MASTER'S THESIS

The impact of Wuzhen Theatre Festival on local tourism：A Synthetic Control Method

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ABSTRACT

In China, ancient town tourism is facing severe challenges due to fierce competition and serious homogeneity. With the rapid development of mass tourism in China, how to stand out from the numerous tourist destinations is an urgent problem to be solved for ancient towns. The case study of this paper is Wuzhen. As the most famous ancient town destination in China, the most well-known activity is the Wuzhen Theatre Festival. Does this event have a substantial economic impact on the local tourism industry? Up to now, few studies have explored the causal effects between small-scale event tourism and local tourism. This paper adopts the Synthetic Control Method to explore the impact of small-scale tourism events on local tourism industry. The case study is based on the Wuzhen Theatre Festival held in Tongxiang, Jiaxing city, Zhejiang Province, China. The results of Synthetic Control Method show that Wuzhen Theatre Festival has significantly increased the tourism revenue in Tongxiang. In contrast, there was no significant impact on the number of tourists.

1. INTRODUCTION

According to the report from the National Statistics Bureau of China (2019), there are 229 tourism attractions of ancient town by the end of July in 2019. Zhejiang Province is the one with the largest number of ancient towns across the whole country: 38, which means it has 17% resources of ancient town in China. According to the research of Ma, Wen and Yu (2015), due to the spill over effects of the Shanghai World Expo in 2010, tourist arrivals to these historic water towns increased to nearly 30 million—almost 100 times greater than the number of arrivals in the early 1990s (p. 122). The tourist destination of ancient town is facing fierce market competition and serious homogenization problems in nowadays. The cultural and material tourism resources of these destinations have been destroyed a lot by tourism development. But the average re-visit rate is only 11%. Due to the serious commercialization, tourists argued about the terrible experience. From these we can see focusing only on increasing the number of tourists to develop mass tourism is obviously not the solution. In this background, Wuzhen did a good job and became one of China's top 10 historical and cultural towns and one of China's top 10 charming destinations.

Wuzhen is in the north of Tongxiang, Jiaxing City of Zhejiang province, China (longitude 120 ° 54 'east, latitude 30 ° 60' north). It is in the "golden triangle region" of China's Yangtze River plain, where is close to Shanghai and Hangzhou (the capital of Zhejiang province). Its location is marked in Figure 1 below. Wuzhen preserves the architectural style and atmosphere of the elegant river town completely in the late Qing dynasty and the Republic of China, which has always been known as "the last river town in China". Wuzhen has a history of more than 7,000 years. In 2003, Wuzhen was awarded the outstanding achievement award for heritage protection in the Asia-Pacific region by the United Nations. It was also included in the United Nations preparatory list for world cultural heritage protection and the rescheduled list of China's world cultural heritage.

Figure 1. Location of Wuzhen

Source: own elaboration from Google Picture

Wuzhen is divided into "Eastern Zone, Southern Zone, Western Zone and Northern Zone" by the cross-shaped inland river system. The local people live by the water, forming the layout structure of the ancient water town just like Venice. Wuzhen Theatre Festival is hold in Western Zone. It has successfully held

for seven years from 2013. The launch date of the festival was fixed in every October and last for 11 days since 2014, when the second Wuzhen Theatre Festival been held. The successful development and protection of Wuzhen is also known as the "Wuzhen Model". In other words, "overall property development -- overall planning and standardized management -- unified coordination of scenic features and functions -- highlighting the functions of leisure and business -- differentiated with surrounding competitor -- sustainable growth in the number of vacationers and per capita consumption -- forming influences and creating repeated consumption (Zhen and Wang, 2012).

This model is particularly prominent in the Western Zone, which has completely become the theme attraction of river town with commercial interests. The shops, homestays, hotels and restaurants in the Western Zone are all planned and arranged by Wuzhen Tourism Company[1]. From home stay owners, popcorn and popsicle vendors, shoemakers who set up stands, to the cooks and the candy-man craftsmen, all the service personnel here are the staff of Wuzhen Tourism Company. It can be said that all of them are playing their roles in the Western Zone -- they are performing folk performances. The Western Zone is just a closed space environment, which makes the Wuzhen Theatre Festival has its unique experience. This unified management is similar to Disneyland. But it is different from Disneyland in essence: Wuzhen's tourism is based on its natural scenery and culture, not the artificial tourism resources.

As Ma et al. (2015) said, rapid industrialization and urbanization in China have motivated Chinese domestic tourists to search for a nostalgic experience in small traditional towns and villages with a distinct cultural heritage (p. 119). They are right. Before the development of tourism in the ancient town, the pillar industries of Tongxiang were mainly industry, foreign trade of clothing and textile, wholesale and retail, etc. With the development of ancient town tourism, the tourism-oriented service industry gradually occupied an important position. Ma et al. (2015) found from the 1980s, both the number of river towns and the scale of tourist arrivals in them have increased by leaps and bounds (p. 122). The situation is same in Wuzhen. Since 2001, the gross value of the tertiary industry in Tongxiang, which is dominated by the service industry. The proportion of the tertiary industry in GDP has increased rapidly. By 2013, the proportion of the tertiary industry has increased from 20.2% to 48.7%, with an average rate of 2.38% annually.

In the face of fierce market competition, Wuzhen adopted the innovation of tourism projects -- the first session of Wuzhen Theatre Festival was held in 2013, which was the combination of traditional culture and modern drama. The festival increased tourism cultural diversity and expand the scope of attracting tourists. Moreover, it also makes full use of the celebrity effect to publicize and promote the tourism in

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[1]In 2007, Cysts Holding Co., LTD. (CYTS) paid 355 million yuan for a 60% stake in Wuzhen Tourism. On July 1, 2009, Wuzhen Tourism introduced the strategic investor venture capital company IDG. After the capital increase, CYTS holds 51%, Tongxiang Wuzhen Ancient Town Tourism Investment Co., Ltd. holds 34%, and IDG holds 15% in total. After IDG divestment in 2013, CYTS got 66% equity, Tongxiang Wuzhen Town tourism investment company holding unchanged. CYTS is a joint stock limited company founded and listed in 1997 with Cysts Group Co., LTD., an enterprise directly under the central committee of the Communist Youth League of China (CYTS) as the initiator.

