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TOURISM AND LOCAL GROWTH IN ITALY

by Raffaello Bronzini[*], Emanuele Ciani[**] and Francesco Montaruli[*]

Abstract

Economic theory and the empirical literature are not conclusive on the relationship between tourism and economic growth. In this paper we estimate the impact of foreign tourists' spending on value added per capita growth in the Italian provinces, using various econometric strategies. The overall results show that the effect is positive and statistically significant, but modest in economic terms. The impact is larger for the less developed provinces, and null for those that showed the highest tourist revenues per inhabitant at the beginning of the period, suggesting that congestion phenomena may occur.

JEL Classification: R00, R10, R11, L83.
Keywords: tourism, economic growth, tourism expenditure, beach disease, dynamic panel data, instrumental variables.

Contents

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1. Introduction[1]

Italy is a country that is oriented towards tourism, where foreign travellers' expenditure provides a remarkably positive contribution to the balance of payments. Especially for some regions that lag behind economically, tourism is considered a great opportunity to boost growth. However, the hypothesis that tourism drives development has convinced supporters but also severe critics. On the one hand, its supporters argue that tourism expansion can trigger economies of scale, private investment and efficiency gains through pro-competitive effects activated by a greater degree of international openness (Song et al. 2012). On the other hand, its critics maintain that the tourism sector has low productivity and can displace other sectors characterized by more intense technological progress (manufacturing or tradable services for firms), eventually harming economic development (the so called 'Beach Disease'; see Copeland 1991 and Holzner 2011, among others). Furthermore, it is argued by the critics that tourism booms can cause congestion, thus generating problems of excessive use and management of cultural heritage and natural resources (Nowak and Sahli 2007). Empirically, the impact of tourism on economic growth has been studied extensively at national level. The review by Song et al. (2012) concludes that the sign and size of the impact are uncertain. A more recent work by Antonakakis et al. (2015) finds heterogeneous effects among countries and over time.

Although tourism is largely a local phenomenon, since tourists are attracted by immobile resources, and consume mainly within the territory they visit, only some studies adopt a sub-national approach.[2] Our work contributes to this literature by using a unique sub-regional data set for the empirical analysis. We estimate the effect of foreign tourists' spending on value added per capita growth for the Italian provinces (a proxy of the unavailable provincial per capita GDP) over the period 1997-2014. The main purpose is to verify whether the provinces with a higher initial level of tourism expenditure per head, i.e.

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[1] We thank participants at Bank of Italy seminars for their useful comments. We are grateful to Cristina Fabrizi for having shared the provincial housing price index with us, and to Monica Andini, Andrea Petrella, Paolo Sestito and Roberto Torrini for their valuable suggestions. The views and opinions expressed in this paper are those of the authors only and do not represent in any way those of the Bank of Italy.

[2] Among the works that adopt a sub-national approach, see Cortés-Jiménez (2008), Paci and Marrocu (2014) and Faber and Gaubert (2019).

those more specialized in the tourism sector, grow faster than the others in the subsequent period.

Our analysis presents some novelties with respect to most of the previous literature. First, it is based on a monetary variable - the expenditure of foreign tourists - which appears more suitable for estimating the effects of tourism on value added than the physical variables used in previous studies, such as the number of nights spent by tourists in the area. Second, while most of previous empirical evidence at the subnational level refers to regions (with the exception of Faber and Gaubert, 2019), we look at smaller geographical units, the 95 Italian provinces (NUTS 3 level of the European classification). Given the high concentration of tourists in a few provinces within a region, this level of analysis should capture the effect of tourists' consumption on local growth more accurately. For example, in 2014 the province of Rome absorbs the 97% of the total tourist presences of Lazio (and the 18% of Italy) and Venezia the 57% of Veneto (14% of the national total). Finally, we use empirical models that try to control for the bias due to the endogeneity of tourism, i.e. OLS growth regression, instrumental variables and dynamic panel data models.

According to our results, the effect of tourism on growth appears to be significant in statistical terms, but modest in economic terms. An increase in initial per capita tourism expenditure of around 10 per cent generates, on average, a higher cumulative growth over the next decade by around 0.2 percentage points (the effect rises to a maximum of 0.4 percentage points in some estimated models). However, a significant degree of heterogeneity emerges among different provinces. The effect is greater for those starting from low levels of added value per capita and employment rates. In addition, the relatively smaller provinces in terms of population benefit the most. Since these conditions characterize the South, we find a greater effect in the southern provinces compared with the central and northern ones; for example, a 10 per cent increase in tourist spending generates a cumulative effect of 0.47 percentage points in the southern provinces and 0.15 points in the central and northern areas in the following ten years. Overall, these results give support to the hypothesis of the "beach disease": in the provinces where the unused production inputs are abundant the impact of tourism is greater, whereas the opposite occurs in those where they are scarce.

The effect of tourism spending also appears to be non-linear, suggesting the presence of congestion: in provinces where per capita tourist expenditure exceeds a certain threshold, further increases do not produce positive effects on the value added. In the sample period examined, 15 of the 95 total provinces have an amount of expenditure that reaches or exceeds this threshold; among these is the province of Rome.

The rest of the paper has the following structure. In the next section we discuss the theoretical and empirical literature on tourism and growth. In section 3 we present the econometric models used and the descriptive evidence of the geographical distribution of tourism; while in section 4 we illustrate the results of our econometric estimations and in the last paragraph we illustrate the main policy implications.

2. Theoretical and empirical literature on tourism and growth

Economic theory is not conclusive on the relationship between tourism and economic growth. There are two main contrasting views. The first one, based on the tourism-led growth hypothesis (TLG), postulates a positive relationship between tourism and economic development similar in vein to the export-led growth models. According to this approach, a tourism boom has a number of positive effects on recipient economies, especially for small countries heavily dependent on the touristic sector. By bringing foreign currency, tourism inflows allow beneficiary countries to expand imports, in particular of capital goods, and by increasing employment it brings about a raise in residents' income. Moreover, it can spur new private and public investment and attract foreign capital. Thanks to economies of scale, and through the pro-competitive effects produced by higher international competitiveness, tourism can hence also lead to efficiency gains for local firms. Eventually, it might generate demand-driven positive effects in other economic sectors linked to tourism (see, among others, Schubert et al. 2011 and the surveys by Song et al. 2012 and Brida et al. 2016).

A second view of the economic impact of tourism is less optimistic. The main idea is that the tourist sector can be harmful for growth because it shows lower productivity and employs a less-skilled labour force than other sectors. Tourism booms might cause a shift of resources (capital and labour) from tradable and high-productivity sectors, such as manufacturing or firm services, to non-tradable activities related to the tourism sector, which are generally less productive. Such a shift of resources from the more dynamic sectors, which have more rapid technological progress, can depress overall productivity and eventually the economic growth and welfare of residents (Copeland 1991; Smeral 2003). This negative crowding-out effect of tourism was defined as the 'Beach Disease' (see e.g., Lanza et al. 2003, Chao et al. 2006; Capò et al. 2007; Holzner 2011).[3] Furthermore, the social costs of tourism associated with congestion and the intensive use of natural resources and cultural heritage should also be taken into account when one considers the economic effects of tourism. This calls for a proper planning and management of natural and historical resources (Nowak and Sahli 2007).

Empirically speaking, the effect of tourism on economic growth has been studied mostly at the country level. A number of papers examine the impact of tourism on GDP or GDP growth using a time series methodology, such as Granger causality tests, VAR models and cointegration analyses. The estimates turned out to be rather heterogeneous, even though positive results tend to prevail. The review by Song et al. (2012) concludes that the effects are uncertain; whereas that by Brida et al. (2016) finds that the majority of about 100 studies examined found a positive impact on the beneficiary economy, but they warn that the countries analyzed are those more specialized in tourism and are not representative of all countries. Other recent papers find heterogeneous results. Lee and Chang (2008) apply panel cointegration techniques and find that the long-run impact of tourism expenditure on GDP is higher for non-OECD countries than for OECD countries. The most recent work by Antonakakis et al. (2015) finds heterogeneous effects among countries and over time; for Italy there is a bi-directional causal effect: from tourism to growth but also the other way round (from growth to tourism).[4]

Tourists are attracted by immobile resources and tend to be heavily concentrated in a specific location. Moreover, most of their expenditure is made within the territory they visit. For these reasons, in order to estimate the economic impact of an inbound tourism boom more accurately, the analysis should be carried out at sub-national level, but only a few papers have adopted this approach so far. Among them, Cortés-Jiménez (2008) estimates the effect of tourism on the growth of GDP per capita in the Italian and Spanish regions and

[3] From the 'Dutch Disease', the term that identified the process of de-industrialization caused by the boom in the primary sector that occurred in the 1960s in the Netherlands.

