



The economic impact of UNESCO World Heritage: Evidence from Italy[☆]

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ARTICLE INFO

JEL classification:

H24

H71

H73

Keywords:

UNESCO World Heritage List

Economic impact

Real estate market

Tourism

ABSTRACT

This paper investigates the impact of the UNESCO World Heritage List (WHL) inscription on income and property values in Italian municipalities with heritage sites inscribed during the past two decades. To address the selection bias and identify the causal impact of inscription, we focus on municipalities having sites included in the national 'tentative list' (i.e., a list of candidates for subsequent nomination) and exploit the plausibly exogenous timing of inscription conditional upon being on the list. The evidence from a heterogeneity-robust event study analysis suggests that WHL listing has a significant impact on income and property prices in urban areas. Possible underlying mechanisms are discussed.

1. Introduction

Heritage designation is a policy intervention commonly recognized to bear considerable consequences on the economies of cities and regions where heritage sites are located and the welfare of local communities (Van Balen and Vandesande, 2016). Heritage designations influence the real estate market through legal constraints on the development and use of buildings and the demand for amenity value households place on the historic built environment and its conservation (Ahlfeldt et al., 2017; Waights, 2019; Zhou, 2021). At the same time, by signaling the historical and cultural significance of a location, the listing of sites, monuments, and historic districts contributes to an array of positive externalities and spillovers arising from the cultural heritage, ranging from a boost to tourism flows (Rizzo and Throsby, 2006) to a more general capacity of attracting high human-capital individuals, with direct and induced effects on regional growth (Cerisola, 2019).

Of the different types of heritage listing, the UNESCO World Heritage designation is central to the debate about the economic impact of cultural heritage. Even though the original goals of the UNESCO World Heritage List (WHL) are primarily related to the preservation

and protection of heritage sites with outstanding value, the process of UNESCO designation is increasingly regarded as a tool for territorial marketing and as a place-making catalyst in recent years (Di Giovine, 2018; Ryan and Silvano, 2009; Adie, 2017). Entering the List attracts the attention of the media, the general public, potential donors, and for-profit firms, prompting countries and regions to use their economic and political power to try to influence the WHL designation process.¹ As a result, the expectation of a positive economic impact from the World Heritage designation justifies the considerable efforts required to apply for and eventually achieve UNESCO recognition (Meskell, 2012).

The existing empirical evidence has yielded mixed results, though, generally failing to adequately address the inherent selection bias and correctly identify the causal impact of WHL inscription on local economies (Cellini, 2011). We aim to add to the empirical literature on this issue by exploiting for the first time the two phases of the selection of sites into the UNESCO WHL - the preliminary step of entering sites into the national 'tentative list' and the subsequent step of formal nomination and selection into the WHL - and studying the impact of the UNESCO designation in Italian municipalities on two key economic outcomes: taxable personal income and real estate values. Moreover, to cope with the potential bias in the estimation of the average treatment

[☆] We thank the Editor, two anonymous referees, and participants to the IIPF 2022 (Linz), EPCS 2022 (Braga), SIE 2022 (Turin), SIEP 2022 (L'Aquila), and EWACE 2022 (Turin) conferences for their helpful comments. All authors declare that they have no relevant or material financial interests that relate to the research described in this paper. Data and programs are available from the corresponding author upon request.

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¹ Several studies suggest that the nomination and inscription of World Heritage sites are influenced by political and economic considerations that are not necessarily related to the actual value of sites. For example, Bertacchini and Saccone (2012) find that countries holding a seat in the World Heritage Committee are more likely to have their sites inscribed, while Frey et al. (2013) find that, in addition to a country's political and economic power, the sizes of the tourist and media sectors contribute to the number of sites a country has on the UNESCO List.

effect of a binary, staggered, and absorbing treatment (as the WHL designation) in panel data two-way fixed effects (TWFE) approaches, we employ the estimator for staggered difference-in-differences (DiD) designs proposed by Callaway and Sant'Anna (2021). As we discuss in detail in Section 3 below, this estimation approach groups observations into cohorts based on the timing of the first treatment (WHL designation) and delivers a cohort-specific DiD estimate of the effect of the treatment by comparing the cohort-based evolution of the outcome of interest (property values, income) with the evolution of the same variables in never-treated or not-yet-treated groups (admissible comparisons), thus overcoming the fundamental weakness of the conventional TWFE approach. Next, a dynamic aggregated estimate of the treatment effect is obtained by averaging the DiD estimates across all cohorts in each of the $l = 0, \dots, L$ periods after treatment.

Italy constitutes an ideal environment for analyzing the impact of UNESCO designations because of the considerable number of World Heritage Sites and its decentralized government structure, where regional and local governments play an active role in the application process for heritage site recognition (Bertacchini and Revelli, 2021). As a result, it is a question of substantial policy relevance whether those efforts are worth their cost. We employ a rich dataset on taxable income and distribution along with values of real estate properties at the municipal level. We combine it with information on the World Heritage site nomination and selection process over the past two decades.

This paper contributes to the existing literature on the economic impact of heritage designation policy in three main ways. First, we employ data on personal income and real estate markets, thus addressing the impact of WHL designation on two key economic outcomes representing local governments' major tax bases for the first time. Second, unlike previous studies that use data at the relatively large regional or provincial levels covering extremely diverse territories and internally heterogeneous economic structures, we use data at the municipal level, thus offering more accurate estimates of the local impact of the WHL on far more homogeneous territories. Finally, to address the fundamental endogeneity issue arising from the fact that the trajectories of income and property values in treated municipalities might differ significantly from those in the other municipalities even before the official UNESCO designation, we focus on the sample of localities having their sites included in the national Tentative List (TL) during the period of observation. Since the national TL is a procedural requirement for a government to propose heritage sites for eventual designation into the UNESCO WHL, the timing of WHL designation conditional on entering the TL can be taken as plausibly random. In doing so, we follow a similar strategy as Li (2022), who addresses the selection bias that developers are more likely to build new high-rises in fast-appreciating areas by restricting the sample to residential properties near approved new high-rises and exploiting the plausibly exogenous timing of completion conditional upon the timing of approval, and Liao et al. (2022), who identify the causal effect of winning an architecture award on successful projects' property prices by applying a difference-in-differences approach with propensity score matching on a Singapore dataset of winning and non-winning projects of comparable aesthetic value.

The evidence from our event study analysis on the Italian context points to a positive, statistically significant, and non-negligible (over two percent) impact of WHL designation on income per capita. At the same time, the consequences in the real estate market are more heterogeneous. First, we find hardly any impact of the WHL treatment on ordinary apartments, a result that is consistent with existing theoretical and empirical contributions highlighting two potentially contrasting effects of conservation and designation policies on property prices: the enhancement of existing historical or cultural characteristics of an area that raise its amenity value on the one hand, and the lower housing productivity due to rising maintenance costs and more stringent use limitations and regulations on the other hand (Coulson and Leichenko,

2001; Coulson and Lahr, 2005; Waights, 2019; Ahlfeldt and Holman, 2018).

At the same time, the prices of luxury dwellings respond significantly, with an average price increase of over five percent within six years from designation. When allowing for a heterogeneous impact depending on the degree of urbanization of the area as a proxy of supply elasticity, we find that the prices of luxury dwellings in urban areas rise by almost ten percent. At the same time, they show no increase in rural areas where housing supply is arguably more elastic. Finally, we find that the prices of commercial properties rise significantly in urban and rural areas that are awarded the WHL status, though the effect is more persistent in the latter.

