.
- ANCI. Primo rapporto annuale sul sistema di protezione per richiedenti asilo e rifugiati: anno 2005. Technical report, 2006.
- ANCI. Rapporto Annuale SAI. Technical report, 2022.
- ANCI, Caritas Italiana, Fondazione Migrantes, and Servizio Centrale dello SPRAR. Rapporto sulla protezione internazionale in Italia 2017. Technical report, 2017.
- Dmitry Arkhangelsky, Susan Athey, David A. Hirshberg, Guido W. Imbens, and Stefan Wager. Synthetic Difference-in-Differences. *American Economic Review*, 111(12):4088–4118, 12 2021. ISSN 0002-8282. doi: 10.1257/aer.20190159.
- David Austin and Terry Dinan. Clearing the air: The costs and consequences of higher CAFE standards and increased gasoline taxes. *Journal of Environmental Economics and Management*, 50(3):562–582, 11 2005. ISSN 00950696. doi: 10.1016/j.jeem.2005.05.001.
- Peter C. Austin. An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behavioral Research*, 46(3):399–424, 5 2011. ISSN 00273171. doi: 10.1080/00273171.2011.568786.

- David H Autor, Lawrence F Katz, and Melissa S Kearney. The Polarization of the U.S. Labor Market. Technical report, 2006.
- César Barreto, Paul Berbée, Katia Gallegos Torres, Martin Lange, and Katrin Sommerfeld. The Civic Engagement and Social Integration of Refugees in Germany. *Nonprofit Policy Forum*, 13(2):161–174, 4 2022. ISSN 21543348. doi: 10.1515/npf-2022-0015.
- Antonio M Bento, Kevin D Roth, and Yiwei Wang. The Impact of CAFE Standards on Innovation in the US Automobile Industry. Technical report, 2015.
- Timothy Besley and Stephen Coate. Centralized versus decentralized provision of local public goods: A political economy approach. *Journal of Public Economics*, 87(12):2611–2637, 12 2003. ISSN 00472727. doi: 10.1016/S0047-2727(02)00141-X.
- Silvia Bolgherini, Mattia Casula, and Mariano Marotta. Municipal reaction to functional rescaling in Italy. *International Journal of Public Sector Management*, 31(4):448–465, 2018. ISSN 09513558. doi: 10.1108/IJPSM-12-2016-0204.
- Umberto Bossi and Gianfranco Fini. Modifica alla normativa in materia di immigrazione e di asilo, 8 2002.
- Alex Bowen, Karlygash Kuralbayeva, and Eileen L. Tipoe. Characterising green employment: The impacts of ‘greening’ on workforce composition. *Energy Economics*, 72:263–275, 5 2018. ISSN 01409883. doi: 10.1016/j.eneco.2018.03.015.
- Emanuele Bracco, Maria De Paola, Colin P. Green, and Vincenzo Scoppa. The effect of far right parties on the location choice of immigrants: Evidence from Lega Nord Mayors. *Journal of Public Economics*, 166:12–26, 10 2018. ISSN 00472727. doi: 10.1016/j.jpubeco.2018.07.012.
- Massimiliano Bratti, Claudio Deiana, Enkelejda Havari, Gianluca Mazzarella, and Elena Claudia Meroni. Geographical proximity to refugee reception centres and voting. *Journal of Urban Economics*, 120, 11 2020. ISSN 00941190. doi: 10.1016/j.jue.2020.103290.
- Valeria Bucci, Giancarlo Ferrara, and Giuliano Resce. Local government spending efficiency and fiscal decentralization: evidence from Italian municipalities. *Applied Economics*, 56(5):599–614, 2024. ISSN 14664283. doi: 10.1080/00036846.2023.2169241.
- Matheus Bueno and Marica Valente. The effects of pricing waste generation: A synthetic control approach. *Journal of Environmental Economics and Management*, 96:274–285, 7 2019. ISSN 10960449. doi: 10.1016/j.jeem.2019.06.004.
- Brantly Callaway and Pedro H.C. Sant’Anna. Difference-in-Differences with multiple time periods. *Journal of Econometrics*, 225(2):200–230, 12 2021. ISSN 18726895. doi: 10.1016/j.jeconom.2020.12.001.