Wuzhen, which greatly increases the popularity and public praise of Wuzhen and makes the tourism in Wuzhen rise to a new stage. According to Figure 2, even in the years when the number of tourists declined, the revenue never dropped, which means that Wuzhen has always been maintaining considerable economic benefits.

Figure 2. The number and revenue of tourists in Wuzhen from 2006 to 2019
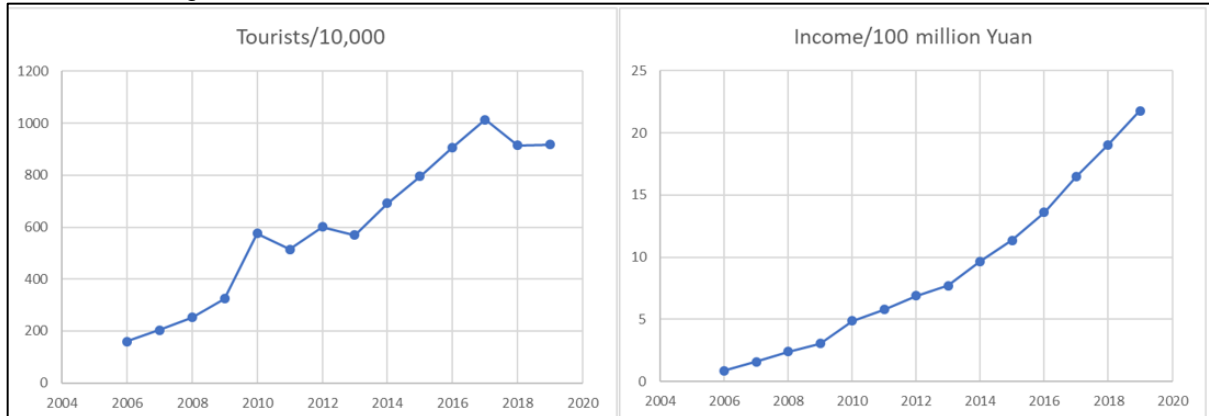
Source: own elaboration from Cyts Holding Co., LTD. Annual Report 2006-2019

Since the second festival, with the expansion of the festival's scale, the number of attendees has increased dramatically. The attendance rate of performances has increased from 80.7% in the first festival to 99.2% in the second festival, indicating the rapid expansion of the theatre festival's influence. In addition, the actual ticketing rate increased to 83.6% from 71.7% in the first session. The box office revenue was also increasing rapidly. The Wuzhen Theatre Festival was founded in 2013 and began to make profits in the third year, which exceeded the expectations of Wuzhen Tourism Company. It has become a powerful driving force for the rapid development of tourism in Wuzhen.

There is no doubt that Wuzhen Theatre Festival has brought objective economic revenue to Wuzhen. So, for the tourism of Tongxiang, does Wuzhen Theatre Festival still play a considerable positive role? The purpose of this paper is to assess the economic benefits of Wuzhen Theatre Festival to local tourism in Tongxiang by using Synthetic Control Method (SCM). Is the economic benefit brought by Wuzhen Theatre Festival still important or insignificant in regional tourism? This paper fills the gap of using SCM to study the economic impact of small-scale events. The research results will verify my doubts and investigate the development direction of "Wuzhen Model". This will also provide a useful reference for similar tourist destinations seeking transformation.

In order to implement SCM, I need comparison unit consistent. So, it is necessary to explain the administrative division of the destination. Wuzhen is a historic scenic attraction and belongs to Tongxiang. Tongxiang is a county-level city, part of Jiaxing City. The location of Jiaxing, Tongxiang and Wuzhen are marked in the Figure 3. The scope of research objective will be limited to Tongxiang city. That is my objective is measure the economic impact of Wuzhen Theatre Festival on Tongxiang.

Figure 3. Location of Wuzhen in Jiaxing
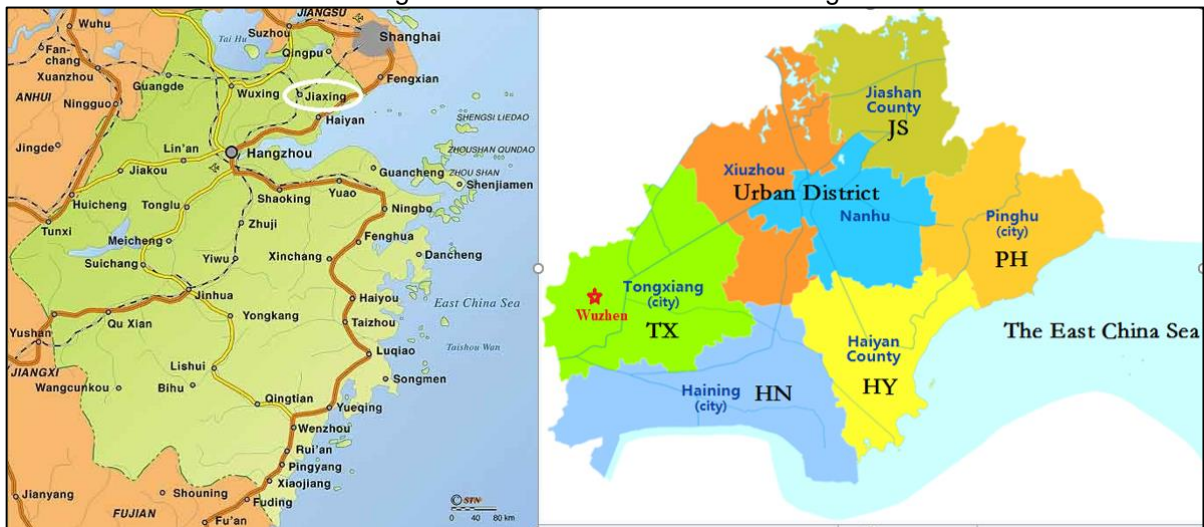
Source: own elaboration from Google Picture

The SCM requires that the control group should have the same characteristics as the treatment group before intervention. Therefore, I decided to choose by following three criteria: countries or county-level cities belonging to Zhejiang Province, tourist destinations of ancient towns within the territorial jurisdiction, and not affected by Wuzhen Theatre Festival. Finally, I selected 25 countries to compose my Donor Pool, which will be list and explained in detail in part of Methodology.