[4] On the empirical literature on tourism growth, see also Balaguer and Cantavella-Jorda (2002) and Tugcu (2014).

finds a positive effect, especially for the coastal regions. Wang and Xia (2013) carry out a case study estimating the effect of tourism revenues on the economic growth (GDP) of the Gaouchu district in the Jiangsu province in China. They found that GDP growth Granger causes tourism revenues, but that tourism revenues do not Granger cause GDP growth in the district. Paci and Marrocu (2014) estimate the effect of tourism on the growth of per capita regional GDP in 10 European countries, finding a positive effect, especially for regions specializing in tourism, but that is not economically sizeable. These regional studies mainly estimate dynamic panel data models. More recently, Faber and Gaubert (2019) use data on hotel revenues from municipalities along the Mexican coastline. They use beach quality and archeological sites as an instrument for measuring tourists' expenditure. Their estimates suggest that a 10 per cent increase in hotel revenues increases local nominal GDP by 4.0 per cent (and employment by 2.5 per cent). To our knowledge, Faber and Gaubert (2019) is the only paper which exploits data at a sub-regional level and uses expenditure instead of nights spent by tourists. The authors further calibrate a spatial equilibrium model to estimate the spillover effects on the national economy.

In this paper we also adopt a sub-regional geographical scale - by looking at the 95 Italian provinces - and we focus on a monetary measurement - the expenditure of foreign tourists. Our econometric framework builds on the one previously used for cross-country and regional studies. We estimate growth regressions by relating foreign tourists' expenditure to value added growth, both throughout the entire period and by exploiting longitudinal variation (using an Arellano Bond System-GMM). In this framework, we provide two main econometric novelties. First, we formally assess the stability of our estimates if covariates are included, following the idea of Altonji et al. (2005). We do so by calculating bounds for the coefficient of interest, as suggested by Oster (2019). Secondly, we propose an instrument for the average foreign tourists' expenditure during the period. The instrument predicts the expenditure by interacting the initial provincial composition of tourists by country of origin with the national growth in expenditure by tourists from each specific country.

3. Empirical strategy and data

3.1 Empirical strategy

We adopt three main econometric strategies to estimate the effect of tourism revenues on the economic growth of Italian provinces. We start from a standard growth regression model *à la* Barro estimated by OLS. Then, to take into account the potential bias due to the endogeneity of tourism we adopt an IV strategy. Finally, we fully exploit the information included in the longitudinal data set and we estimate dynamic panel models.

Baseline model – First, we estimate growth regression over the period 1997-2014 at the provincial level, using per capita variables, through the following model:

$$\overline{\Delta lny_{\iota,97-14}} = \beta_0 + \rho lny_{i,97} + \beta_1 lntexp_{i,97} + x'_{i,97}\beta_x + \epsilon_i \quad (1)$$

where $y_{i,t}$ is per capita value added in province *i* in year *t*, $\overline{\Delta lny_{\iota,97-14}} = (lny_{i2014} - lny_{i1997})/17$ is its average growth between 1997 and 2014, $lntexp_{i,97}$ is the log of per capita foreign tourists' expenditure in 1997, and $x'_{i,97}$ is a set of variables fixed at the initial period (controls). In the robustness section we also estimate the model using the number of nights spent in the province by all tourists (domestic and foreign).

As the tourism expenditure variable is fixed at 1997 and we control for the initial value added, the coefficient β_1 can be interpreted as the impact on growth of being more specialized in tourism. In other words, we study whether provinces with greater foreign tourists' expenditure at the beginning of the period grew differently than other provinces with a similar initial value added.

The main problem in this regression is that there might be other characteristics, either fixed or pre-determined at the beginning of the period, which are related to tourism specialization and, at the same time, to the trend in the value added. We first try to tackle this problem, which might bias the estimated impact of tourism, by including a wide range of variables related to (i) human capital; (ii) infrastructure; (iii) economic structure; and (iv) demography and geographic structure. As we are not sure whether these covariates are sufficient to capture all relevant heterogeneity, we assess the stability of the coefficient of interest to the inclusion of these covariates. As explained by Altonji et al (2005), if selection on observables is related to selection on unobservables, then the changes in the coefficient are informative about the bias induced by excluding relevant characteristics. However, to understand whether these changes are large, the explanatory power of the additional covariates needs examining, as captured by the R2. To provide a quantitative assessment, we exploit Oster's (2019) suggestion to calculate a bound for the coefficient of interest, by assuming that selection on observables is directly proportional to selection on unobservables and that the maximum R2 that could be explained also including all other (unobservable) relevant features would be 1.3 times the one we observe.[5] The results of this exercise will be presented in section 4.1.

IV model – One interesting alternative specification of model (1) is to use, as the main explanatory variable, the average tourist expenditure over the period 1997-2014 (instead of in the initial period). This regression accounts for the different trends in foreign tourists' expenditure across provinces over time (see Section 2.3), but suffers from a simultaneity bias. To provide a solution to this problem, we build a 'Bartik' instrument based on the 1997-98 provincial shares of expenditure by country of origin, following the original suggestion from Bartik (1991). We first aggregate in a residual category all countries of origin with an overall average annual expenditure of €100 million during 1997-2014, in the whole of Italy. The predicted 'Bartik' expenditure in each year is then calculated as

$$lntexp_{i,t}^{bartik} = lntexp_{i,97} + \sum_{k=1}^{K} \omega_{i,97-98}^{k} \times (lntexp_t^k - lntexp_{97}^k) \qquad (2)$$

where $k = 1, \dots, K$ are the countries of origin while $\omega_{i,97-98}^{k}$ is the initial share of tourists from country k in the (foreign) tourist expenditure in province i (calculated as an average for 1997 and 1998 to reduce noise). The final term in Eq. (2), for which there is no subscript i, is the national growth in the expenditure of tourists from country k. We then use, as a regressor, the average of $lntexp_{i,t}^{bartik}$ over the entire period.

The validity of this instrument hinges on whether the initial shares of different countries of origin are uncorrelated with ϵ_i (the exclusion restriction). This seems reasonable: the greater presence in a specific province of tourists from certain countries

[5] 1.3 is an empirical rule-of-thumb motivated by a review of randomized experiments; it corresponds to the value that "would allow at least 90% of randomized results to survive" (Oster, 2019, p. 189).

might depend on the initial conditions in 1997, but it is difficult to believe that it is correlated with subsequent shocks (ϵ_i) that have not already been captured by the initial level of $lny_{i,97}$, the covariates $x'_{i,97}$ and the average tourist expenditure itself. The exclusion restriction might be more reasonable if we move to years further away from the initial condition (1997). We show that the results are similar if we focus only on the years 2004-14, which are further away from the initial share. This should help to further minimize any possible bias.

Dynamic Panel Data Model – Finally, as a robustness check we switch to a regression for annual growth and we use provincial fixed effects instead of covariates, which are anyway quite persistent over time. Using fixed effects introduces additional problems, because the equation also includes the lagged dependent variable, which is by construction related to the fixed effects. Following Rajan and Subramanian (2008), who study the impact of international aid on countries' GDP growth, we use the Arellano Bond System-GMM. This method is the best option among the available alternatives for estimating dynamic equations with fixed effects, given that our series tend to be quite persistent. In the Arellano Bond System-GMM we use two different sets of moments. In one the equation is taken in first differences and the growth of the right hand variables is instrumented with previous lags. As our series are quite persistent, differencing removes most of the variability and might lead to a weak instrument problem. To gain precision and avoid weak-instrument bias, the System-GMM exploits also another set of moments, where the equation is in levels and the right-hand side variables are instrumented with previous changes. As discussed by Roodman (2009), for these instruments to be valid we need to assume that the initial distance from the steady state condition is not systematically related to province level fixed effects. We defer to Rajan and Subramanian (2008) for a more detailed discussion of the use of this method in the context of growth regression. In Section 3 we discuss all the relevant tests for this method and other details for its implementation.