- Giuseppe Campesi. Between containment, confinement and dispersal: the evolution of the Italian reception system before and after the ‘refugee crisis’. *Journal of Modern Italian Studies*, 23(4):490–506, 8 2018. ISSN 1354571X. doi: 10.1080/1354571X.2018.1501995.

- Francesco Campo, Sara Giunti, and Mariapia Mendola. The Refugee Crisis and Right-Wing Populism: Evidence from the Italian Dispersal Policy. Technical report, 2021. URL www.iza.org.
- Francesco Campo, Sara Giunti, and Mariapia Mendola. Refugee crisis and right-wing populism: Evidence from the Italian Dispersal Policy. *European Economic Review*, 168, 9 2024. ISSN 00142921. doi: 10.1016/j.euroecorev.2024.104826.
- Francesca Campomori and Maurizio Ambrosini. Multilevel governance in trouble: the implementation of asylum seekers' reception in Italy as a battleground. *Comparative Migration Studies*, 8(1), 12 2020. ISSN 2214594X. doi: 10.1186/s40878-020-00178-1.
- Marco Catarci. Challenging Interculturalism: The Inclusion of Asylum Seekers and Refugees in Italy. *Journal of European Studies*, 8(2):21–33, 2016. ISSN 1836-1803. URL <http://www.eusanz.org/ANZJES/index.html>.
- Pavel Chakraborty and Chirantan Chatterjee. Does environmental regulation indirectly induce upstream innovation? New evidence from India. *Research Policy*, 46(5):939–955, 6 2017. ISSN 00487333. doi: 10.1016/j.respol.2017.03.004.
- Arnaud Chevalier, Benjamin Elsner, Andreas Lichter, and Nico Pestel. Forced Migration and Local Public Policies: Evidence from Post-War West Germany *. Technical report, 2023.
- Ernani F. Choma, John S. Evans, James K. Hammitt, José A. Gómez-Ibáñez, and John D. Spengler. Assessing the health impacts of electric vehicles through air pollution in the United States. *Environment International*, 144:106015, 11 2020. ISSN 0160-4120. doi: 10.1016/J.ENVINT.2020.106015.
- David Coffin and Jeff Horowitz. The Supply Chain for Electric Vehicle Batteries. *Journal of International Commerce and Economics*, 12 2018. URL <https://www.usitc.gov/journals>.
- Scott Cunningham. *The Mixtape*. Yale University Press, 2021. ISBN 9780300251685. doi: 10.2307/j.ctv1c29t27. URL <http://www.jstor.org/stable/j.ctv1c29t27>.
- Stacy C Davis and Robert Gary Boundy. Transportation Energy Data Book: Edition 39. Technical report, United States, 2021. URL <https://www.osti.gov/biblio/1767864https://www.osti.gov/servlets/purl/1767864>.
- Marco Alberto De Benedetto and Maria De Paola. The impact of incumbency on turnout. Evidence from Italian municipalities. *Electoral Studies*, 44:98–108, 12 2016. ISSN 02613794. doi: 10.1016/j.electstud.2016.06.012.
- Marco Alberto De Benedetto and Maria De Paola. Term limit extension and electoral participation. Evidence from a diff-in-discontinuities design at the local level in Italy. *European Journal of Political Economy*, 59:196–211, 9 2019. ISSN 01762680. doi: 10.1016/j.ejpoleco.2019.02.009.
- Clément de Chaisemartin and Xavier D’Haultfœuille. Two-Way Fixed Effects Estimators with Heterogeneous Treatment Effects. *American Economic Review*, 110 (9):2964–2996, 9 2020. ISSN 19447981. doi: 10.1257/aer.20181169.

- Senyo Dotsey and Audrey Lumley-Sapanski. Temporality, refugees, and housing: The effects of temporary assistance on refugee housing outcomes in Italy. *Cities*, 111, 4 2021. ISSN 02642751. doi: 10.1016/j.cities.2020.103100.
- Hadi Dowlatabadi, Lester B Lave, and Armistead G Russell. A free lunch at higher CAFE? A review of economic, environmental and social benefits. Technical Report 95, 1996.
- Christian Dustmann, Kristine Vasiljeva, and Anna Piil Damm. Refugee Migration and Electoral Outcomes. *Review of Economic Studies*, 86(5):2035–2091, 10 2019. ISSN 1467937X. doi: 10.1093/restud/rdy047.