2.　*Literature Review*

This paper falls into the events literature. In the last century, Getz (1989) defined it as "the systemic planning, development and marketing of festivals (and special events) as tourist attractions, development catalysts, and image builders for destination areas". At the same time, he thought "Events have become an increasingly significant component of destination marketing" (Getz, 1997). And Getz (1989) also said events are rapidly increasing in popularity as a means of attracting attention to particular geographical (destination) locations. Gursoy and Uysal (2004) said events or festivals are being used as a vehicle to achieve objectives such as creating infrastructure, providing jobs, bringing in revenue, attracting investment, growing the arts, promoting a region, and building a better image. And Higham and Hinch (2002) thought events are especially often used to increase visitation and reduce seasonality of tourists' flow. Is the Wuzhen Theatre Festival as useful as these hypotheses? The purpose of holding the Wuzhen Theatre Festival is also to make Wuzhen stand out from the homogenized ancient town tourism in China, to gain more tourism revenue, more visitors and a better reputation. What are the specific impacts of Wuzhen Theatre Festival on local tourism? How should I measure it? They will be the focus of my discussion below.

There is another strand of the literature evaluating economic impacts. According to Yu (2016), the economic benefits brought by Wuzhen Theatre Festivals are mainly divided into two categories. The first category is direct revenue, such as box office revenue of theatre shows, derivative revenue, sponsorship and financial subsidies. The second category is indirect revenue, which is mainly reflected in tourism consumption, such as ticket revenue, accommodation revenue and catering revenue. Direct revenue is the main revenue source for the festival, while indirect revenue is the most important part of the festival's influence on Wuzhen's tourism. For economic impacts of Event Tourism and event facilities, Hodur and Leistritz (2006) had another classification. They thought there were 3 sources: expenditures from facility construction, facility/ event/ business operations and event attendees. If I measure the economic impact according to this way, I need to collect data from the beginning of the first festival preparation, including cost-benefit analysis of facility design and construction, source of capital and budget survey, staff salary level of Wuzhen, Cost-benefit Analysis (CBA) of Wuzhen operation, etc. However, these are all concentrated on Wuzhen itself, which cannot reflect the impact of local tourism. And CBA is only useful as an ex-ante method to evaluate a project. In my case, I'm evaluating ex-post effects in the project. So, this classification cannot work.

At the same time, Crompton (2004), Matheson (2002), Noll and Zimbalist (1997) thought the development of stadiums, convention centres and other tourists-oriented facilities often requires public investment or support (as cited in Hodur and Leistritz, 2006, p.2). So, the local economic effects were often cited as justification for public investment. As a result, Crompton (1995) and Porter (1999) found public entities often request estimates of economic impact associated with these facilities and/or activities sponsored by them (as cited in Hodur and Leistritz, 2006, p.2). Crompton (2004), Matheson (2002), Noll and Zimbalist (1997) said this has led to a problem: the economic impact of sports and other entertainment events on host communities has been greatly exaggerated (as cited in Hodur and Leistritz, 2006, p.2). Is there the same problem in Tongxiang? All the news and reports said Wuzhen Theatre Festival is a big success. Is it also exaggerated to attract investment? It's necessary to verify the real impact of the Wuzhen Theatre Festival on local tourism. However, the event tourism generally studied economic impact has a large influence range. The impact of the festival on Tongxiang, a small host community, can be relatively easily estimated. But the festival is held once a year for only 11 days, and its influence range is very small. Is it possible to measure its influence by means of statistics? And can the principles be applied to the study of a small scale? Then I found Hodur and Leistritz (2006) said that further while many of the published case studies examined large-scale events, the fundamental principles of economic impact analysis apply equally well to smaller scale events of all types. So, I decided my objective local entity is Tongxiang rather than the larger municipal unit of Jiaxing City, which is also to avoid possible overestimation. About choice of outcome variables: whether direct or indirect, economic impacts mainly fall into two categories, tourism revenue and the number of tourists. Since my research scope is Tongxiang, my research outcome variables will be the tourism revenue, tourist person-time and tourism expenditure per tourist of Tongxiang.

Methodologically, this paper is related with causal inference techniques used to measure causal impacts in a more controlled way. SCM is such an approach. It is an extension and improvement of Difference in Difference Estimation (DID). DID technique originated in the field of econometrics, but the logic it used has appeared as early as the 1850's by John Snow and is called the 'controlled before-and-after study'. DID can control the difference of objects of study before treatment based on the data of natural trail, and then the true impacts of policy or project can be isolated (Fang and Yan, 2013). But it's very hard to find a control group which has the same trail as the treatment group because there is regional heterogeneity in practice. For overcoming this disadvantage, Abadie and Gardeazabal (2003) came up with a new method called Synthetic Control Methods. This method can construct the "counterfactual" control group of policy treatment individuals through the weighted average of the control group, which is the synthetic control unit. This control group was synthesized by weighted average of all potential comparisons, which can better simulate the treatment group trend before treatment, to obtain better comparison effect after treatment.