Based on this evidence, we investigate possible transmission mechanisms of WHL designation on local economic outcomes. First, to test the tourism-led local income growth channel, a hypothesis frequently made in the literature (Faber and Gaubert, 2019), we study the trajectories of official tourist flows in WHL-treated and TL-control localities around designation years and find that they are compatible with the hypothesis of increased touristic visibility of a locality after WHL designation. Next, we test the sorting hypothesis based on the idea that the increased amenity value of sites after WHL inscription attracts to the area wealthy individuals with a high marginal valuation of those amenities (Brueckner et al., 1999; Lanzara et al., 2019; van Duijn and Rouwendal, 2021). Although data on mobility by income level are not available, we find the resident population and the share of high-income taxpayers to grow faster in treated localities after designation, compatibly with a hypothesis of gentrification leading to a change in the composition of residents and a higher demand for luxury dwellings.

This work relates to three strands of scholarly research. The first concerns the tourism-enhancing effects of World Heritage sites. While a voluminous literature has analyzed the impact of UNESCO designation, mainly focusing on tourism flows in developed and developing countries (Arezki et al., 2009; Yang et al., 2010; Caust and Vecco, 2017; Panzera et al., 2021), the empirical evidence has yielded mixed results, as shown by the recent review and meta-analysis by Yang et al. (2019). More importantly, those contributions do not rely on causal inference models to adequately address the inherent endogeneity issue of WHL designation. As far as Italy's UNESCO WHL sites are concerned, Patuelli et al. (2013) find the number of WHL sites in a region to stimulate the inflow of visitors from other Italian regions and the number of WHL sites in surrounding regions to reduce it, compatibly with the hypothesis of spatial substitution within a competitive destinations' framework. Canale et al. (2019) and De Simone et al. (2019) analyze the impact of WHL designations on tourism at the level of the Italian provinces, confirming a tourism-enhancing role for the UNESCO WHL inscription. Conversely, using tourism flow data from 16 Italian cities whose heritage sites obtained UNESCO recognition, Ribaud and Figini (2017) find no evidence of higher growth of touristic flows after the inscription relative to the pre-inscription period. Using Data Envelopment Analysis, Cuccia et al. (2016, 2017) focus instead on the impact of UNESCO WHL on tourism destinations' performance, finding that the presence of UNESCO sites reduces the efficiency of the regional tourism industry, as local tourism operators tend to overestimate the effects of the WHL inscription and to oversupply the accommodation capacity and other hospitality services. We complement this literature by adopting a causal inference approach for testing the tourism-enhancing effect of UNESCO designations on the local economy.

Our findings also relate to papers that address the capitalization of cultural heritage values in real estate markets. This strand of literature is based theoretically on a hedonic approach and empirically on micro data on real estate transactions and prices. It explores how the housing market responds to the listing of historic buildings and the designation of cultural sites and conservation areas (Shultz and King, 2001; Coulson and Leichenko, 2001; Coulson and Lahr, 2005; Lazrak et al., 2014; Waights, 2019; Franco and Macdonald, 2018; Fritsch et al., 2016). Research in this field uses spatial models to estimate the

extent of spillovers on neighborhoods surrounding designated historic properties, typically finding significant positive externalities from these urban development and rehabilitation policies (Koster et al., 2016). While using a different empirical approach, we add to this debate by providing original evidence on how the heritage value signaled by the process of UNESCO listing affects property values at the municipal level. Moreover, our analysis of the impact of WHL designation on the level and distribution of income relates to the “tourism gentrification” literature studying how urban revitalization policies generating massive flows of capital in the real estate markets of ordinary middle-class neighborhoods can produce radical social reconfigurations and transform them into affluent enclaves (Biagi et al., 2011).²

Finally, the estimation of the economic effects of mega events such as the Olympic Games is at the centre of a lively academic debate that exhibits remarkable conceptual and methodological similarities with the investigation of UNESCO WHL designations in terms of choice of meaningful outcome variables, spatial level of study, impact duration from a short time to long-run consequences, and proper control group and counterfactual scenarios (Rose and Spiegel, 2011; Bruckner and Pappa, 2015; Firgo, 2021). Concerning the latter point, to account for self-selection in the bidding process, recent works use candidate cities that were not elected to host the event as the control group to estimate the event’s impact accurately. The evidence generally points towards a positive effect of hosting those mega events in terms of export (Rose and Spiegel, 2011), investment, consumption (Bruckner and Pappa, 2015), and regional GDP per capita (Firgo, 2021).

The rest of the paper is structured as follows: Section 2 describes the UNESCO WHL selection process, Section 3 presents the data and the econometric approach, Section 4 summarizes the main estimation results, and Section 5 investigates and discusses the underlying mechanisms. Section 6 concludes.

2. The UNESCO World Heritage list

The WHL is the primary implementing mechanism of the 1972 UNESCO World Heritage Convention. This international agreement encourages identifying, protecting, and preserving humanity’s cultural and natural heritage (UNESCO, 2007). The List consists of cultural, natural, and mixed properties of outstanding universal value (OUV), which operational guidelines of the World Heritage Convention define according to ten criteria detailing the cultural and natural significance the proposed heritage sites must meet for inclusion on the List (UNESCO, 2021). The composition of the WHL is the outcome of two different phases, nomination and selection, and of the input of three distinct actors: state parties, advisory bodies, and the World Heritage Committee (Strasser, 2002). The nomination process starts with the state parties’ initiative, which submits nomination proposals for their sites to be included on the List. Experts from two advisory bodies, the International Council on Monuments and Sites (ICOMOS) for cultural properties and the International Union for Conservation of Nature (IUCN) for natural properties evaluate the nomination dossiers according to the OUV claims, the measure proposed to protect the integrity and manage the heritage site. Once the technical evaluation is concluded, the advisory body communicates its recommendation to the World Heritage Committee, the final decision-making body of representatives from 21 member states. The selection of new sites occurs every year at the World Heritage Committee’s annual sessions in June. A site is inscribed if it meets at least one of the ten criteria and the conditions of uniqueness, authenticity, and integrity. As of 2023, 1199 cultural and natural sites have been included.

Having national heritage sites with World Heritage recognition does not guarantee safer protection or additional financial resources from

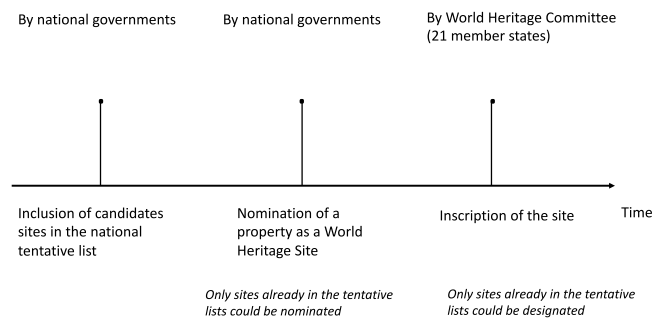


Fig. 1. Unesco shortlisting process. Note: Authors’ elaboration.

UNESCO to the listed properties. The protection of World Heritage properties still rests on national conservation programs. Yet, being on the WHL is increasingly regarded as generating positive effects at the local level. By signaling a heritage site’s exceptional quality and authenticity, the UNESCO designation helps attract the attention of media, donors, visitors, and decision-makers (Frey and Steiner, 2011), thus allowing cities and regions to promote their place as a tourist destination and an amenity-rich area. Developing a World Heritage nomination requires resources, time, commitment, and mobilization of different national and local stakeholders. Preparing a nomination usually involves at least two years of work, but sometimes it might take many years. For example, a well-documented and protected cultural monument or site can require a much less complicated and time-consuming nomination process. On the other hand, a large multi-use natural property, a historic town, a cultural landscape or a cultural route requires new protection measures and management plans to be implemented and documented. In the latter cases, as the nominated property stretches over larger areas and multiple administrative units, the growing number of stakeholders results in a more complicated management system or plan (UNESCO, 2011).