- EPA and NHTSA. 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards. *Federal Register*, 77 (199), 10 2012. URL www.regulations.gov.
- EPA and NTHSA. Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule. *Federal Register*, 75(88), 2010. URL <http://epa.gov/climatechange/emissions/>.
- Andrea Fabrizi, Giulio Guarini, and Valentina Meliciani. Green patents, regulatory policies and research network policies. *Research Policy*, 47(6):1018–1031, 7 2018. ISSN 00487333. doi: 10.1016/j.respol.2018.03.005.
- Bruno Ferman, Cristine Pinto, and Vitor Possebom. Cherry Picking with Synthetic Controls. *Journal of Policy Analysis and Management*, 39(2):510–532, 3 2020. ISSN 0276-8739. doi: 10.1002/pam.22206. URL <https://onlinelibrary.wiley.com/doi/10.1002/pam.22206>.
- Massimiliano Ferraresi, Giuseppe Migali, and Leonzio Rizzo. Spillover effects in local public spending. *Regional Studies*, 52(11):1570–1584, 11 2018. ISSN 13600591. doi: 10.1080/00343404.2017.1415429.
- Matteo Gamalerio, Mario Luca, Alessio Romarri, and Max Viskanic. Refugee reception, extreme-right voting, and compositional amenities: Evidence from Italian municipalities. *Regional Science and Urban Economics*, 100, 5 2023. ISSN 18792308. doi: 10.1016/j.regsciurbeco.2023.103892.
- Enrico Gargiulo. The limits of local citizenship: administrative borders within the Italian municipalities. *Citizenship Studies*, 21(3):327–343, 4 2017. ISSN 14693593. doi: 10.1080/13621025.2016.1277982.
- Meisam Ahmadi Ghadikolaie, Pak Kin Wong, Chun Shun Cheung, Jing Zhao, Zhi Ning, Ka Fu Yung, Hang Cheong Wong, and Nirmal Kumar Gali. Why is the world not yet ready to use alternative fuel vehicles?, 7 2021. ISSN 24058440.
- Luigi Guiso, Paola Sapienza, and Luigi Zingales. The Role of Social Capital in Financial Development. *American Economic Review*, 93(3):526–556, 2004.
- Luigi Guiso, Paola Sapienza, and Luigi Zingales. Civic capital as the missing link. *National Bureau of Economic Research*, 2010. URL <http://lists.repec.org/mailman/listinfo/nep-soc>.

- Mitsutsugu Hamamoto. Environmental regulation and the productivity of Japanese manufacturing industries. *Resource and Energy Economics*, 28(4):299–312, 11 2006. ISSN 09287655. doi: 10.1016/j.reseneeco.2005.11.001.
- James Hamilton. Green Jobs: Electric Vehicles Careers in Electric Vehicles. Technical report, Bureau of Labor Statistics, 9 2011.
- Dominik Hangartner, Elias Dinas, Moritz Marbach, Konstantinos Matakos, and Dimitrios Xefteris. Does exposure to the refugee crisis make natives more hostile? *American Political Science Review*, 113(2):442–455, 5 2019. ISSN 15375943. doi: 10.1017/S0003055418000813.
- Serhan Ili, Albert Albers, and Sebastian Miller. Open innovation in the automotive industry. *R&D Management*, 40(3):246–255, 6 2010. ISSN 00336807. doi: 10.1111/j.1467-9310.2010.00595.x.
- Italian Legislative Decree n°266. Disposizioni in materia di rapporto di impiego del personale della carriera prefettizia, a norma dell’articolo 10 della legge 28 luglio 1999, n. 266., 5 2000.
- Adam B Jaffe and Karen Palmer. Environmental Regulation and Innovation: A Panel Data Study. *The Review of Economics and Statistics*, 79(4):610–619, 1997. ISSN 00346535, 15309142. URL <http://www.jstor.org/stable/2951413>.
- Christopher R. Knittel, Douglas L. Miller, and Nicholas J. Sanders. Caution, drivers! children present: Traffic, pollution, and infant health. *Review of Economics and Statistics*, 98(2):350–366, 5 2016. ISSN 15309142.