3.2 Variables and data

We built a balanced panel of data for 95 provinces between 1997 and 2014. Over these years the number of Italian provinces expanded from 95 to 107. As most of the variables are observable at the provincial level, we found it more reasonable to consider the initial definition of 95 provinces. For those variables that were available at municipal level (in particular foreign tourists' expenditure) we simply re-aggregated the time series using the initial 95-province scheme. Other variables, in particular value added, were not available at a more disaggregated level than the provincial one, and therefore we reconstructed the time series by appropriately splitting the new provinces into the old ones (the 95-province scheme), weighting by population share (in each year) of the municipalities belonging to each province.

Our main explanatory variable is foreign tourists' expenditure, taken from the Bank of Italy's survey on International Tourism (see Bank of Italy, 2017). We also show the results using the total nights spent by tourists (both foreign and Italian), which is the most commonly used variable in the literature. We refer to this additional variable as tourist presences (number of nights spent).

As a main outcome we start from value added per capita, as a proxy for per capita GDP and therefore for the overall level of economic development.[6] Secondly, we use non-scaled value added as further outcome variables, to measure the impact on the overall economy of the provinces, and employment rate, in order to evaluate the effect of tourism on the local labor market. Finally, we look at population to investigate whether tourism, in affecting local development, also attracts migration from other areas.

As common in the literature (Abadie and Gardeazabal, 2003; Barro and Sala-i-Martin, 2004), in order to account for unobservable components we include several control variables, either measured in the initial year or fixed over time. We initially include proxies for the initial (1997) human capital accumulation (shares of population with high school diploma and with university degree), presence of infrastructures (*Istituto Guglielmo Tagliacarne* index of provincial infrastructures), and sectoral composition (shares of value added the

[6] The source for value added at the province level are the territorial accounts of the national institute of statistics (ISTAT), which are consistent with the national accounts. Monetary values are not deflated. Given that deflators at the provincial/regional level are not available, and that our regressions include a constant (or year/period dummies in the yearly/sub-period regressions) deflating monetary values by using a national deflator leads to exactly the same results. In principle, we could deflate the different sectoral components of the value added by each sector national deflator. However, this also requires some assumptions, given that value added at the provincial level is only available at a very aggregate level (agriculture, manufacturing, services).

industrial sector, constructions and services).[7] In our preferred specification we also include the initial size of the province in terms of population (in logarithm), the age structure (population shares aged 15-64 and 15-34), some variables accounting for geographical morphology (log of surface, average altitude, average slope, fraction of the surface in coastal municipalities), the employment rate, and a proxy for social capital.[8] These variables are both predictors of the value added per capita and might also capture different exposures of each province to external shocks, depending on the structural characteristics of the local economy.

Descriptive statistics for the main variables used in the empirical analysis (and their sources) are reported in Table 1.

3.3 Descriptive analysis

Figure 1, panel (a) presents the geographical distribution of foreign tourists' expenditure scaled by the number of provincial inhabitants in 1997 (the initial year of our analysis). The chart shows that the expenditure is higher in the central and northern regions than in the southern regions. In the North East almost all the provinces of Trentino Alto Adige, Friuli Venezia Giulia and Veneto (except for the provinces of Vicenza and Treviso in Veneto) and, in the North West, those of Liguria and Valle d'Aosta, show values higher than the median. The driving effect of the natural resources (coastal and mountain areas) emerges, as well as the influence of places sustained by tourism linked to cultural heritage (Verona). A similar effect involves the Centre, where high spending values are recorded in many Tuscan provinces, on Emilia Romagna's coasts, in some coastal provinces of the Marche and Abruzzo, in Rome, Latina, Perugia and in some mountain provinces of Abruzzo. In the

[7] The index of provincial infrastructures is provided by *Istituto Guglielmo Tagliacarne* and it is defined over the years 1991 and 2001. In each year it is expressed relatively to the Italian average (Italian average=100). We estimate the values for 1997 using a linear interpolation of the 1991 and 2001 data. The shares of population with high school diploma and with university degree are available only for census years (1991 and 2001) and we linearly interpolated them for 1997.

[8] Social capital is the first component extracted from a principal component analysis of different indicators (referendum turnout, share of no profit, corruption and blood donation); see Bronzini et al. (2019) for a more detailed description.

South most of the provinces have tourist spending figures lower than the median with only a few exceptions, especially in Sardinia.

Expenditure data are only available for foreign tourists (data on domestic tourist spending are not available), but the picture that emerges from analyzing the presence of Italian and foreign tourists in terms of number of nights spent per inhabitant is quite similar to that of spending. The majority of the provinces that show higher expenditures show also higher presences, and the provinces of the Centre and North are among them (the figures on nights spent are not shown but are available upon request).

The dynamics of foreign tourists' spending over the 1997-2014 period show a moderate convergence (Figure 1b), with the recovery of some lagging provinces especially in the South (in particular Campania, Calabria, Sicily and Sardinia), and a slower dynamic in the leading areas (for example north-eastern and coastal provinces on the Adriatic). This convergence emerges also when analyzing the trends in presences, which are sustained/steady in the South (in Puglia and Calabria, but also in parts of Sicily and Sardinia) and in several Piedmont provinces in the North, while some areas already highly specialized have recorded lower growth (for example in the provinces of the North East); but other provinces, on the contrary, have further strengthened (like those of Tuscany).

A simple correlation indicates that increased spending by foreign tourists per inhabitant is associated with greater growth in value added per capita in the following period (Figure 2). In the econometric analysis, to take into account the different starting conditions of the provinces, growth regressions have been estimated that take into account a large set of initial characteristics of the provinces, including the initial level of value added per capita.

4. Results

4.1 Main results

Following from Figure 2, simple regressions display a positive association between the initial level of per capita foreign tourists' expenditure and the growth in per capita value added during the following years (Table 2, column 1). As standard in growth regressions, we control first for the initial level of value added. The coefficient on foreign tourists' expenditure remains positive and statistically significant (column 2). The same coefficient slightly decreases, but is still significant, when we progressively include a large set of covariates (columns 3 and 4), measured at the beginning of the period, which are likely to affect productivity and growth (human capital, infrastructure, initial sectoral shares, population age and initial employment rate), and also to be related to tourism (altitude, slope steepness, fraction of coastal municipalities).[9] Using our preferred specification, which includes all the covariates (column 4), the effect is not remarkable: a 10 per cent increase in the initial per inhabitant foreign tourist expenditure increases annual growth of value added per inhabitant by 0.02 per cent.

A recurring issue in these specifications is that we do not know which variables to include, and we may not be including all the relevant ones. To assess whether our estimates are robust to the presence of additional unobservable heterogeneity that is correlated with both $lntexp_{i,1997}$ and the growth in value added, we follow the idea of Altonji et al. (2005) of looking at changes in the coefficient of interest when we include covariates. In particular, we calculate a bound for the coefficient of interest assuming that the degree of selection on unobservables is equal to the degree of selection on observables and that, were we able to control for all relevant covariates (including the relevant unobservables), the R2 would be 1.3 times the one observed in the actual regression, as suggested by Oster (2019; see section 3.1). The last lines of Table 2 report this bound. It confirms that the true effects are positive, and possibly even a little larger than our estimates.

[9] The coefficients on the additional covariates are reported in Table A1 of the Appendix.

There is also a positive impact of tourism on the employment rate (column 5), which is smaller than the one on value added (the variation in the employment rate is calculated as a change). The results are also similar if we focus on non-per capita value added (column 6). On the other hand, we find no impact of foreign tourism expenditure on population (column 7). These results are nevertheless less robust than previous findings, as Oster's bound turns out to be negative. Similar estimates to the main ones are obtained by using total tourist presences (Table 3), which also includes Italian tourists.