A procedural aspect of the UNESCO World Heritage selection process that is key to our identification strategy is that nominations must first be part of inventories of national heritage sites that State Parties compose and submit to the World Heritage Committee. These inventories, called “Tentative Lists”, reflect the cultural and natural heritage in a State party’s territory that it considers to be of potential outstanding universal value and suitable for inscription in the WHL. Although this provision is present in the text of the 1972 World Heritage Convention (Article 11.1), it is only since the 1990s that the process of composing Tls by member states has become more systematic, primarily to facilitate advisory bodies’ evaluation of nomination dossiers in comparison with other potential candidate sites (Van der Aa, 2005). Since the mid-2000s’ revision of the selection process (UNESCO, 2007), each country can submit no more than one – or, in exceptional cases, two – of its TL sites for WHL designation.

As of 2022, 185 out of 194 States Parties to the Convention have submitted a TL. The Operational Guidelines of the UNESCO World Heritage Convention do not prescribe a specific process or methodology to be followed when selecting sites for inclusion in the TL. State parties can update their TL at any time. A single department at the national government level or various working groups and advisory councils can compose this List based on technical evidence that supports the potential OUV of candidate sites. Public or private stakeholders, such as local governments or heritage experts, can propose sites for the TL, which are then evaluated by government agencies responsible for managing the application process (Fulton et al., 2020). In the case of Italy, the first TL was submitted in 1996 and was followed by a second comprehensive update in 2006. After that year, a few new sites were added, and some proposed ones were revised. Fig. 1 shows the main steps of the nomination and selection procedure.

² See however Coulson and Leichenko (2004) for evidence against the notion that historic preservation is a precursor to gentrification.

While entering the TL is required for a site to be proposed for WHL inscription, the timing between the two steps tends to vary considerably. Table A1 in the Appendix lists the properties included in the Italian TL and those that obtained the World Heritage designation between 2006 and 2019, which is our period of analysis. For the sites inscribed into the WHL, the average time between the inclusion in the TL and the final UNESCO recognition is 7.4 years, but with significant variability. For example, the property of Mantua and Sabbioneta gained WHL designation two years after inclusion in the TL. In contrast, it took more than ten years in the TL for some other sites (i.e. Ivrea, an industrial city of the 20th century or Le Colline del Prosecco di Conegliano e Valdobbiadene) to officially enter the WHL. And, while admittedly difficult to measure, the ‘waiting time’ does not seem to be related to any inherent indicator of site ‘excellence’. Using the number of OUV criteria proposed in the TL dossier (Table A1) as a proxy of the importance of heritage sites, the average number of criteria for the sites inscribed in the WHL in the period 2008–2019 is 2.55, lower than that for the sites not yet inscribed (mean value = 2.87), and the difference is not statistically significant.³

3. Data and methodology

3.1. Data

We use data on the Italian municipalities from 2006 to 2019. The data source for the World Heritage Sites – access to the national TL and formal inscription in the WHL – is the UNESCO World Heritage Center (<https://whc.unesco.org>). We attribute the selected sites to their respective administrative (municipal) boundaries based on the name and geographic coordinates from the official evaluation documents. If the World Heritage properties (i.e., cultural landscapes and serial sites) cross multiple municipalities, we consider all administrative units that fall within the boundaries of the comprehensive UNESCO site. Out of more than 8000 municipalities, we focus on the 471 municipalities with a heritage site included in the national TL (130 of which were ‘treated’ by the WHL designation during the reference period), for around 6500 observations.

The main objective of the empirical analysis is to ascertain whether entering the UNESCO WHL has an impact on two key indicators of local economic performance: real estate prices and personal income. As for the former, we use the average value of properties in three categories: ordinary dwellings (apartments), luxury dwellings (villas), and commercial properties. Information on real estate values comes from the database of real estate prices provided by the Italian Internal Revenue Authority (<https://www.agenziaentrato.gov.it/>). For each municipality, a minimum-maximum range of market values is provided every six months (price per square meter), type of property, and state of maintenance and conservation. We focus on the average yearly values of properties in a good state of care and conservation in each of those categories. As for income, we use the average yearly taxable income per taxpayer as the main outcome variable.⁴ Income data for tax purposes at the municipal level come from the Department of Finance of the Italian Treasury (<http://www1.finanze.gov.it>). Throughout the analysis, we also use the share of taxpayers with income above €75,000 and municipal-level data on population, tourist flows, and overnight stays from the Italian Statistical Office (<https://www.istat.it>). Tourist flows at the municipal level are available for the years 2014 to 2019. Summary statistics for all the variables used in the analysis are reported in Table 1.

³ Dattilo et al. (2023) find that the marginal quality of WHL-inscribed sites decreases as the number of World Heritage sites in a country increases. However, their analysis is based on a period of about 40 years, where it is plausible that there is greater temporal heterogeneity in the quality of inscribed sites under the condition of a relatively fixed stock of cultural and natural capital.

⁴ We use net income after tax deductions.

Table 1
Descriptive statistics.

| Variables | (1) N | (2) mean | (3) sd | (4) min | (5) max |
|--|----------|-------------|-----------|------------|------------|
| All municipalities | | | | | |
| Income per capita (log) | 108,322 | 9.775 | 0.222 | 8.545 | 11.45 |
| Ordinary dwellings (log prices) | 99,159 | 6.871 | 0.430 | 5.427 | 9.480 |
| Luxury dwellings (log prices) | 64,668 | 7.064 | 0.403 | 6.004 | 9.363 |
| Commercial properties (log prices) | 92,441 | 6.961 | 0.416 | 5.728 | 10.06 |
| Tourist arrivals (log) | 17,951 | 8.635 | 1.714 | 2.996 | 16.12 |
| Nights in touristic facilities (log) | 17,941 | 9.749 | 1.738 | 4.820 | 17.25 |
| Share of income $\geq 75,000$ | 108,322 | 0.063 | 0.059 | 0 | 0.689 |
| Share of taxpayers with income $\geq 75,000$ | 108,322 | 0.010 | 0.010 | 0 | 0.180 |
| Population (log) | 108,556 | 7.839 | 1.351 | 3.367 | 14.87 |
| Municipalities in TL | | | | | |
| Income per capita (log) | 6561 | 9.843 | 0.195 | 9.037 | 10.46 |
| Ordinary dwellings (log prices) | 5906 | 7.055 | 0.481 | 5.927 | 8.863 |
| Luxury dwellings (log prices) | 3472 | 7.258 | 0.467 | 6.163 | 8.880 |
| Commercial properties (log prices) | 5265 | 7.138 | 0.496 | 5.920 | 9.014 |
| Tourist arrivals (log) | 1506 | 9.132 | 1.825 | 4.419 | 16.12 |
| Nights in touristic facilities (log) | 1506 | 10.15 | 1.861 | 5.485 | 17.25 |
| Share of income $\geq 75,000$ | 6561 | 0.092 | 0.066 | 0 | 0.443 |
| Share of taxpayers with income $\geq 75,000$ | 6561 | 0.015 | 0.011 | 0 | 0.081 |
| Population (log) | 6569 | 8.591 | 1.459 | 4.564 | 14.87 |
| Treated municipalities | | | | | |
| Income per capita (log) | 1788 | 9.885 | 0.188 | 9.154 | 10.40 |
| Ordinary dwellings (log prices) | 1409 | 7.097 | 0.474 | 6.225 | 8.500 |
| Luxury dwellings (log prices) | 976 | 7.240 | 0.445 | 6.450 | 8.483 |
| Commercial properties (log prices) | 1063 | 7.259 | 0.486 | 6.268 | 8.384 |
| Tourist arrivals (log) | 582 | 9.209 | 2.003 | 4.970 | 15.52 |
| Nights in touristic facilities (log) | 581 | 10.18 | 2.029 | 6.353 | 16.38 |
| Share of income $\geq 75,000$ | 1788 | 0.117 | 0.072 | 0 | 0.435 |
| Share of taxpayers with income $\geq 75,000$ | 1788 | 0.019 | 0.013 | 0 | 0.081 |
| Population (log) | 1789 | 8.631 | 1.478 | 4.727 | 13.43 |

Notes: Authors' elaboration.