SCM is always used to evaluate the effect of policy. There is no literature that studies the economic impact of local tourism activities using SCM. Moreover, the literature that uses SCM on the impact on tourism is also limited. The most common ways of evaluating the economic effect of tourism events are direct survey of visitor numbers and spending and direct surveys of business employment and financial ratios (Esu, Arrey, Basil & Eyo, 2009). In my case, I will use macro data (aggregated data) which for the purpose of comparison. It is more adequate to get an overall view of the festival than the micro data. So, method of collecting questionnaire is not proper for me. In recent years, Biagi, Brandano and Pulina (2017) used SCM to evaluate the effect of tourism taxation on national and international tourism in Italy. They compared SCM with Panel/Time series models and General Equilibrium (CGE)/Input-Output models and concluded their features. Time series model is a partial equilibrium framework and always need a rather long-time span to assess the shocks, dynamics, policy interventions, etc. CGE model also need large dataset and is more suitable for country-level macroeconomic analysis, but not city level analysis. SCM can overcome these limitations. Since it was come up by Abadie et al. (2003) in economic effect of terrorism in Basque country, it had been applied in antitobacco polices in California by Abadie, Diamond and Hainmueller (2010), economic performance in two Italian regions exposed to mafia activity by Pinotti (2015) and so on. These studies are mainly regional research. Biagi et al. (2017) said the main advantage of SCM is the potential applicability to micro territorial settings and it's more appropriate when the treated cases and the overall sample is small. And Addessi, Biagi and Brandano (2019) also used SCM to evaluate the impact of introduction of euro on tourist flows. Their use of a non-parametric approach makes it possible to account for the total equilibrium effect (direct plus indirect impact). Meanwhile, it can avoid any bias or identification problems that the gravity estimation might imply. SCM also allows for unobservable factors that may affect samples. After completing the pre - and post-treatment fitting between the treatment and control units, a Placebo Test could be performed if the value of Root Mean Squared Prediction Error (RMSPE) is small enough to exclude the influence of the unobserved factors. In my case, Tongxiang is the only treated unit and there are overall 26 samples. Wuzhen Theatre Festival isn't a policy and only last for 11 days in a year, as a result its effect may be

not significant enough to have a statistical outcome. But if I want to evaluate the whole effect of this regional tourism activity, SCM is better to use in my case. On the other hand, I can fill the gap of using SCM to study the economic impact of small-scale events.

3. Methodology

3.1. Theoretical framework

Policy interventions can be evaluated comparing two scenarios, the observed one where policy intervention stands up and a hypothetical scenario were the economy would not be affected by the policy. As a matter of fact, the second scenario is no longer real and need to be carefully designed. SCM works by artificially creating a counterfactual unit that are unaffected by policy interventions. Use this counterfactual unit to copy the trend of the treated group during preintervention. The future path of the synthetic control group can be then plotted, which will be the development trend of simulation treated unit without treatment. The difference between the treatment group and the synthetic control group in the future is the treatment effect. It can be explained by formulas.

Firstly, there are 2 assumptions:
- The sample must be a balanced panel (longitudinal) dataset, which means all units are observed at the same time periods. Assume time periods t = 1, …, T;
- The sample includes a positive number of per-intervention period, T_0. And a positive number of post-intervention periods, T_1. ($T = T_0 + T_1$, $1 \leq T_0 < T$).

Assume Y_{it}^N be the outcome variable that could be observed for region i at time t in the absence of the intervention, for units i = 1, …, J +1, and time periods t = 1, …, T. Suppose there are "J+1" units in the sample and "j=1" is the case of interest (the treated unit). So, from j=2 to j=J+1 are all potential comparisons (the Donor Pool). Assume that the intervention has no effect on the outcome during the pre-intervention period, so for $t \in \{1, …, T_0\}$ and all i $\in \{1, …, N\}$, I have that $Y_{it}^1 = Y_{it}^N$. If Y_{it}^1 is potential result with treatment of country i at time t. And Y_{it}^0 is the results of country i without treatment at time t. The effect of treatment is $\alpha_{it} = Y_{it}^1 - Y_{it}^0$.

Let D_{it} be an indicator that equal to 1 if unit "i" is exposed to the intervention at time t, and 0 otherwise. The observed outcome for unit "i" at time t is:

$$Y_{it} = Y_{it}^N + \alpha_{it} D_{it} \qquad (1)$$

$$D_{it} = \begin{cases} 1 & if\ i = 0\ and\ t > T_0 \\ 0 & otherwise \end{cases} \qquad (2)$$

My goal is estimating α_{it}. When $t > T_0$,

$$\alpha_{it} = Y_{it}^1 - Y_{it}^0 = Y_{it} - Y_{it}^N \tag{3}$$

Y_{it}^1 is the outcome of treated unit which can be observed. But Y_{it}^N is the outcome of synthetic control unit and cannot be observed. So, I need a model to calculate it:

$$Y_{it}^N = \delta_t + \theta_t Z_i + \lambda_t \mu_i + \varepsilon_{it} \tag{4}$$

δ_t is an unknown common factor with constant factor loadings across units. Z_i is a (r $\times$ 1) vector of observed covariates (not affected by the intervention). θ_t is a (1 $\times$ r) vector of unknown parameters. λ_t is an unknown common factor with varying factor loadings μ_i across units. And the error terms ε_{it} are unobserved transitory shocks at the region level with zero mean for all i.