By breaking down the regression into three sub-periods (Table 4, columns 1-4) we find consistent evidence of a positive relationship between tourism specialization and growth in value added, although the effect seems to have been less significant in more recent years. In order to allow for differential trends, we also add the interaction between periods and geographical area dummies into the regressions that pool all the sub-periods. Following the usual statistical convention, the areas are defined as four groups of regions.[10] The coefficient estimates are still positive and in line with our main results from Table 2. Looking at shorter periods of three years we still find the same empirical evidence, which indicates that the positive effect detected in the longer term seems to show up in the shorter term as well (columns 5-10).

Using the main specification, we explore the heterogeneity of the effect across different dimensions. We do so by adding an interaction term with specific variables. Due to the small sample size we are not able to provide a full estimate with all the interaction terms, and therefore a caveat might be that some of the dimensions of heterogeneity overlap and we are not fully able to discriminate between the different explanations. In Figure 3 we display the examined heterogeneity in graph form, by evaluating the marginal effects of foreign tourists' expenditure for different subsamples.

[10] Geographical areas group regions into four zones: North-West (Piedmont, Valle D'Aosta, Lombardy, Liguria), North-East (Trentino-Alto Adige, Veneto, Friuli Venezia-Giulia, Emilia Romagna), Centre (Tuscany, Umbria, Marche, Lazio), and South (Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicily, Sardinia).

First of all, we test the hypothesis that the effect of tourism is stronger where there is more unused production capacity. In this case the tourist industry is less likely to crowd out other sectors by changing relative local prices and wages. Indeed, we find that the effects are stronger in areas that were more disadvantaged in the beginning: those with lower initial value added per capita or employment rate (Table 5). Furthermore, looking at the structural characteristics of the provinces, we do not find heterogeneous effects according to the strength of the offer of tourist accommodation, but stronger effects in smaller provinces, that may offer less employment opportunity (in any case no strong heterogeneity arises if we look at big metropolitan areas). Finally, a greater impact emerges for the South of Italy, which historically has lagged behind the rest of the country in economic terms, and shows higher unemployment.

The impact of tourism on local economies might also depend on the reaction of local prices. If the housing supply is inelastic, an influx of tourism might raise rents, which in turn reduces the labor supply (as it is more costly for workers to live in the area) and raises local wages. As a result, the impact of tourism in these areas should be lower, while the opposite should occur in the provinces where the housing supply is more elastic. We therefore analyze the effect of tourism by splitting the sample of provinces in terms of high and low house supply elasticity, according to an index of housing price elasticity at the provincial level built by Accetturo et al. (2019), to which we defer for more details. The sign of the estimated coefficients is as expected: the dummy for provinces with higher housing elasticity is positive (it is not shown in the tables but is available on request), as they have fewer constraints on growth, and the interaction term is also positive, as we expected. However, the magnitude is small and the coefficient is not statistically significant. We also tried using a provincial housing price index as an endogenous variable. This index, built with data from the *Osservatorio del mercato immobiliare* and *Il Consulente Immobiliare*, is only available for the years between 2000 and 2014, hence we use the same specification over this period.[11]

[11] The index is equal to 100 for 2005 in Italy. Consistently with the rest of the analysis, we look at the average change in the logarithm of the index as dependent variable, hence the estimates are interpreted in the same way. Data between 2000 and 2005 are from *Il Consulente Immobiliare* (see Muzzicato et al., 2008), while changes in the following years are estimated on data from *Osservatorio del mercato immobiliare*.

The results show a positive impact of tourism on house prices, but the coefficient is rather small (0.0016, s.e. 0.0019) and also not statistically significant. One possible issue with these estimates is that the crowding out effects are highly localized and therefore what matters is the (very) local housing elasticity. Unfortunately, as already discussed, data constraints limit our ability to run the analysis at a more detailed geographical level.

Finally, returns on tourism specialization might be non-linear: they may be large at low level of tourists' presences, but there might be a point at which they decrease or become negative because of the costs of congestion or the possible crowding out of other sectors, when the tourist industry expands to the point of significantly impacting on relative local prices and wages. Actually, our results suggest that the impact of tourism specialization can be concave (Table 5, column 7), i.e. returns on tourism specialization are decreasing. The point at which the marginal effect becomes negative is $lntexp_{i,1997}$=6.4. This level was reached, in 1997, by 16 provinces, for which therefore a further expansion of the tourist sector might not have been beneficial. For instance these provinces include Venice, Florence and Rome.[12] In our set of provinces, the range of marginal effects ranges from 0.0069 to -0.0047.

4.2 Results for IV and dynamic panel data models

Results using the initial tourism specialization may overlook changes that have occurred over time. In Table 6, column 1, we estimate an alternative specification where we use the average annual expenditure of foreign tourists over 1997-2014 as an explanatory variable. As in the main results, the estimates display a positive but small impact of tourism on growth. However, this specification raises an issue of simultaneity with the value added dynamics. We therefore rely on a 'Bartik' instrument based on interacting the initial share of different countries on each province's total foreign tourist expenditure with the aggregate trend in each country's expenditure in Italy. The results are reported in Table 6, columns 2-4. Our instrument is a good predictor of the average tourist expenditure (column 2). The 2SLS result is slightly larger than the main result with average expenditure, hence confirming that

[12] For Rome there is evidence that the expansion of tourism that followed the Great Jubilee 2000 did not bring about an increase in value added (see Bronzini et al., 2019).

the positive effect of tourism is not driven by simultaneity. The results are also similar when we look at 2004-14 (Table 6, columns 5-8). This is reassuring with respect to the validity of the exclusion restriction, as we are moving further away from the initial composition (in terms of country of origin of tourists) used to build the ‘Bartik’ instrument (eq. 2). We also use Oster’s bound to show that the results do not seem to be driven by a violation of the exclusion restriction. We look at the reduced form, i.e. the regression of the outcome over the instrument, and similarly to the previous section we assume that selection on observables is directly proportional to selection on unobservables and that the maximum R2 that could be explained also by including all the other (unobservable) relevant features would be 1.3 times the one we really observe. The bound is positive and actually larger, confirming that the positive effect that we highlight is likely to be robust to some degree of violation of the exclusion restriction.

As the main issue with our estimates is the possible presence of unobserved time-fixed heterogeneity, one alternative is to look at annual growth and include provincial fixed effects instead of the time-persistent covariates that we are currently using. The annual growth equation to estimate is:

$$\Delta lny_{it} = \rho lny_{it-1} + \beta_1 lntexp_{i,t-1} + \gamma_t + u_i + \epsilon_{it} \qquad (3)$$

A standard FE estimator (Table 7, col 2) suffers from the incidental parameter problem due to the fact that the lagged value of value added is, by construction, correlated with the fixed effects. As in Rajan and Subramainan (2008), we therefore estimate the equation by using the Arellano-Bond system-GMM, using lags of up to 8 periods before for both the lagged dependent variable and the tourist expenditure variables (column 3). For the lagged dependent variable we actually only use lags starting from four years before, as the AR tests indicate an autocorrelation of the errors up to three lags. We also collapse the instruments as suggested by Roodman (2009), in order to avoid ending up with too many weak instruments. The Hansen test fails to reject the null with p-value 0.172, which is reassuring because it is not too large and therefore does not indicate that we have a problem of too many instruments. We further test for the validity of the underlying assumptions by using difference-in-Hansen tests for the validity of the additional moment restrictions imposed by the level equation and for the separate validity of the instruments for the $y_{i,t-1}$ and for $lntexp_{i,t-1}$. All the tests fail to reject the null of validity of the restrictions. The estimated effect of tourism on value added growth is similar in size to the ones from the standard growth regression (Table 2), although they are not statistically significant because of larger standard errors. The results are also similar if we use the lags of the 'Bartik' predicted foreign tourists' expenditure (from Eq. 2) as instruments for $lntexp_{i,t-1}$.

5. Conclusions

In this paper we estimated the impact of tourist expenditure on provincial economic growth in Italy, using several econometric strategies robust to the endogeneity of the tourism variable.