3.2. Empirical specification

Getting a consistent estimate of the local economic impact of WHL designation – the average treatment effect on the treated (ATT) – in a panel data context like the one we deal with here requires addressing two fundamental issues.

First, and similarly to conventional DiD approaches within the original two-group and two-period settings, consistent estimation of ATT on a dataset with multiple periods and variation in treatment timing across units - i.e., a treatment binary indicator switching to 1 at different times for different units and never reverting to 0, as is the case with the WHL designation (a staggered and absorbing treatment) - relies on the assumption of no-anticipation and parallel trends. This assumption requires that treated and control groups experience the same outcome evolution in the absence of the treatment and can, in principle, be tested by comparing the outcome trends in the two groups before the treated group receives the treatment.

The context we study here could admittedly depart from those ideal experimental conditions if the procedural aspects of the WHL nomination induced local changes in investment and other strategic marketing decisions in expectation of the official designation. As a result, real estate market prices and incomes in the treated areas might move to different growth trajectories before the timing of the official UNESCO treatment. Moreover, using all municipalities that do not host WHL sites as the control group – including rural areas, industrial zones, or residential suburbs – may overlook potential sources of unobserved heterogeneity in local characteristics that may lead to pre-existing differences in outcome trajectories and a violation of the parallel trends assumption.

To cope with these concerns, we exploit the fact that the procedural requirement for a government to propose heritage sites for the designation into the UNESCO WHL (inclusion into a national tentative list), coupled with the hypothesis that the timing of WHL designation

conditional on entering the national tentative list can be taken as plausibly random, creates an ideal control group. In fact, the municipalities having a candidate site within their territories in the national TL tend to be far more similar to the WHL-treated ones than the rest of the country, so the key outcomes of interest in those localities should display similar trends as in the treated localities before the treatment. For instance, while the municipalities receiving the UNESCO treatment have an average resident population of above 23,000 inhabitants, per-capita income of around €20,000, and average housing price per square meter of about €1500, the average Italian municipality has a resident population that hardly exceeds 7000 inhabitants, and significantly lower per-capita income (less than €18,000) and housing prices (about €1000). On the other hand, the municipalities having a heritage site in the national TL are far more similar to the treated ones, with a population of about 25,000, per-capita income exceeding €19,000, and housing prices at around €1400.

Moreover, assuming that, once included in the TL, whether and when the official UNESCO recognition will come can plausibly be considered a random event, the average difference in post-treatment outcome trajectories between treated and control localities can be interpreted as the dynamic causal effect of the UNESCO designation.

Second, as pointed out by recent and fast-growing literature (reviewed by De Chaisemartin and D'Haultfoeuille (2022)), a straightforward extension of DiD methods to panel data with staggered treatments may lead to bias in the estimate of the ATT if treatment effects are heterogeneous either over time or across units. The bias fundamentally arises from the fact that 'variational hungry' OLS two-way fixed effects estimation (TWFE) compares switching units (localities acquiring the WHL recognition in our case) both to groups that remain untreated at different dates and to groups that are already treated at both dates. The latter constitute 'forbidden comparisons' in the presence of time-heterogeneous treatment effects and make the OLS estimate of ATT a non-convex combination of treatment effects (negative weighting). An array of heterogeneity-robust estimators have been recently proposed (Roth et al., 2022).

We employ the estimator for staggered DiD designs developed by Callaway and Sant'Anna (2021). Their approach first groups observations into cohorts based on the timing of their first treatment. Within the potential outcomes framework, let W_m indicate the time of treatment (the year municipality m enters the WHL in our case), $D_{m,w} = (1|W_m = w)$ the treatment binary indicator, and $Y_{m,t}(D_{m,w} = 1) = Y_{m,t}(w)$ the potential outcome that unit m would experience at time t if it were first treated in time $W_m = w$. Then, for units that never receive the treatment, observed outcomes are the untreated potential outcomes in all periods ($Y_{m,t}(0)$), while for treated units, observed outcomes are the potential outcomes corresponding to the period when that unit receives the treatment ($Y_{m,t}(w)$):

$$Y_{m,t} = Y_{m,t}(0) + \sum_{l=2, \dots, T} [Y_{m,t}(w) - Y_{m,t}(0)] D_{m,w} \quad (1)$$

Generalizing the canonical two-group two-period DiD set-up, Callaway and Sant'Anna (2021) set the cohort(w)-time(t) specific $ATT(w, t)$ as the main causal parameter of interest:

$$ATT(w, t) = E(Y_t(w) - Y_t(0)|D_w = 1) \quad (2)$$

Under the assumptions of limited treatment anticipation (Assumption 3 in Callaway and Sant'Anna (2021), p. 204) and parallel trends (Assumption 4/5 in Callaway and Sant'Anna (2021), p. 204), the $ATT(w, t)$ is identified by comparing the expected change in outcome (income, property prices) for cohort w between periods $w-1$ (the year before treatment that is taken as the base year) and t to that of the same variable for either never-treated (Assumption 4) or not-yet-treated (Assumption 5) groups:

$$ATT(w, t) = E(Y_t - Y_{w-1}|W = w) - E(Y_t - Y_{w-1}|W \in C) \quad (3)$$

where C denotes either the set of never-treated C_{nt} or not-yet-treated C_{ny} units. Replacing expectations with their sample analogs:

$$ATT(w, t) = \frac{1}{N_w} \sum_{m: W_m=w} [Y_{m,t} - Y_{m,w-1}|W_m = w] - \frac{1}{N_C} \sum_{m: W_m \in C} [Y_{m,t} - Y_{m,w-1}|W_m \in C] \quad (4)$$

with N_w the number of municipalities treated at time w and N_C the number of municipalities in the control group.

Since our dataset includes a sizeable proportion of units that do not receive treatment at any point (the 341 municipalities in the TL that do not manage to get WHL designation during the period of observation), and, at the same time, those units are arguably similar in many respects to the 130 eventually treated units, we follow the recommendation in Callaway and Sant'Anna (2021) and use the never-treated units as the control group.

Still, it might be argued that an unconditional parallel trends assumption as the one on which the above estimate of $ATT(w, t)$ relies is unlikely to hold in practice, even when restricting the analysis to the sample of municipalities with their heritage sites included in the TL. To further address potential concerns of parallel trend violation between treated and untreated municipalities in our sample of TL municipalities, we therefore relax the above assumption and employ the doubly robust (DR) estimator from Sant'Anna and Zhao (2020), which combines regression adjustment and inverse probability weighting (IPW) methods:

$$ATT(w, t) = E \left\{ \frac{D_w}{E[D_w]} - \frac{\frac{(1-D_w)p_w(X)}{1-p_w(X)}}{E \left[\frac{(1-D_w)p_w(X)}{1-p_w(X)} \right]} \Delta(w, t) \right\} \quad (5)$$

$$\Delta(w, t) = Y_t - Y_{w-1} - E(Y_t - Y_{w-1}|D_w = 0, X) \quad (6)$$

where $p_w(X)$, a generalized propensity score, is the conditional probability of belonging to the treated group $D(w) = 1$ given X , a pre-treatment vector of observable covariates. The propensity score estimated in the first step works as a weighting scheme on the evolution of the outcomes in the untreated observations that imposes the same distribution of the covariates in the treated and untreated samples (Abadie, 2005). We include in X two local characteristics — the size of the resident population and per capita income, measured at the municipal level in 2006.⁵

Finally, an aggregated ATT estimate can be obtained by taking a weighted average of the DiD estimates across all cohorts w . In our event study application, the parameters of interest are the weighted averages of the treatment effects in each of the $l = 0, \dots, L$ periods after treatment:

$$ATT(l) = \sum_w \theta_w ATT(w, w+l) \quad (7)$$

with weights θ_w based on the frequencies of the treated cohorts w relative to the overall treated population:

$$ATT(l) = \sum_w \mathbf{1}(w+l \leq T) P(W = w|W+l \leq T) ATT(w, w+l) \quad (8)$$

4. Main results

4.1. WHL effects on income and real estate values

Figs. 2 through 7 plot summary event-study estimates, $ATT(l)$, of the effect of the UNESCO World Heritage Designation on the main

⁵ While we employ the doubly-robust estimator throughout, almost identical results emerge when relying on an unconditional parallel trends assumption, reinforcing our hypothesis that most of the fundamental differences existing within the extremely heterogeneous universe of the Italian municipalities are removed when focusing on the subset of those localities having a heritage site included in the national tentative list.