To construct a counterfactual group, I need use synthetic control to weighted average of units in the Donor Pool. I can write it as a weight (J$\times$1)vector: $W = w_2, \ldots, w_{J+1}$, $0 \leq w_J \leq 1$ for j = 2, ..., J and $w_2 + \cdots + w_{J+1} = 1$. w can formulate a better control group with more similar trail to the treatment group. W reflects the relative importance of each variable when I measure the difference between the treated group and the synthetic control group. The value of the outcome variable for each synthetic control unit indexed by W is:

$$\sum_{j=2}^{J+1} w_j Y_{jt} = \delta_t + \theta_t \sum_{j=2}^{J+1} w_j Z_j + \lambda_t \sum_{j=2}^{J+1} w_j \mu_j + \sum_{j=2}^{J+1} w_j \varepsilon_{jt} \tag{5}$$

And $W = w_2, \ldots, w_{J+1}$ can be wrote as $\sum_{j=2}^{N+1} w_j^* Y_{jt} = Y_{1t}$:

$$\sum_{j=2}^{N+1} w_j^* Y_{j1} = Y_{11} , \sum_{j=2}^{N+1} w_j^* Y_{j2} = Y_{12} , \ldots , \sum_{j=2}^{N+1} w_j^* Y_{jT_0} = Y_{1T_0} , \sum_{j=2}^{N+1} w_j^* Z_j = Z_1 \tag{6}$$

If $\sum_{s=1}^{T_0} \lambda_s / T_0 \neq 0$:

$$Y_{it}^N - \sum_{j=2}^{J+1} w_j^* Y_{jt} = \frac{\lambda_t}{\sum_{s=1}^{T_0} \lambda_s / T_0} \sum_{j=2}^{J+1} w_j^* \frac{1}{T_0} \sum_{s=1}^{T_0} \left(\varepsilon_{js} - \varepsilon_{1s} \right) - \sum_{j=2}^{J+1} w_j^* \left(\varepsilon_{jt} - \varepsilon_{1t} \right) \tag{7}$$

Generally, if the preintervention period is relative long, the average of right side of this equation should be close to 0. As a result of it, the estimator of α_{it} is:

$$\hat{\alpha}_{1t} = Y_{1t} - \sum_{j=2}^{J+1} w_j^* Y_{jt} \tag{8}$$

Critics of Mill's method of Differences pointed out that SCM may be limited because it may ignore the unmeasured factors affecting Y_{it} and heterogeneity in the effects of observed and unobserved factors. Abadie, Alexis and Jens (2014) countered it: the unobserved factors can be controlled if there is large enough period before intervention. That is in the period of preintervention, the value of Y_0 can match well with Y_1. Once I find the synthetic unit has the same behaviour with treated unit, the difference of outcome variable is the effect of treatment. Also, I would decide whether to conduct a placebo test or

not. Then based on the fitness of 2 groups before and after treatment to further exclude non-observational factors.

3.2. Data collection

As for the choice of predictors, I need to consider the factors that influence tourism demand, tourism revenue and the number of tourists. In research of Biagi et al. (2017), they choose the number of tourist accommodation, density of population, distance from the port and airport, length of stay to be predictors. Their aim is evaluating the effect of tourism tax on national and international tourism demand. The outcome variables are the number of national and international tourists. Addessi et al. (2019) used outbound tourists as dependent variable and population density, GDP, real exchange rate and distance as predictors. Most of them focus on the demand equation and it gave me good examples. Because domestic tourism is the main source of Chinese tourism revenue and consider about availability of data, I will choose factors that affect domestic tourism more. After taking cues from other authors, I decided to use population[2], GDP per capita (yuan)[3], Per Capita Annual Net Revenue of Rural Residents (yuan)[4], Per Capita Annual Disposable Revenue of Urban Residents (yuan)[5] and Consumer Price Indices (Preceding year=100)[6] to be predictors. Furthermore, I will use tourism revenue in 2006, 2009, and 2012 to be auxiliary predictors.

Then I need determine the countries that constitute Donor Pool. I have said in Introduction that there are 3 criterions: countries or county-level cities belonging to Zhejiang Province, tourist destination of ancient towns within the territorial jurisdiction, and not affected by Wuzhen Theatre Festival. There are totally 38 ancient towns in Zhejiang Province, and they belong to 27 countries or country-level cities[7]. Here is the list of the 27 regions and their levels

Table 1. List of 27 regions

Provincial Level (1st)	Prefectural Level (2nd)	Country Level (3rd) Include District (Urban Area)/ Country-level city/ Country
Zhejiang Province	Jiaxing City	1 Tongxiang
	Hangzhou City	2 Fuyang; 3 Jiande
	Ningbo City	4 Fenghua; 5 Ninghai; 6 Yinxian; 7 Cixi; 8 Xiangshan
	Wenzhou City	9 Yongjia; 10 Cangnan; 11 Taishun
	Huzhou City	12 Urban Area; 13 Deqing

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[2] Refers to the total number of people alive at a certain point of time within a given area. The annual statistics on total population is taken at midnight, the 31th of December (Jiaxing Bureau of Statistics, 2019)

[3] GDP per capita is calculated by comparing a region's GDP achieved in one year's time with the region's permanent population (Household population) (Jiaxing Bureau of Statistics, 2019)

[4] Refers to the total income of permanent residents of the rural households during a year after the deduction of the expenses for productive and non-productive business operation, the payment for taxes and the payment for collective units for their contracted tasks, which can then be spent for investment in productive and non-productive construction, for consumption in daily life and for saving deposit (Jiaxing Bureau of Statistics, 2019)

[5] Refers to the actual income of the sample households which can be used for daily expenses, i.e., total income minus personal income tax, social security fee and sample household subsidy (Jiaxing Bureau of Statistics, 2019)

[6] The CPI (Preceding year = 100) is a relative number reflecting the trend and extent of changes in the prices of consumer goods and services purchased by urban and rural residents within a certain period (Jiaxing Bureau of Statistics, 2019)

[7] The constitution of China provides for three de jure levels of government. Currently, however, there are five practical (de facto) levels of local government: the provincial (province, autonomous region, municipality, and special administrative region), prefecture, county, township, and village