The results show that overall the impact is positive and statistically significant, but economically modest. According to the different estimates, the impact of a 10 per cent increase in the initial per capita foreign tourists' expenditure increases growth in the following decade in a range between 0.2 and 0.4 per cent. Taken at the average value of initial expenditure and value added, this implies that for every additional euro in the initial year, the value added grows in the following decade by €0.8-1.7.[13] The positive effect of tourism involves employment as well, but does not seem to increase the local population. We find a non-negligible heterogeneity of the effect across provinces. For about 15 out of 95 provinces that showed the highest tourism revenues per inhabitant at the beginning of the period, a further increase in tourist outlays has no effect on economic growth. Among them we find the province of Rome (in line with the findings of Bronzini et al., 2019), which suggests the presence of costs of congestion. Furthermore, the impact of an increase in tourism outlays is larger for the most economically lagging provinces, among which are the provinces of southern Italy.

[13] The average per capita foreign tourists' expenditure in 1997 was €391 while value added per capita was € 16,299.

Overall the results, heterogeneous across provinces, support the hypothesis of a beach disease effect: where there are abundant unemployed production inputs the impact of tourism is stronger, but in other areas it can also contrast the growth of per capita GDP since it encourages activities and employment with lower productivity. On the whole, we can conclude that the impact of tourism on local development is important for some territorial areas, but it should not be overemphasized. Tourism policies should take into account both the heterogeneity of the effect across the provinces, and the potential congestion costs in some areas that are already highly specialized in tourism.

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Tables

Table 1. Descriptive statistics (1995)

Variable definition [source]	Mean	Std. dev.
Infrastructure index [Istituto Tagliacarne]	109.0	66.1
Share of high school graduates in the population 1997 [Istat: census]	0.264	0.032
Share of university graduates in the population 1997 [Istat: census]	0.052	0.011
Share of value added in industrial sector 1997 [Istat]	0.225	0.084
Share of value added in construction sector 1997 [Istat]	0.057	0.018
Share of value added in service sector 1997 [Istat]	0.670	0.076
ln(population) 1997 [Istat]	13.01	0.71
ln(surface) [Istat]	7.910	0.593
Social capital (factor) [Bronzini et al., 2019]	0.001	1.513
Average altitude (000m) [Istat]	0.350	0.223
Average slope [Istat]	17.520	15.577
Fraction surface in coastal municipalities [Istat]	0.160	0.202
Population share aged 15-64 1997 [Istat]	0.672	0.017
Population share aged 15-34 1997 [Istat]	0.282	0.023
Employment 1997 [Istat]	212709	234304
Population 1997 [Istat]	598994	635559
Value added per capita 1997 in euro [Istat]	16290	4250
ln(value added per capita) 1997 [Istat]	9.663	0.269
Employment rate 1997 [Istat: Labor Force Survey]	0.518	0.087
Foreign tourists' expenditure per capita 1997 in euro [Bank of Italy and Istat]	391.378	593.919
ln(foreign tourists' expenditure per capita) 1997 [Bank of Italy and Istat]	5.345	1.032
Average logarithmic growth in value added per capita 1997-2014 [Istat]	0.018	0.006
Average change in value added per capita 1997-2014 [Istat]	0.002	0.002
Average logarithmic growth in population 1997-2014 [Istat]	0.003	0.004
Average Bartik ln(foreign tourists' expenditure per capita) 1997-2014 [Bank of Italy and Istat]	5.399	0.998

Note: The data refer to 95 Italian provinces observed from 1994 to 2014; linear interpolation is used to impute the missing values between census years (which are 1991, 2001, 2011); monetary values are expressed in euro.

Table 2. Growth regressions 1997-2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Average 1997-2014 growth in:						
	Value added per capita				Employment rate	Value added	Population
ln(foreign tourists' expenditure per capita)$_{1997}$	0.00185***	0.00302***	0.00271***	0.00200***	0.00052**		
	(0.00054)	(0.00058)	(0.00072)	(0.00075)	(0.00023)		
ln(foreign tourists' expenditure)$_{1997}$						0.00180**	-0.00020
						(0.00078)	(0.00047)
ln(value added per capita)$_{1997}$		-0.00832***	-0.00847**	-0.02613***	0.00457**		
		(0.00223)	(0.00397)	(0.00606)	(0.00176)		
ln(value added)$_{1997}$						-0.01854***	0.00758**
						(0.00616)	(0.00334)
Infrastructure, human capital and sectoral composition			X	X	X	X	X
Full set of covariates				X	X	X	X
Observations	95	95	95	95	95	95	95
Oster's bound		0.00374	0.00400	0.00251	-0.00040	-0.00965	-0.00262
r2	0.11342	0.22371	0.26273	0.42777	0.72499	0.47845	0.55590

Note: * p<.10 ** p<.05 *** p<.01. The unit of observation is the province. OLS estimates; robust standard errors in brackets. In columns (1)-(4), (6) and (7) the average growth is calculated as [ln(y)$_{2014}$ - ln(y)$_{1997}$]/17; in column (5) as [y_{2014} - y_{1997}]/17. All regressions also include a constant. The basic set of covariates (column 2) includes: Infrastructure index 1997, Share of high school graduates in the population 1997, Share of university graduates in the population 1997, Share of value added in the industrial sector 1997, Share of value added in the construction sector 1997, Share of value added in the service sector 1997. The full set of covariates also includes: ln(population) 1997, ln(surface) 1997, Social capital (factor), Average altitude (000m), Average slope, Fraction surface in coastal municipalities, Population share aged 15-64 1997, Population share aged 15-34 1997, Employment rate 1997. Oster's bounds are calculated assuming that the degree of selection on unobservables is equal to the degree of selection on observables and that the maximum R2 that we would estimate if we were able to include all relevant unobservables is 1.3 times the one observed in the actual regression including the controls. We used the pscalc.ado Stata program written by Oster (2019).

Table 3. Growth regressions 1997-2014, using total tourist presences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Average 1997-2014 growth in:						
	Value added per capita				Employment rate	Value added	Population
ln(tourist presences per capita)$_{1997}$	0.00200***	0.00235***	0.00228***	0.00192***	0.00027		
	(0.00043)	(0.00045)	(0.00057)	(0.00070)	(0.00019)		
ln(tourist presences)$_{1997}$						0.00195***	0.00004
						(0.00067)	(0.00032)
ln(value added per capita)$_{1997}$		-0.00483**	-0.00567	-0.02269***	0.00519***		
		(0.00204)	(0.00374)	(0.00601)	(0.00196)		
ln(value added)$_{1997}$						-0.01520**	0.00751**
						(0.00609)	(0.00328)
Infrastructure, human capital and sectoral composition			X	X	X	X	X
Full set of covariates				X	X	X	X
Observations	95	95	95	95	95	95	95
Oster's bound		0.00278	0.00255	0.00175	-0.00024	-0.00181	-0.00116
r2	0.14718	0.19519	0.29382	0.44080	0.71289	0.50023	0.55493

Note: * p<.10 ** p<.05 *** p<.01. The unit of observation is the province. OLS estimates; robust standard errors in brackets. In columns (1)-(4), (6) and (7) the average growth is calculated as $[\ln(y)_{2014} - \ln(y)_{1997}]/17$; in column (5) as $[y_{2014} - y_{1997}]/17$. All regressions also include a constant. The basic set of covariates (column 2) includes: Infrastructure index 1997, Share of high school graduates in the population 1997, Share of university graduates in the population 1997, Share of value added in the industrial sector 1997, Share of value added in the construction sector 1997, Share of value added in the service sector 1997. The full set of covariates also includes: ln(population) 1997, ln(surface) 1997, Social capital (factor), Average altitude (000m), Average slope, Fraction surface in coastal municipalities, Population share aged 15-64 1997, Population share aged 15-34 1997, Employment rate 1997. Oster's bounds are calculated assuming that the degree of selection on unobservables is equal to the degree of selection on observables and that the maximum R2 that we would estimate if we were able to include all relevant unobservables is 1.3 times the one observed in the actual regression including the controls. We used the pscalc.ado Stata program written by Oster (2019).