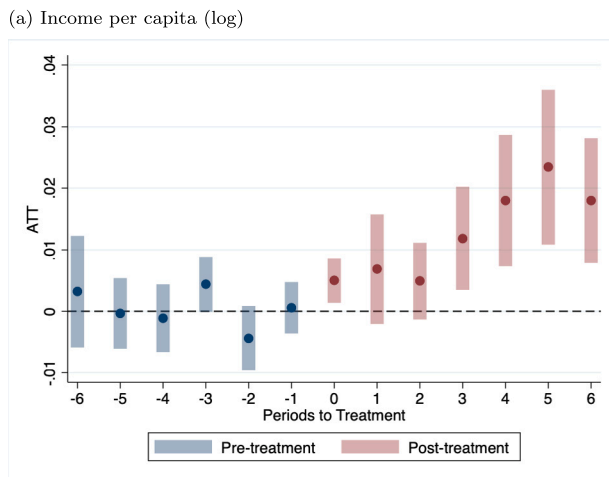


Fig. 2. UNESCO designation (year = 0) and income.

Note: The figure plots estimates and 95% confidence intervals of the average treatment effect on the treated using the doubly-robust estimator in Callaway and Sant'Anna (2021). Varying base displayed for estimates in pre-treatment periods. Standard errors are clustered at the municipality level. Number of observations: 6561.

local economic outcomes within a $(-6, +6)$ years window around the WHL designation event. Table A2 presents $ATT(l)$ estimates across the $(-6, -1)$ pre-designation periods and across the $(0, +6)$ post-designation periods.⁶

Fig. 2 reports the estimated event study coefficients on the log of per-capita income and 95 percent confidence bands. All post-treatment coefficients are to be interpreted as the effect of the treatment relative to the fixed pre-treatment period $w - 1$, using the set of never-treated municipalities in the TL as controls, while all pre-treatment coefficients $w - j$ ($j \geq 1$) are relative to the immediately preceding year $w - j - 1$. As Fig. 2 shows, WHL designation is estimated to have a positive, statistically significant, and non-negligible impact on income per capita. The effect peaks around five years since designation when it exceeds two percent of the baseline $w - 1$ income level. The pre-treatment event study coefficients show no evidence of the existence of pre-trends.

Fig. 3 reports the event study estimated coefficients on log-transformed property prices for the three categories of ordinary dwellings (“apartments”), luxury dwellings (“villas”), and commercial properties. Here, the consequences of WHL designation turn out to be more heterogeneous. First, in line with some existing theoretical and empirical contributions highlighting the potentially contrasting effects of conservation and designation policies on property prices (Coulson and Leichenko, 2001; Coulson and Lahr, 2005; Waights, 2019; Ahlfeldt and Holman, 2018), we find hardly any impact of the WHL treatment on ordinary dwellings. Second, the prices of luxury dwellings show some positive response (even though not always statistically significant) that gradually builds up, reaching a price increase of about six percent six years since designation. Finally, the prices of commercial properties react promptly since the very year of designation and keep growing until peaking after six years since designation at an increase of around 10% relative to the base-period price.

Indeed, similarly to any other exogenous shock to housing demand, UNESCO site designation seems likely to have heterogeneous consequences on affected localities’ real estate prices depending on the elasticity of the housing supply (Gyourko, 2017; Hilber, 2017). While, in principle, the degree to which house price capitalization from a

⁶ For comparison, Table A3 in the Appendix reports the results from a stacked DiD approach discussed in Cengiz et al. (2019), Cunningham (2021) and Baker et al. (2022), using the stacked event study estimator by Bleiberg (2021).

demand shock varies across locations can depend on differences in geographical/physical supply constraints and on a variety of endogenously determined regulatory constraints, the scarcity of developable land that is typical of highly urbanized areas is generally believed to play a major role (Hilber and Mayer, 2009; Hilber and Vermeulen, 2016). As a result, we allow the UNESCO listing process to have a heterogeneous impact on real estate prices across Italian municipalities depending on their degree of urbanization as a proxy of housing supply elasticity.

We employ the Eurostat degree of urbanization methodology that relies on a combination of geographical contiguity and population density. Based on the size, density, and contiguity of the population residing in grid cells that are homogeneous by shape and surface area (1 km^2), Eurostat classifies local administrative units as cities (high urbanization), towns (medium urbanization), or rural areas (low urbanization). In Italy, 68% of municipalities are rated as low urbanization (72% of the surface where 24% of the population lives), 29% are medium urbanization (23% of surface, 42% of population), and 3% are high urbanization (5% of surface, 34% of population). We group high and medium urbanization municipalities in an ‘urban area’ class where we hypothesize the housing supply elasticity is lower than in the ‘rural area’.

The results are as follows when performing the event study analysis separately on urban and rural areas. As shown in Fig. 4, the price response to WHL designation is larger in urban than rural areas. As for luxury dwellings, the price effect of WHL designation is positive and significant only in highly urbanized areas, with no effect in rural areas where the housing supply is arguably more elastic. A qualitatively similar pattern emerges regarding apartments, but the event study effects in the sample of urban municipalities are not statistically significant. Finally, the prices of commercial properties rise significantly in urban and rural areas due to WHL listing, though the estimated post-treatment effects are more persistent in the latter.

5. Mechanisms

In this section, we try to shed light on the potential underlying mechanisms that could be responsible for transmitting the effects of inscription in the UNESCO WHL on the local economic indicators we have documented above. The fundamental hypothesis that has motivated and driven our empirical analysis is that WHL designation represents a positive shock to the visibility and fame of the places hosting the sites. In turn, that should raise the demand (the willingness to pay) for the ‘amenities’ (recreational goods and services) that can be consumed at the designated locations.

Indeed, while systematic analyses of the impact of UNESCO designations on tourism based on Italian municipal data do not exist to date, informal accounts of popularity booms of localities having their sites inscribed in the WHL have frequently appeared in the local and national media.⁷ For instance, consider the 2014 UNESCO inscription of the Vineyard Landscape of Piedmont, a traditional wine-growing area spreading across 16 municipalities in the Southern part of the Piedmont region in the NorthWest of Italy. In 2008, six years before designation, the influential Lonely Planet tourist guide for Italy (around 1000 pages long) did not even include the Piedmont Vineyards of Langhe-Roero and Monferrato in its four-pages List of Contents (pp. 13–16), jokingly referred to Piedmont as “Tuscany without the tourists” (p. 211), and suggested a visit to the hills of Southern Piedmont

⁷ See, for example, ‘UNESCO, turismo boom per le colline Prosecco Conegliano Valdobbiadene’, *IlSole24Ore*, July 8, 2019, available at: <https://www.ilsole24ore.com/art/unesco-turismo-boom-le-colline-prosecco-conegliano-valdobbiadene-ACejNNX>, accessed January 28, 2024. Or ‘Tutti pazzi per il Monferrato: boom di turisti e investimenti’, *La Repubblica*, May 28, 2023, available at: https://www.repubblica.it/il-gusto/2023/05/28/news/monferrato_nuova_langa_per_i_wine_lover_50_best_a_torino_si_tratta-402062600/, accessed January 28, 2024.