Shaoxing City	14 Zhuji; 15 Shengzhou; 16 Urban Area
Jinhua City	17 Wuyi; 18 Lanxi; 19 Yiwu; 20 Yongkang
Quzhou City	21 Longyou; 22 Jiangshan
Taizhou City	23 Xianju; 24 Linhai; 25 Wenling
Lishui City	26 JIngning

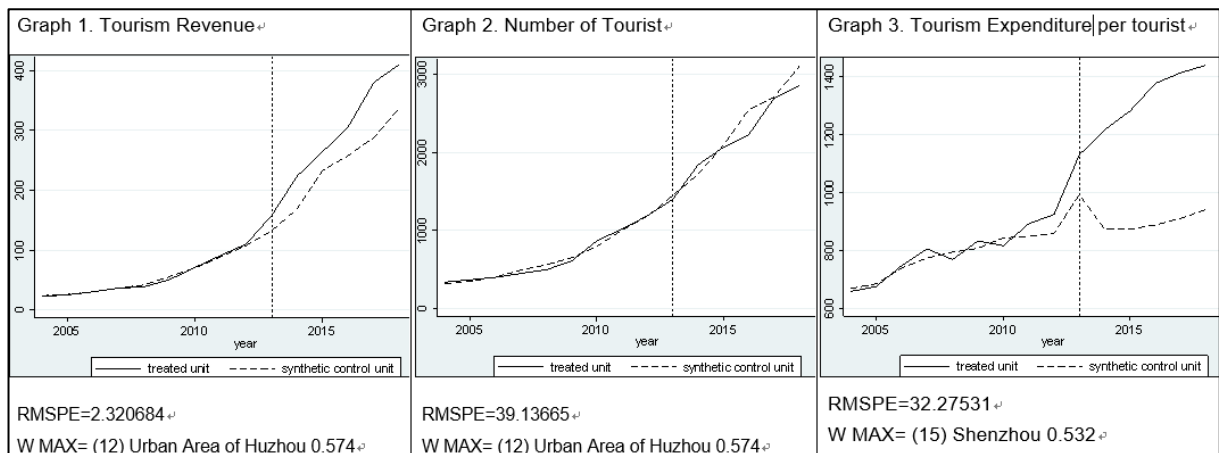Source: Author's own elaboration

There are 2 ancient towns in Jiaxing City, Wuzhen and Xitang. I delete Xitang Ancient Town because it is closed to Wuzhen and I need make sure all units in Donor Pool are completely independent. Finally, I got my Donor Pool with 25 potential comparative units and 1 treated unit. About data collection, I download the "Yearly Report" from 2005 to 2019[8] in the website of Zhejiang Provincial Bureau of Statistics of China[9]. All the data in the "Yearly Report" are collected by the local bureau of Statistics and submitted to the Zhejiang Provincial Bureau of Statistics.

4. RESULTS

4.1. Preliminary results

After collecting 15 years' data of 26 countries that have destination of ancient tows, I got the result of trend of each tourism variables (Figure 4). The continues line represents treated unit and dashed line is the synthetic control unit. As I had suspected before, the theatre festival did bring more tourism revenue to Tongxiang just like Graph 1 shows. The Root Mean Squared Prediction Error (RMSPE) in Graph 1 is 2.32, which can be accepted and means two units have a good fitness before the treatment of 2013. As for Number of Tourists and Tourism expenditure per tourist, their RMSPEs are too large which represents treated unit and synthetic unit didn't fit well for pre-treatment period. As a result of this, I cannot prove the change appeared after 2013 was due to Wuzhen Theatre Festival. So, I will focus on Tourism Revenue in the following analysis

Figure 4. SCM results: treated versus synthetic control group.

Source: Author's own elaboration.

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[8] Because the yearly report data records the statistics of the previous year, the actual data years are 2004-2018
[9] Website address：http://tjj.zj.gov.cn/

According to the Table of Unit Weights (Table 2), there are 3 can be used in Donor Pool: country 9 (Yongjia), country 12 (Urban area of Huzhou) and country 14 (Zhuji). Except these 3 countries, weights of other countries are all 0. The role of the Synthetic Tongxiang is that it provides a reasonable approximation to the Tourism Revenue that would have been in Tongxiang after 2013 in the absence of the theatre festival.

Table 2. Unit Weights of Tourism Revenue

Code & Name of Countries	Unit Weight	Code & Name of Countries	Unit Weight	Code & Name of Countries	Unit Weight	Code & Name of Countries	Unit Weight	Code & Name of Countries	Unit Weight
2 Fuyang	0	7 Cixi	0	12 Urban Area of Huzhou	0.574	17 Wuyi	0	22 Jiangshan	0
3 Jiande	0	8 Xiangshan	0	13 Deqing	0	18 Lanxi	0	23 Xianju	0
4 Fenghua	0	9 Yongjia	0.048	14 Zhuji	0.378	19 Yiwu	0	24 Linhai	0
5 Ninghai	0	10 Cangnan	0	15 Shengzhou	0	20 Yongkang	0	25 Wenling	0
6 Yinxian	0	11 Taishun	0	16 Urban Area of Shaoxing	0	21 Longyou	0	26 Jingning	0

Source: Author's own elaboration

From Table 3 we can see the synthetic Tongxiang shows a good balance with real Tongxiang. I estimate the causal effect of festival as the difference between Tongxiang and synthetic Tongxiang after 2013. We can see both 2 units increased a lot after 2013 from Graph 1. But obviously the growth rate of Tongxiang was faster and the gap between Tongxiang and synthetic Tongxiang became larger and larger.