Table 4. Growth regressions over different periods

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Average growth during t0-t1:												
	1997-2003	2003-2009	2009-14	pool 97-03, 03-09, 09-14		1997-2000	2000-03	2003-06	2006-09	2009-12	2012-14	pool 97-00, 00-03, 03-06, 06-09, 09-12, 12-14	
ln(foreign tourists' expenditure per capita)$_{t0}$	0.00261**	0.00268*	0.00190	0.00270***	0.00186**	0.00495***	0.00123	0.00231	0.00513*	0.00388	-0.00117	0.00340***	0.00228**
	(0.00114)	(0.00153)	(0.00203)	(0.00091)	(0.00093)	(0.00172)	(0.00202)	(0.00149)	(0.00267)	(0.00272)	(0.00396)	(0.00094)	(0.00106)
ln(value added per capita)$_{t0}$	-0.05883***	-0.01331	-0.01118	-0.03017***	-0.03379***	-0.06833***	-0.05078**	-0.00763	-0.03530*	-0.01870	-0.03400	-0.03819***	-0.04136***
	(0.01107)	(0.01024)	(0.02019)	(0.00763)	(0.00856)	(0.01402)	(0.02045)	(0.01446)	(0.01996)	(0.02922)	(0.02733)	(0.00909)	(0.00983)
N	95	95	95	285	285	95	95	95	95	95	95	570	570
Time dummies				X								X	
TimeXarea dummies					X								X
r2	0.45633	0.46171	0.33877	0.73314	0.76899	0.41473	0.37003	0.29021	0.34977	0.23157	0.39545	0.66522	0.69939

Note: * p<.10 ** p<.05 *** p<.01. The unit of observation is the province. OLS estimates; robust standard errors in brackets (clustered by province in columns (4), (5). (12) and (13)). The average growth is calculated as $[\ln(y)_{t1} - \ln(y)_{t0}]/(t1-t0)$. In columns (4), (5), (12) and (13) the different periods are pooled together as separate observations. All columns include the full set of controls as in column (4) of Table 2. Additionally, columns (4) and (12) include period dummies; columns (5) and (13) include period X geographical area dummies. Geographical areas group regions into four zones: North-West (Piedmont, Valle D'Aosta, Lombardy, Liguria), North-East (Trentino-Alto Adige, Veneto, Friuli Venezia-Giulia, Emilia Romagna), Centre (Tuscany, Umbria, Marche, Lazio), and South (Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicily, Sardinia).

Table 5. Growth regressions 1997-2014; heterogeneous effects of tourism

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Average 1997-2014 growth in value added per capita								
ln(foreign tourists' expenditure per capita)$_{1997}$	0.00467***	0.00187**	0.00275***	0.00214***	0.00195***	0.00186**	0.01686***	0.00152*	0.00188**
	(0.00133)	(0.00089)	(0.00091)	(0.00076)	(0.00074)	(0.00074)	(0.00595)	(0.00080)	(0.00077)
ln(foreign tour expforeign tour exp pc)$^2{}_{1997}$							-0.00131**		
							(0.00051)		
ln(foreign tour exp pc)$_{1997}$× 1[ln(value added per capita)$_{1997}$>median]	-0.00370**								
	(0.00147)								
ln(foreign tour exp pc)$_{1997}$× ln(bed places in tourist accomodations per capita)$_{1998}$		-0.00065							
		(0.00045)							
ln(foreign tour exp pc)$_{1997}$× ln(employment rate)$_{1997}$			-0.01873*						
			(0.01079)						
ln(foreign tour exp pc)$_{1997}$× 1[city]				-0.00208					
				(0.00164)					
ln(foreign tour exp pc)$_{1997}$× ln(population density)$_{1997}$					-0.00070				
					(0.00088)				
ln(foreign tour exp pc)$_{1997}$× ln(population)$_{1997}$						-0.00138**			
						(0.00061)			
ln(foreign tour exp pc)$_{1997}$× 1[South of Italy]								0.00317*	
								(0.00174)	
ln(foreign tour exp pc)$_{1997}$× 1[high housing elasticity									0.00064
									(0.00166)
ln(value added per capita)1997	-0.02495***	-0.02233***	-0.02356***	-0.02614***	-0.02638***	-0.02396***	-0.02374***	-0.02601***	-0.02547***
	(0.00656)	(0.00648)	(0.00598)	(0.00602)	(0.00597)	(0.00619)	(0.00565)	(0.00600)	(0.00589)
N	95	95	95	95	95	95	95	95	95
r2	0.4727	0.4714	0.4587	0.4407	0.4331	0.4514	0.4843	0.4567	0.4463

Note: * p<.10 ** p<.05 *** p<.01. The unit of observation is the province. OLS estimates; robust standard errors in brackets. All columns also include the full set of controls as in column (4) of Table 2. In columns (2) the controls also include ln(bed places in tourist accommodation per capita)$_{1998}$; in column (4) also 1[city], which is a dummy for the provinces including a large metropolitan area (Turin, Milan, Venice, Rome, Naples); in column (8) also the dummy 1[South of Italy]; in column (9) also the dummy 1[high housing elasticity]. The continuous interaction variables (ln(bed places in tourist accommodation per capita)$_{1998,}$ ln(employment rate)$_{1997,}$ ln(population density)$_{1997,}$ ln(population)$_{1997}$) have been demeaned so that the coefficient on ln(foreign tourists' expenditure per capita)$_{1997}$ can be interpreted as the value at the sample mean.

Table 6. Growth regressions using average foreign tourists' expenditure, IV estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Period between t0=1997 and t1=2014				Period between t0=2004 and t1=2014			
	OLS	OLS (First-stage)	OLS (Reduced form)	2SLS	OLS	OLS (First-stage)	OLS (Reduced form)	2SLS
	average growth in value added	average(ln(foreign tourists' expenditure pc))	average growth in value added	average growth in value added	average growth in value added	average(ln(foreign tourists' expenditure pc))	average growth in value added	average growth in value added
average(ln(foreign tourists' expenditure pc)$_{1997\text{-}2014}$)	0.00219**			0.00265***	0.00339***			0.00414***
	(0.00094)			(0.00089)	(0.00115)			(0.00116)
average(Bartik ln(foreign tourists' expenditure pc) $_{1997\text{-}2014}$)		0.78267***	0.00208***			0.72254***	0.00299***	
		(0.04622)	(0.00077)			(0.04941)	(0.00094)	
ln(value added per capita)$_{t0}$	-0.02606***	-0.01579	-0.02634***	-0.02630***	-0.02078**	-0.15884	-0.02245**	-0.02179**
	(0.00587)	(0.47448)	(0.00610)	(0.00526)	(0.00976)	(0.48057)	(0.01023)	(0.00896)
N	95	95	95	95	95	95	95	95
Bound	0.00436	0.14623	0.00274		0.00664	0.18536	0.00363	
r2	0.42262	0.93045	0.42869	0.42065	0.32172	0.90508	0.32602	0.31876
First-stage F		291				216		

Note: * p<.10 ** p<.05 *** p<.01. The unit of observation is the province. Robust standard errors in brackets. The Bartik is predicted starting from foreign tourists' expenditure in 1997 and applying the total (over the entire Italy) growth in expenditure for each country of origin to the share of each country in the expenditure of each province in 1997-1998 (averaged over two years to diminish measurement error); see eq. (2) in the text. All columns include the full set of controls as in column (4) of Table 2.