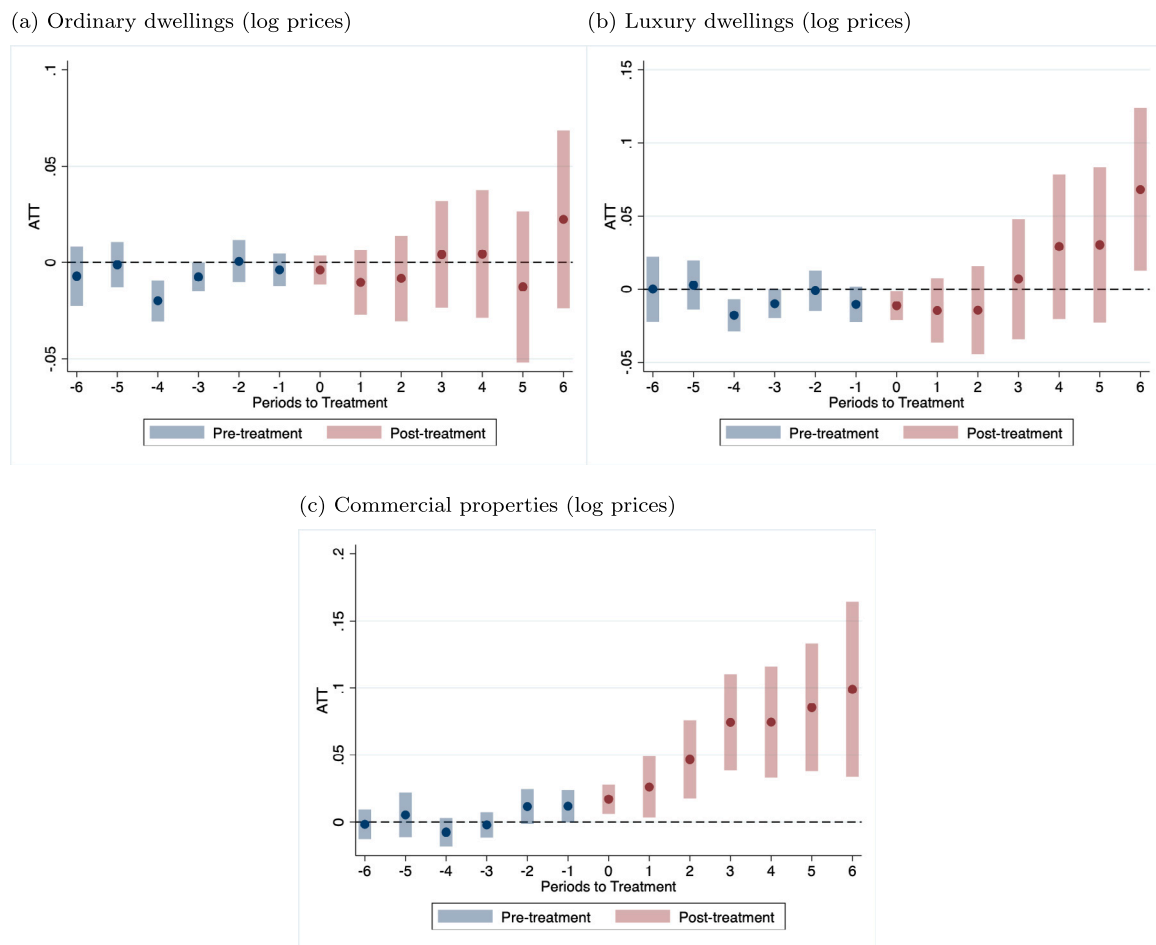


Fig. 3. UNESCO designation (year = 0) and property values.

Note: The figures plot estimates and 95% confidence intervals of the average treatment effect on the treated using the doubly-robust estimator in Callaway and Sant’Anna (2021). Varying base displayed for estimates in pre-treatment periods. Property values are measured in price per square meter. Standard errors are clustered at the municipality level. Number of observations: (a) 5906, (b) 3472, and (c) 5265.

(“prestigious wine-making area”) as a single discovery trip to a “largely ignored” region along so-called “Roads Less Travelled” that included as diverse activities as hiking to the over 4000 mt. Monte Rosa mountain in the extreme North and strolling through the elegant city centre of Turin (p. 29). By contrast, in the 2020 edition of the Lonely Planet guide for Italy, six years after designation, the “vine-graced slopes of the Langhe” were sensationally included in Italy’s Top 18 Experiences along with celebrated destinations as Eternal Rome, Venice streets and canals, the Amalfi Coast and the ruins of Pompeii. In fact, the growth of tourist flows to the 16 municipalities in the Piedmont UNESCO area during the five years following designation (2014–2019) was +62%, significantly in excess (over 30%) of the touristic growth in the rest of Southern Piedmont during the same period (+47%). Moreover, relatively unknown localities finding themselves within the designated area experienced an exceptional popularity boost. For instance, the somewhat obscure village of Calosso, with around 1000 inhabitants, had the number of tourists more than tripled between 2014 and 2019 (from less than 500 to more than 1600), while the town of Canelli, the “capital” of the worldwide famous local sparkling wine (Asti Spumante), saw a relatively modest increase in tourists during the same period (less than +50%).

The increased demand for listed cultural heritage can take different forms. Thanks to improved access to communication and transportation, growth of global wealth and lifetime earnings flows, rising numbers of well-off retirees, greater value given to leisure time, and the development of a globalized property market facilitating the purchase of properties abroad during the past few decades (Biagi et al., 2011),

it is possible to envisage multiple sources of increased demand for the consumption of the amenities of UNESCO listed localities. For the sake of simplicity, we can group them into three categories: (1) renters or pure consumers of local housing during their period of stay in the WHL destinations (tourists); (2) part-time consumers of local housing that do not reside in WHL localities (second home owners); (3) owners-users of properties in WHL localities (residents). Below, we try to identify the distinct socio-economic impact of increased demand for listed cultural heritage by those different types of consumers.

As for the first category, tourism itself is a complex and varied phenomenon in terms of length (from short excursions to long holidays), reason (culture, religion, nature) and type of accommodation (formal or informal), and official statistics on tourist inflows typically do not include informal phenomena (i.e., one-day trip visits or stays in informal accommodation structures). While acknowledging these well-known difficulties, a straightforward way of ascertaining the touristic impact of WHL designation consists of employing the official figures of: (a) the number of tourist arrivals, (b) the number of overnight stays around the dates of WHL designations in treated and control localities. Those tourism inflow data are available for 2014–2019 at the municipal level. Since the presence of tourists is a variable showing considerable spatial auto-correlation due to the widespread phenomenon of tourists visiting many related nearby sites in a single trip, we cluster standard errors at the province level (NUTS-3). As before, we employ the Callaway and Sant’Anna (2021) non-parametric estimation approach and use the never-treated municipalities with heritage sites in the national tentative list as a control group.