Table 3. Predictor Balance

X	Treated	Synthetic
Population	66.97889	67.0173
GDP per capita (yuan)	42542	42497.74
Per Capita Annual Net Income of Rural Residents (yuan)	11903.56	11414.51
Per Capita Annual Disposable Income of Urban Residents (yuan)	23736.22	23685.94
Consumer Price Indices (Preceding year=100)	102.1111	102.6934
Tourism Revenue (2006)	30.1	30.05156
Tourism Revenue (2009)	50.63	52.50446
Tourism Revenue (2012)	110.03	107.6836

Source: Author's own elaboration

I got the matrix list of treatment effect of each year (Table 4). According to Table 4, tourism revenue in Tongxiang was always lower than synthetic Tongxiang before 2013. However, Tongxiang surpassed synthetic Tongxiang and the gap between 2 units expand a lot since 2013. The festival in 2014 and 2017 had the most significant effect. Generally, the treatment effect had an increasing trend.

Table 4. Matrix List

Year	Treatment effect	Year	Treatment effect	Year	Treatment effect
2004	-1.1754796	2009	-4.8744576	2014	54.913796
2005	-.71447889	2010	.72437794	2015	31.185307
2006	.04843963	2011	2.401297	2016	48.619263
2007	-.23670071	2012	2.3464363	2017	91.999333
2008	-3.3113204	2013	25.849437	2018	73.071321

Source: Author's own elaboration

Figure 5 shows that theatre festivals have a significant positive impact on tourism revenue, and this impact is different every year. In 2013 and 2014, there were significant increase of tourism income. The increase rate decreased in 2015 but still positive. It may due to the policy of restriction on spending on official receptions, vehicles and overseas trips of government. Then increase rate got higher in 2016 and 2017. In 2018 there was another dip, which was result of tighter visa policies of China. The magnitude of the impact estimated in Graph 1 is substantial. My research shows that during the whole period from 2004 to 2018, tourism revenue increased by nearly 5.996 billion yuan on average, or about 17.75%.

Figure 5. Treatment Effect
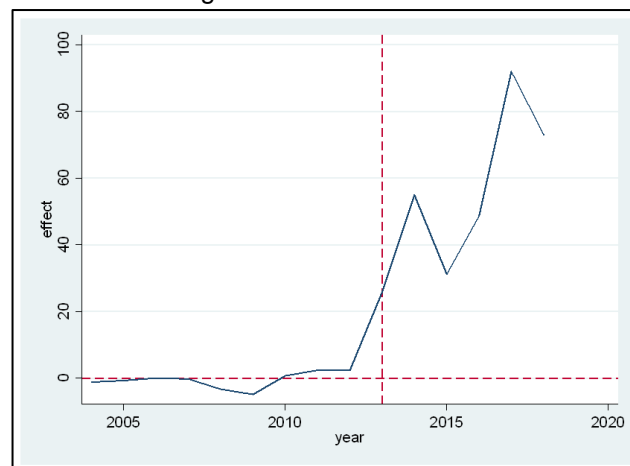
Source: Author's own elaboration.

4.2. Placebo test

In order to assess the statistical significance of the estimate, I must consider whether my results are determined entirely by chance. If I had chosen a town at random instead of Tongxiang, how long would I get this result? So, I took a placebo test. Like the robustness test method used by Abadie, Alexis and Jens (2003), Liu and Zeng (2017). It is necessary to verify that the most significant difference in predicted changes of the analysis is indeed the influence of Wuzhen Theatre Festival rather than other external factors not observed here. Abadie et al. (2010) proposed a Permutation Test like the Rank Test to determine whether other countries have the same situation as Tongxiang and what is the probability. The core of this test is to assume that all countries in the Donor Pool start to hold theatre festivals in 2013, to construct the synthetic control objects of corresponding towns by using the synthetic control method. Then estimate the treatment effect under the hypothesis and compare the treatment effect

actually produced in Tongxiang. If the placebo study shows that the estimated gap is very large in Tongxiang compared with the countries that did not hold Wuzhen Theatre Festival, it can be said that: my analysis can provide obvious evidence that tourism revenue of Tongxiang is positively affected by festival. On the other hand, if the gap between Tongxiang and other countries is very small, it can be said that our analysis does not provide obvious evidence that Wuzhen Theatre Festival has a positive effect.

Since this method requires that the synthetic control objects in the Donor Pool have a good fitness before the treatment, if the fitting effect is not ideal before 2013, i.e., RMSPE is relatively large. Even the large difference of predictive variables was obtained at the later stage of the treatment, it still cannot reflect the effect of the treatment. Placebo test will be operated only when the RMSPE is small enough. So, I will exclude number of tourists and tourism expenditure per tourist. Here is only the test of tourism revenue. Figure 6 shows the results of the placebo trial. The grey lines represent the interval for each of the 26 tests. That is, the grey line shows the difference in tourism revenue between each town in the donor pool and its respective synthetic version. The black line shows the estimated gap in Tongxiang.

Figure 6. Gap in Tourism Revenue in 26 countries
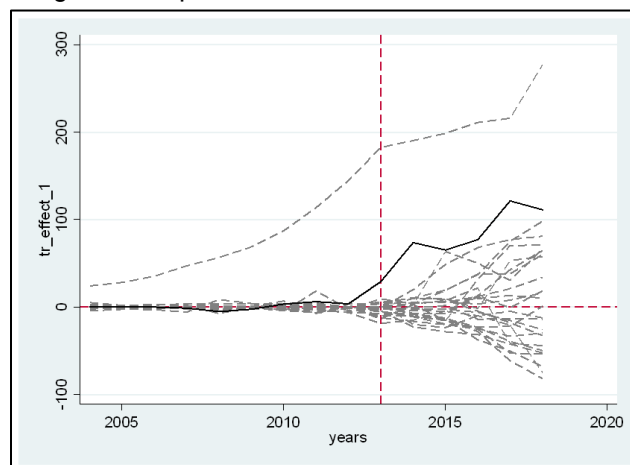
Source: Author's own elaboration.