Table 7. Annual growth regressions, with province-based fixed effects

	(1)	(2)	(3)	(4)
	Growth in value added per capita between t-1 and t			
	OLS	FE	System-GMM	System-GMM
ln(foreign tourists' expenditure per capita)$_{t-1}$	0.00350***	0.00193	0.00493	0.00733
	(0.00069)	(0.00243)	(0.00332)	(0.00588)
ln(value added per capita)$_{t-1}$	-0.01126***	-0.20878***	-0.10437	-0.06895
	(0.00284)	(0.01924)	(0.07210)	(0.04993)
Time dummies	X	X	X	X
N	1615	1615	1615	1615
Oster's bound	0.05621	25.98482		
r2	0.46994	0.53976		
Lags for ln(value added per capita)$_{t-1}$			8 (t-4 to t-9)	8 (t-4 to t-9)
Lags for ln(foreign tourists' expenditure per capita)$_{t-1}$			8 (t-2 to t-9)	8 (t-2 to t-9)
AR(1) p-value			0.000	0.000
AR(2) p-value			0.010	0.009
AR(3) p-value			0.022	0.019
AR(4) p-value			0.192	0.197
Hansen p-value			0.172	0.099
Difference in Hansen excluding levels (p-value)			0.750	0.489
Difference in Hansen excluding lags of ln(value added per capita)$_t$ (p-value)			0.725	0.196
Difference in Hansen excluding lags of ln(foreign tourists' expenditure per capita)$_t$ (p-value)			0.403	0.223
Bartik for ln(foreign tourists' expenditure per capita)$_{t-1}$				X

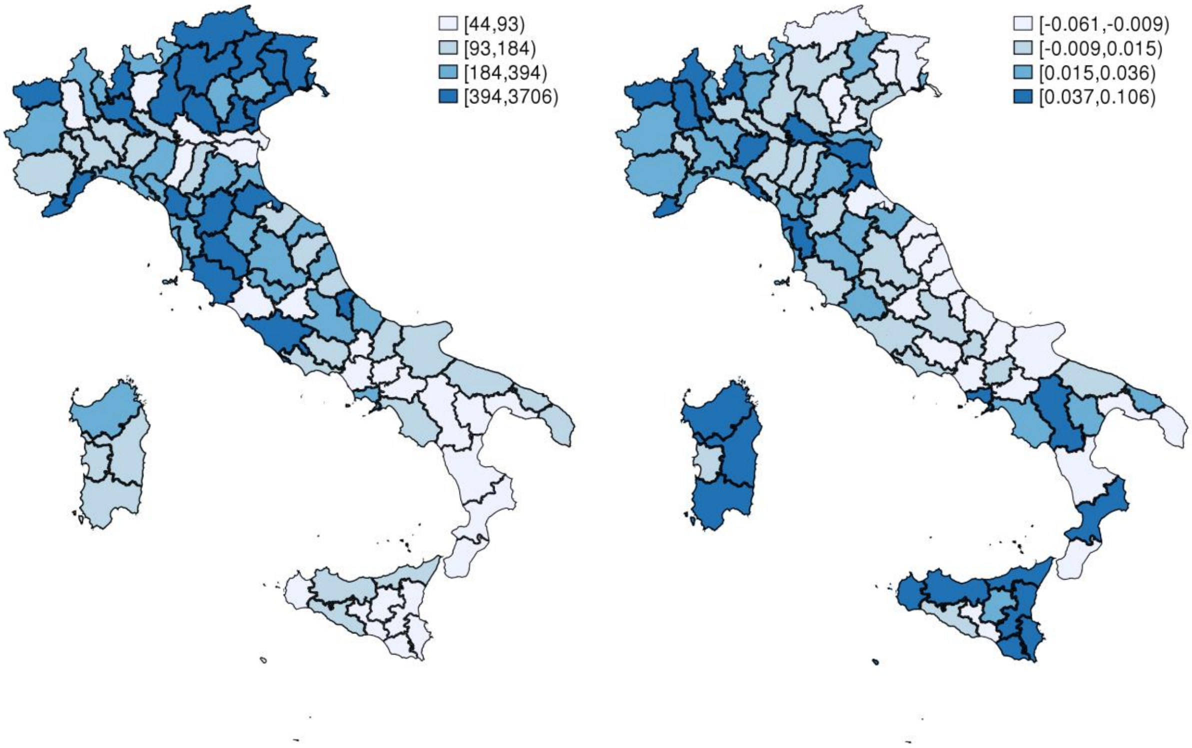
Note: * $p<.10$ ** $p<.05$ *** $p<.01$. The unit of observation is the province. Standard errors clustered by province in brackets. Growth is computed as ln(value added per capita)$_{t+1}$-ln(value added per capita)$_t$.

Figures

Figure 1. Foreign tourists' expenditure (values per inhabitant; quartiles)

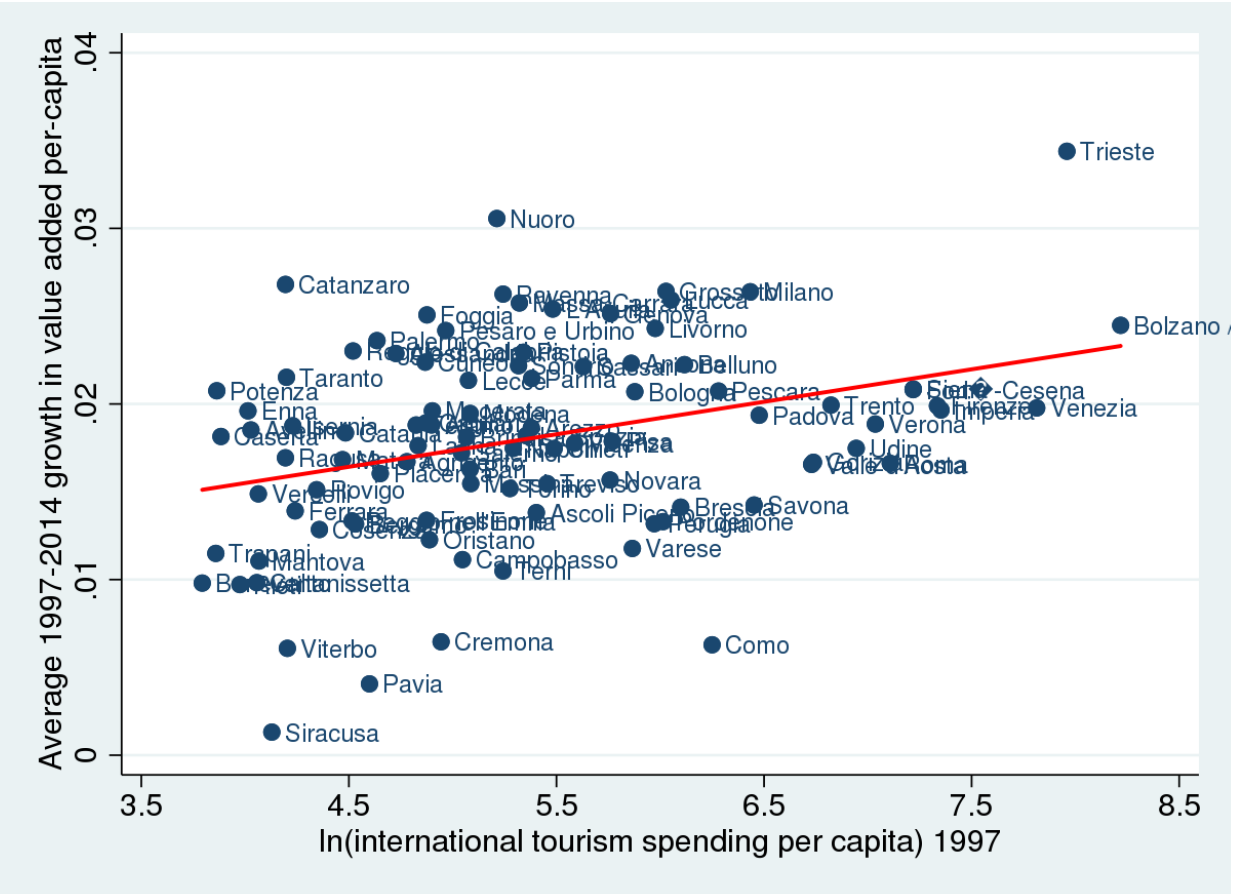
(a) Foreign tourists' expenditure in 1997