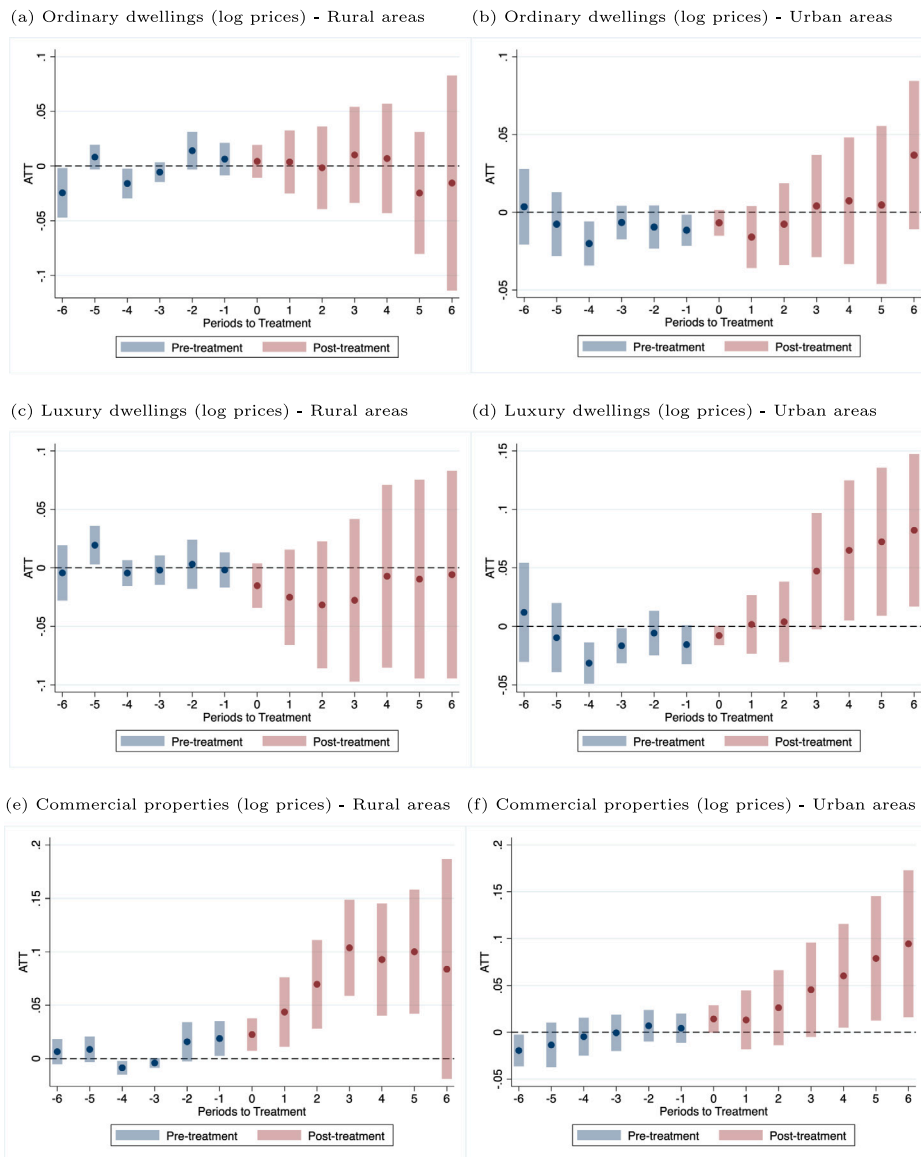


Fig. 4. UNESCO designation (year = 0) and property values — Rural and urban areas. Note: The figures plot estimates and 95% confidence intervals of the average treatment effect on the treated using the doubly-robust estimator in Callaway and Sant’Anna (2021). Varying base displayed for estimates in pre-treatment periods. Property values are measured in price per square meter. Urban areas are defined as high and medium levels of urbanization, while rural areas as low levels of urbanization. Standard errors are clustered at the municipality level. Number of observations: (a) 2883, (b) 3033, (c) 1700, (d) 1734, (e) 2599, and (f) 2664.

As shown by the event study evidence in Fig. 5, tourist arrivals and overnight stays – expressed in log form – significantly increase after WHL designation. For both measures, the average post-treatment effect exceeds 10% of the base $w-1$ period and appears to build up over time. These results are compatible with the phenomenon documented above of rising prices of commercial properties due to WHL designation, with local economies experiencing a shift towards tourism-related services. On the other hand, the rising prices of luxury dwellings that we found above seem unlikely to be explained by the demand from temporary renters.

The other two sources of “external” demand for amenities in WHL localities – private owners of second homes mainly used for seasonal and occasional holidays versus new residents – can be viewed as causes and expressions of a “gentrification” process. The rising prices of luxury properties that we observe in localities having their sites inscribed are compatible with the higher demand of high-income households attracted by the amenity value of the UNESCO heritage. Since both second homeowners and prospective residents put pressure on the

real estate market, though, discriminating between those two sources by further exploring the dynamics of housing prices seems difficult. Rather, we can try to shed light on that issue by observing the trajectories of the overall number of (resident) taxpayers and their distribution along the taxable income schedule across the treated and the control municipalities.

First, data on taxable income allow us to observe the distribution of the population of taxpayers in terms of the tax brackets their income falls into ($<€15,000$; $€15-€26,000$; $€26-€55,000$; $€55-€75,000$; $€75-€120,000$; $>€120,000$). As Fig. 6, panel (a) shows, the share of total municipal taxable income from taxpayers with taxable income above $€75,000$ significantly increases (around 2% within the five years following WHL designation) in the treated municipalities relative to the control ones in the tentative list. Similar (unreported) figures emerge when considering the $€55,000$ and $€120,000$ thresholds. In addition, the rise in the share of income from high-income individuals is accompanied by a small but statistically significant increase in the number of affluent (income $\geq €75,000$) taxpayers (Fig. 6, panel (b)).

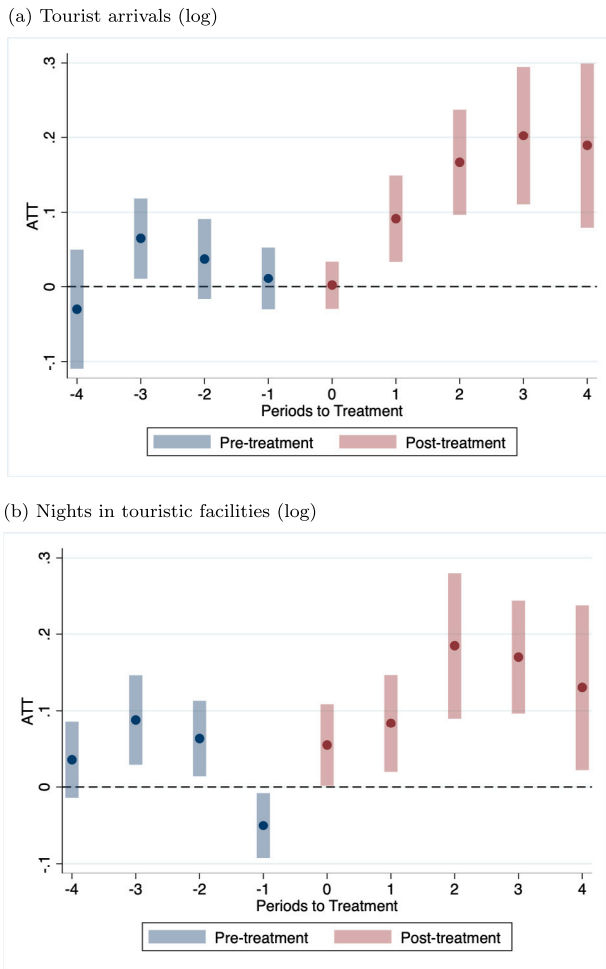


Fig. 5. UNESCO designation (year = 0), tourist arrivals and overnight stays. Note: The figures plot estimates and 95% confidence intervals of the average treatment effect on the treated using the doubly-robust estimator in Callaway and Sant’Anna (2021). Varying base displayed for estimates in pre-treatment periods. Standard errors are clustered at the province level. Data are available for the years 2014–2019. Number of observations: (a) 1506, and (b) 1506.