- Paul Lanoie, J eremy Laurent-Lucchetti, Nick Johnstone, and Stefan Ambec. Environmental policy, innovation and performance: New insights on the porter hypothesis. *Journal of Economics and Management Strategy*, 20(3):803–842, 9 2011. ISSN 10586407. doi: 10.1111/j.1530-9134.2011.00301.x.
- Richard K Lattanzio. Vehicle Fuel Economy and Greenhouse Gas Standards: Frequently Asked Questions. Technical report, 2021.
- Michele Limosani and Pietro Navarra. Local pork-barrel politics in national pre-election dates: The case of Italy. *Public Choice*, 106:317–326, 2001. URL www.unime.it.
- Timothy E Lipman. Annual Review of Environment and Resources Emerging Technologies for Higher Fuel Economy Automobile Standards. 2017. doi: 10.1146/annurev-environ. URL <https://doi.org/10.1146/annurev-environ->.
- Gaia Lott. The Dublin Convention and the Introduction of the ‘First Entry Rule’ in the Allocation of Asylum Seekers in Europe. *Contemporary European History*, 32(3):459–474, 8 2023. ISSN 14692171. doi: 10.1017/S0960777321000746.
- Davide Luca and Paola Proietti. Hosting to skim: organized crime and the reception of asylum seekers in Italy. *Regional Studies*, 56(12):2102–2116, 2022. ISSN 13600591. doi: 10.1080/00343404.2022.2039386.

- Ramon Mahia, Rafael de Arce, Ahmet Ali Koç, and Gülden Bölük. The short and long-term impact of Syrian refugees on the Turkish economy: a simulation approach. *Turkish Studies*, 21(5):661–683, 10 2020. ISSN 17439663. doi: 10.1080/14683849.2019.1691920.
- Chiara Marchetti. Refugees and forced migrants in Italy: the pendulum between 'emergency' and 'system'. Technical report, 2014.
- Giovanni Marin and Francesco Vona. Climate policies and skill-biased employment dynamics: Evidence from EU countries. *Journal of Environmental Economics and Management*, 98, 11 2019. ISSN 10960449. doi: 10.1016/j.jeem.2019.102253.
- Richard D. Morgenstern, William A. Pizer, and Jhih Shyang Shih. Jobs versus the environment: An industry-level perspective. *Journal of Environmental Economics and Management*, 43(3):412–436, 2002. ISSN 00950696. doi: 10.1006/jeem.2001.1191.
- Tommaso Nannicini, Andrea Stella, Guido Tabellini, and Ugo Troiano. Social capital and political accountability. *American Economic Journal: Economic Policy*, 5(2): 222–250, 5 2013. ISSN 19457731. doi: 10.1257/pol.5.2.222.
- Wallace E Oates. An Essay on Fiscal Federalism. Technical Report 3, 1999.
- OECD. Preventing corruption: Public procurement. pages 110–111. OECD Publishing, Paris, 10 2009. doi: 10.1787/9789264061651-31-en.
- Francesco Palermo and Alex Wilson. The multi-level dynamics of state decentralization in Italy. *Comparative European Politics*, 12(4-5):510–530, 2014. ISSN 1740388X. doi: 10.1057/cep.2014.11.
- Xiongfeng Pan, Bowei Ai, Changyu Li, Xianyou Pan, and Yaobo Yan. Dynamic relationship among environmental regulation, technological innovation and energy efficiency based on large scale provincial panel data in China. *Technological Forecasting and Social Change*, 144:428–435, 7 2019. ISSN 00401625. doi: 10.1016/j.techfore.2017.12.012.
- Michael E Porter and Claas Van Der Linde. Toward a New Conception of the Environment-Competitiveness Relationship. Technical Report 4, 1995.
- Paul R Portney, Ian W H Parry, Howard K Gruenspecht, and Winston Harrington. Policy Watch The Economics of Fuel Economy Standards. Technical report, 2003. URL <http://www.eia.doe.gov>.
- Massimo Pulejo. Pulejo (2021). *Journal of Political Institutions and Political Economy*, 2(3):347–364, 2021.
- Robert D Putnam. Social Capital and Public Affairs. Technical Report 8, 1994. URL <http://www.jstor.org>URL:<http://www.jstor.org/stable/3824796>.