(b) Foreign tourists' expenditure: growth rate 1997-2014



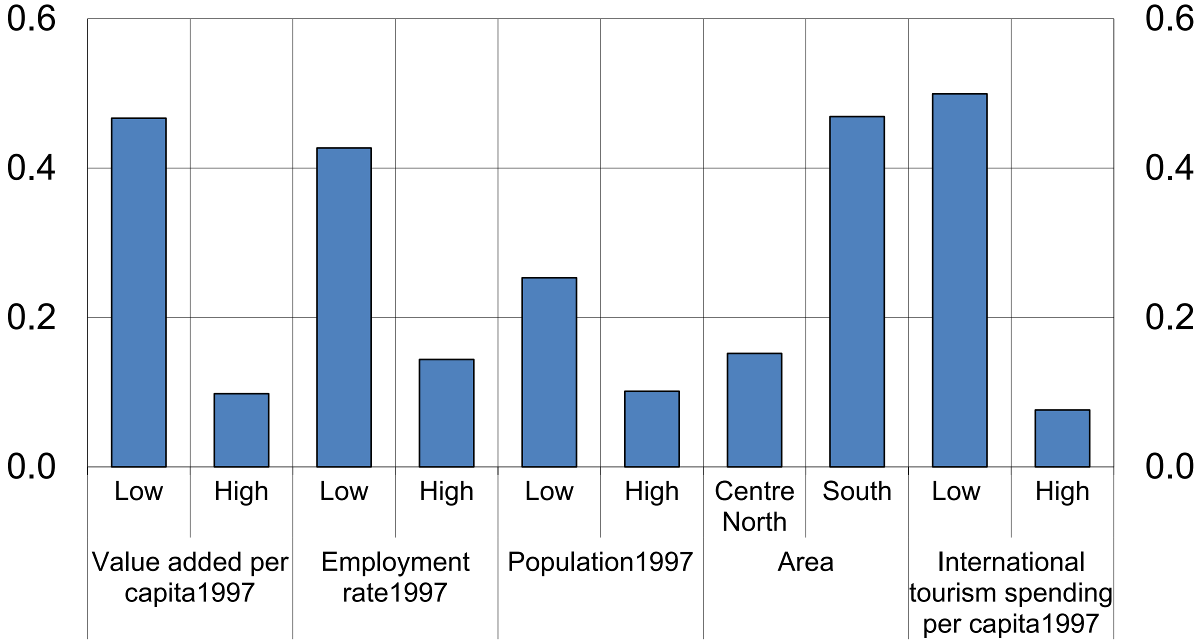
Note: expenditure is in euro; average growth is calculated as [ln(y)2014 - ln(y)1997]/17; in column (7) as [y2014 - y1997]/17.

Figure 2. The relationship between initial foreign tourists' expenditure and the growth rate of value added in the following years



Note: each point is a province. The average growth is calculated as [ln(y)2014 - ln(y)1997]/17; in column (7) as [y2014 - y1997]/17.

Figure 3. Effect of a 10% increase in the initial foreign tourists' expenditure per capita on the cumulative growth of value added per capita in the following decade (per cent)



Note: the effects are calculated using coefficients from Table 5. For continuous interaction variables, Low (High) refers to the average of that variable in the subsample below (above) the median.

Appendix

Table A1. Growth regressions 1997-2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Average 1997-2014 growth in:								
	Value added per capita						Employment rate	Value added	Population
ln(foreign tourists' expenditure per capita)$_{1997}$	0.00185***	0.00302***	0.00271***	0.00200***	0.00209**		0.00052**		
	(0.00054)	(0.00058)	(0.00072)	(0.00075)	(0.00089)		(0.00023)		
[ln(foreign tourists' expenditure pc)$_{2014}$ - ln(foreign tourists' expenditure pc)$_{1997}$]/17					0.00450				
					(0.01901)				
average(ln(foreign tourists' expenditure pc)$_{1997-2014}$)						0.00219**			
						(0.00094)			
ln(foreign tourists' expenditure)$_{1997}$								0.00180**	-0.00020
								(0.00078)	(0.00047)
ln(value added per capita)$_{1997}$		-0.00832***	-0.00847**	-0.02613***	-0.02624***	-0.02606***	0.00457**		
		(0.00223)	(0.00397)	(0.00606)	(0.00599)	(0.00587)	(0.00176)		
ln(value added)$_{1997}$								-0.01854***	0.00758**
								(0.00616)	(0.00334)
Infrastructure index $_{1997}$			0.00002	0.00002*	0.00002*	0.00002*	0.00000*	0.00001	-0.00001**
			(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00000)	(0.00001)	(0.00001)
Share of high school graduates$_{1997}$			0.00267	0.03486	0.03787	0.04619	0.01908**	0.06723*	0.03237
			(0.03993)	(0.04424)	(0.04584)	(0.04514)	(0.00958)	(0.03855)	(0.03115)
Share of university graduates$_{1997}$			0.06469	-0.02898	-0.03635	-0.05977	-0.03297	-0.10305	-0.07407
			(0.11402)	(0.13943)	(0.13889)	(0.14188)	(0.03668)	(0.13178)	(0.08551)
Share of industrial sector$_{1997}$			-0.01791	-0.03052	-0.03128	-0.03288	-0.01390	-0.04551*	-0.01499
			(0.02353)	(0.02347)	(0.02363)	(0.02309)	(0.00914)	(0.02728)	(0.01742)
Share of construction sector$_{1997}$			0.01343	-0.01784	-0.01797	-0.02140	-0.03482**	-0.04286	-0.02502
			(0.03846)	(0.04021)	(0.04055)	(0.04114)	(0.01347)	(0.04182)	(0.02160)

(continue)

									(continue)
Share of service sector$_{1997}$			-0.02218	-0.02963	-0.03042	-0.03071	-0.01924*	-0.03467	-0.00503
			(0.02706)	(0.02809)	(0.02937)	(0.03000)	(0.01034)	(0.03199)	(0.02004)
ln(population)$_{1997}$				0.00336**	0.00341**	0.00350**	-0.00062	0.02116***	-0.00632*
				(0.00151)	(0.00151)	(0.00153)	(0.00046)	(0.00686)	(0.00363)
ln(surface)$_{1997}$				-0.00166	-0.00174	-0.00204	0.00101***	-0.00228*	-0.00062
				(0.00131)	(0.00137)	(0.00132)	(0.00033)	(0.00118)	(0.00086)
Social capital (factor)				0.00112	0.00112	0.00109	0.00101***	0.00181**	0.00069*
				(0.00071)	(0.00071)	(0.00073)	(0.00022)	(0.00072)	(0.00039)
Average altitude (000m)				0.01701***	0.01700***	0.01730***	0.00167	0.01343***	-0.00358
				(0.00402)	(0.00402)	(0.00398)	(0.00134)	(0.00426)	(0.00230)
Average slope				-0.00012**	-0.00012**	-0.00013**	0.00001	-0.00009**	0.00002
				(0.00005)	(0.00006)	(0.00005)	(0.00001)	(0.00005)	(0.00002)
Fraction surface in coastal municipalities				0.00296	0.00263	0.00147	0.00099	0.00193	-0.00104
				(0.00426)	(0.00378)	(0.00422)	(0.00153)	(0.00493)	(0.00232)
Population share aged 15-64$_{1997}$				0.06225	0.05866	0.04694	0.05932***	0.03752	-0.02474
				(0.05082)	(0.05342)	(0.05390)	(0.01535)	(0.06092)	(0.03898)
Population share aged 15-34$_{1997}$				-0.04955	-0.04637	-0.02747	-0.07441***	0.01605	0.06560**
				(0.05094)	(0.05354)	(0.05151)	(0.01665)	(0.06022)	(0.03115)
Employment rate$_{1997}$				0.03895**	0.03906**	0.04085**	-0.04308***	0.04997**	0.01102
				(0.01940)	(0.01940)	(0.01946)	(0.00659)	(0.02126)	(0.01015)
Constant	0.00809***	0.08222***	0.09764**	0.19467***	0.19720***	0.19729***	-0.02774*	0.11493**	-0.07974***
	(0.00298)	(0.01993)	(0.04427)	(0.04811)	(0.04893)	(0.04855)	(0.01482)	(0.04664)	(0.02626)
Observations	95	95	95	95	95	95	95	95	95
Oster's bound		0.00374	0.00400	0.00251		0.00436	-0.00040	-0.00965	-0.00262
r2	0.11342	0.22371	0.26273	0.42777	0.42825	0.42262	0.72499	0.47845	0.55590

Note: * p<.10 ** p<.05 *** p<.01. The unit of observation is the province. Robust standard errors in brackets. In columns (1)-(6), (8) and (9) the average growth is calculated as $[\ln(y)_{2014} - \ln(y)_{1997}]/17$; in column (7) as $[y_{2014} - y_{1997}]/17$