Second, if a mechanism of sorting driven by listed heritage sites was really at work, we should observe a net influx of affluent individuals with strong preferences for outstanding cultural heritage. Unfortunately, our data do not allow a specific investigation in this direction. We have no information on the income, education, or profession of those who migrate to a municipality but only observe the municipal-level yearly variation in the number of residents and the distribution of taxpayers and gross income across the income brackets of the Italian tax system. In this respect, the event study plot in Fig. 7 shows an overall increase in the number of residents in the years following the World Heritage designation, with a magnitude of the effect of about 2% after six years. Taken together, and while not excluding the role of second home owners about which, unfortunately, we do not have information, these pieces of evidence are compatible with the hypothesis of relocation of wealthy households to municipalities hosting heritage of outstanding value after that heritage is officially and openly recognized as such.

6. Conclusions

This paper has investigated the consequences of two decades of inscriptions of heritage sites in the UNESCO WHL on two dimensions of local economic performance (income and real estate values) in a

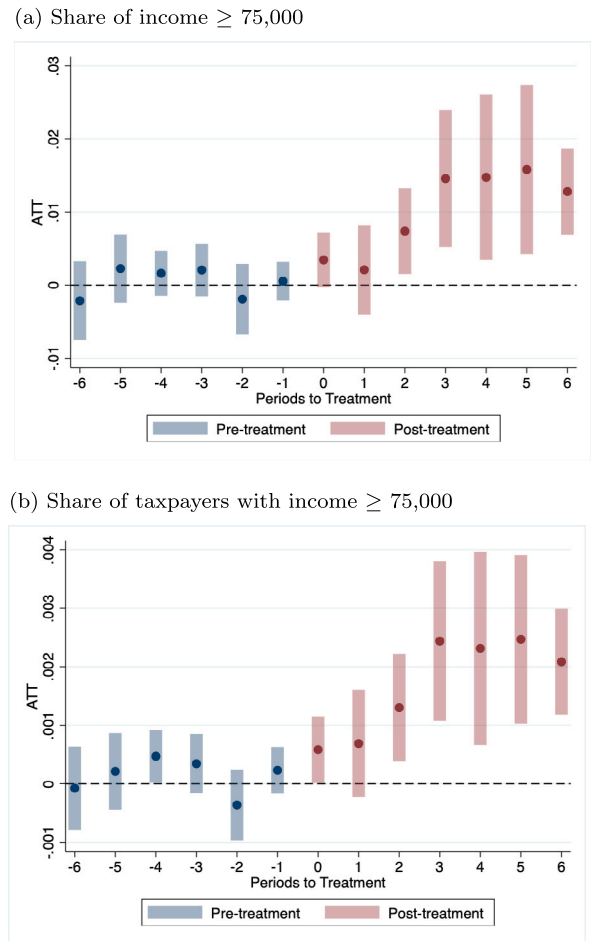


Fig. 6. UNESCO designation (year = 0), share of top income and top income taxpayers. Note: The figures plot estimates and 95% confidence intervals of the average treatment effect on the treated using the doubly-robust estimator in Callaway and Sant’Anna (2021). Varying base displayed for estimates in pre-treatment periods. Standard errors are clustered at the municipality level. Number of observations: (a) 6561, and (b) 6561.

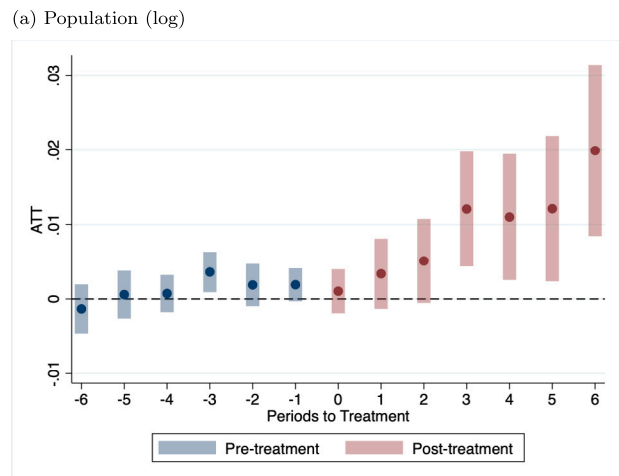


Fig. 7. UNESCO designation (year = 0) and population dynamics. Note: The figure plot estimates and 95% confidence intervals of the average treatment effect on the treated using the doubly-robust estimator in Callaway and Sant’Anna (2021). Varying base displayed for estimates in pre-treatment periods. Standard errors are clustered at the municipality level. Number of observations: 6569.

country (Italy) that has a highly decentralized structure of government and that is rich in cultural resources and UNESCO World Heritage sites.

We offer a novel contribution to the existing empirical research in this area in three main ways. First, the municipal-level data that we employ return more accurate estimates of the local impact of WHL inscription than previous analyses averaging the effects across larger and more heterogeneous (regional) jurisdictions. Second, we address the fundamental endogeneity issue arising from the fact that the trajectories of income and property values in municipalities having their sites included in the WHL might differ significantly from those in the other municipalities even before the official UNESCO designation by focusing on the municipalities having their sites included in the national tentative list of candidates during the period of observation. Since the national tentative list is a procedural requirement for a government to propose heritage sites for nomination into the UNESCO WHL, the timing of WHL designation conditional on entering the tentative list (our key treatment) can be taken as plausibly random. Finally, since standard panel data TWFE event study approaches to the estimation of the average treatment effect on the treated of binary, staggered, and absorbing treatments – as is the case with WHL designation – may deliver biased estimates when treatment effects are heterogeneous across time or units, we employ the heterogeneity-robust staggered difference-in-differences cohort-based estimator of Callaway and Sant’Anna (2021).

The evidence from our event study analysis points to a significant and non-negligible (over two percent) positive impact of WHL designation on municipal income per capita, while the consequences in the real estate market seem contingent on the characteristics of the areas where listed heritage sites are located. Notably, only the prices of luxury dwellings in urban areas respond significantly to treatment, and by over 10%, while they show no increase in rural areas where housing supply is arguably more elastic. Commercial property prices rise in urban and rural areas awarded the WHL status, though the effect is more persistent in the latter.

Based on the available information on touristic flows and the size and composition of the population of resident taxpayers, we have explored possible transmission mechanisms from WHL designation onto local economies, namely the tourism-led local income growth channel and the gentrification channel based on the demand for housing (second homes or residences) by affluent individuals attracted by the amenity value of WHL sites. The event study analysis based on the official figures of tourist arrivals and overnight stays shows that the trajectories of those variables around WHL designation dates are compatible with the hypothesis of increased touristic visibility of localities earning WHL designation. Second, the significant increase in the overall population and the number and share of income of affluent taxpayers in treated localities after the World Heritage designation is compatible with a hypothesis of a WHL-driven process of gentrification.

Finally, the phenomenon of limited land for housing development, particularly in highly urbanized areas, coupled with the increase in demand for second home ownership and bids for renovated and refurbished structures, is bound to lead to competition between “external” groups and local residents, with “exclusionary” consequences due to shortages of affordable housing in the affected areas and displacement or relocation of the most vulnerable segments of the population, including workers in tourism-related sectors, an important dimension of the issue that we have not analyzed here and that ought to be addressed in future analyses of the socioeconomic impact of UNESCO WHL designations.

CRedit authorship contribution statement

Enrico Bertacchini: Conceptualization, Data curation, Formal analysis, Methodology, Software, Writing – original draft, Writing – review & editing. **Federico Revelli:** Conceptualization, Data curation, Formal analysis, Methodology, Software, Writing – original draft, Writing – review & editing. **Roberto Zotti:** Conceptualization, Data curation, Formal analysis, Methodology, Software, Writing – original draft, Writing – review & editing.

Declaration of competing interest

No conflict of interest exists.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.regsciurbeco.2024.103996>.

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