- Alexandra Ricard-Guay. Rethinking the economics and the governance of reception of refugees, asylum seekers and other migrants: the case of Italy. Technical report, European University Institute, Florence, 2019.

- Agatino Rizzo. Declining, transition and slow rural territories in southern Italy Characterizing the intra-rural divides. *European Planning Studies*, 24(2):231–253, 2 2016. ISSN 14695944. doi: 10.1080/09654313.2015.1079588.
- Paul R Rosenbaum and Donald B Rubin. Constructing a Control Group Using Multivariate Matched Sampling Methods That Incorporate the Propensity Score. Technical Report 1, 1985.
- Joakim Ruist. The Fiscal Cost of Refugee Immigration: The Example of Sweden. *Population and Development Review*, 41(4):567–581, 12 2015. ISSN 17284457. doi: 10.1111/j.1728-4457.2015.00085.x.
- Peter Scholten, Godfried Engbersen, Mark van Ostaijen, and Erik Snel. Multilevel governance from below: how Dutch cities respond to intra-EU mobility. *Journal of Ethnic and Migration Studies*, 44(12):2011–2033, 9 2018. ISSN 14699451. doi: 10.1080/1369183X.2017.1341707.
- Suphi Sen. Corporate governance, environmental regulations, and technological change. *European Economic Review*, 80:36–61, 11 2015. ISSN 00142921. doi: 10.1016/j.euroecorev.2015.08.004.
- Senato della Repubblica. Decreto-legge immigrazione e sicurezza pubblica. Technical report, Senato della Repubblica Italiana, Rome, 11 2018.
- Andreas Steinmayr. Contact versus Exposure: Refugee Presence and Voting for the Far-Right *. *Review of Economics and Statistics*, 2020.
- Salvatore Strozza, Federico Benassi, Raffaele Ferrara, and Gerardo Gallo. Recent Demographic Trends in the Major Italian Urban Agglomerations: The Role of Foreigners. *Spatial Demography*, 4(1):39–70, 4 2016. ISSN 2364-2289. doi: 10.1007/s40980-015-0012-2.
- Liyang Sun and Sarah Abraham. Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2): 175–199, 12 2021. ISSN 18726895. doi: 10.1016/j.jeconom.2020.09.006.
- Charles M Tiebout. A Pure Theory of Local Expenditures. Technical Report 5, 1956. URL <https://www.jstor.org/stable/1826343>.
- Govinda R Timilsina and Hari B Dulal. A Review of Regulatory Instruments to Control Environmental Externalities from the Transport Sector. Technical report, 2009. URL <http://econ.worldbank.org>.
- Fan Tong and Inês M.L. Azevedo. What are the best combinations of fuel-vehicle technologies to mitigate climate change and air pollution effects across the United States? *Environmental Research Letters*, 15(7), 7 2020. ISSN 17489326. doi: 10.1088/1748-9326/ab8a85.
- Gilberto Turati, Lorenzo Boetti, and Massimiliano Piacenza. Decentralization and Local Governments' Performance: How Does Fiscal Autonomy Affect Spending Efficiency? *FinanzArchiv*, 68(3):269, 2012. ISSN 0015-2218. doi: 10.1628/001522112x653840.

- US Census Bureau. 2002 NAICS Definition, 2022. URL https://www.census.gov/naics/2002NAICS/2002_Definition_File.pdf.
- Xiao Wang, George Deltas, Madhu Khanna, and Xiang Bi. Community Pressure and the Spatial Redistribution of Pollution: The Relocation of Toxic-Releasing Facilities. *JAERE*, 8(3), 2021. doi: 10.7910/DVN/VIJJK8.
- Yiwei Wang and Qing Miao. The impact of the corporate average fuel economy standards on technological changes in automobile fuel efficiency. *Resource and Energy Economics*, 63, 2 2021. ISSN 09287655. doi: 10.1016/j.reseneeco.2020.101211.
- Yu Zhang, Juanru Wang, Yajiong Xue, and Jin Yang. Impact of environmental regulations on green technological innovative behavior: An empirical study in China. *Journal of Cleaner Production*, 188:763–773, 7 2018. ISSN 09596526. doi: 10.1016/j.jclepro.2018.04.013.