Before intervention, RMSPE in Tongxiang was about 3, and RMSPE in other 25 countries were about 4. This means that before 2013, synthetic country provided a good fit for tourism revenue. However, Figure 6 also shows that during the period 2004-2012, tourism revenue from some countries cannot be well replicated by convex combinations of tourism revenue. For example, in the Urban Area of Shaoxing, its RMSPE is the highest at about 77.6. Before 2013, tourism revenue in Urban Area of Shaoxing was much higher than in other countries. Therefore, there is no sample that can reproduce its tourism revenue by its time series. Similarly, a poorly fitted placebo cannot provide information to measure the huge gap in estimates after the Wuzhen Theatre Festival. For this reason, I eliminate the town with RMSPE more than 6 times higher than Tongxiang. Figure 7 excludes Yinxian (6) and Urban area of Shaoxing (16).

Figure 7. Gap in Tourism Revenue in 24 countries (Discards Countries with Festival RMSPE Six Times Higher than Tongxiang)
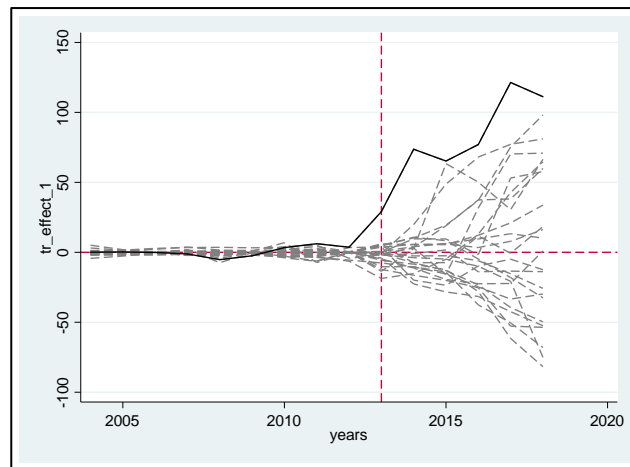
Source: Author's own elaboration.

Of the remaining 24 countries, Tongxiang's gap line is now the most unusual, especially since 2013. From 2013 to 2018, the estimated gap of Tongxiang is very large compared with the distribution of the gap in the donor pool of each town. This indicates that only 1/24, or 4.17%, of the probability will appear such a large gap of tourism revenue between Tongxiang and synthetic Tongxiang. According to the significance level of 5% in general statistics, it can be considered that the increase of tourism revenue of Tongxiang is significant at 5%. Therefore, Wuzhen Theatre Festival has indeed promoted the tourism revenue of Tongxiang

5. CONCLUTION

The present research evaluated the effect of Wuzhen Theatre Festival on tourism Industry of Tongxiang. This is a new attempt to apply SCM at regional tourism activity. SCM helped me to obtain the overall effect (indirect and direct effect) of festival. The results have proved the positive impact of festival on local tourism revenue. But surprisingly, there is no evidence support that the festival has boosted the number of tourists. Regarding tourism expenditure per tourist, due to the poor fitting in the preintervention period, it cannot be proved that the large gap in this variable in the postintervention period is due to the festival. But since the gap of tourism expenditure per tourist expanded year by year and tourist revenue had indeed positive effects, the festival should also be an important factor in tourist expenditure. But how could Wuzhen Theatre Festival improve tourism revenue, but leave the number of tourists unaffected at the same time?

Wuzhen uses the online booking system and limits passenger flow all year round. In 2019, Wuzhen received a total of 9180 thousand tourists, which only increased 0.4% year-on-year. With the slight increase in the number of tourists, the operating revenue and net profit of Wuzhen were 2.79 billion yuan and 807 million yuan respectively, increase 14.4% and 10% year on year. Tourism revenue has a far

higher growth rate than the number of tourists. After 20 years of operation, Wuzhen still maintains substantial growth in revenue. In fact, as early as the planning stage of Wuzhen Theatre Festival, Tongxiang government and Wuzhen Tourism Company had already decided on this sustainable tourism development path. From the performance of Wuzhen, the growth has long been not dependent on the number of tourists, but from secondary consumption (in addition to ticket consumption) and the expansion of per capita consumption. The Festival restricted access to Wuzhen and that it was able to attract visitors with higher willingness to pay. By this way, Wuzhen call sell higher quality services, diversify the product offer and increase tourism expenditure per tourist. Tourists can have better experiences, which can also help to improve reputation and attract better quality tourists.

The Western Zone for holding Wuzhen Theatre Festival is built according to the goal of "integrating sightseeing, leisure, vacation and business activities". Faced with the growing domestic demand in China, the Western Zone 's target customers are leisure vacationers. The per capita consumption and gross margin of high-end leisure vacations are higher, and the possibility of continuous consumption and re-visit rate is greater. As the most important tourist destination in Tongxiang, Wuzhen's development strategy brings Tongxiang a highly profitable, healthy and sustainable tourism industry. This study also proves that the tourism's development in ancient town of China should not pursue low quality and large passenger flow any more but need high-quality transformation. Due to the limited carrying capacity of tourists in a scenic spot, most popular destination now needs to consider the balance between the number of tourists and quality of experience. So, they all implement the restriction of the number of tourists. As a result, it is necessary to increase tourists' staying time, consumption scenes and per capita consumption. I have mentioned in Introduction about the "Wuzhen model": highlighting the functions of leisure and business, sustainable growth in the number of vacationers and per capita consumption, forming influences and creating repeated consumption. From the results of this paper, the "Wuzhen Model" has been very successfully implemented. According to the annual report of Cysts Holding Co., LTD, the proportion of ticket revenue in the total revenue of Wuzhen has been decreasing from 60% to about 40%. Meanwhile the proportion of hotel and catering revenue has increased from 30% to 40%, and the proportion of secondary consumption has reached over 60%. In addition, the re-visit rate of Wuzhen is more than 40%, which is far higher than the average domestic re-visit rate of 11% in China. With the booming development of tourism, Wuzhen's reputation is getting more and more famous even in the international market. Wuzhen has been the main venue and permanent venue of the World Internet Conference since 2017.Convention and exhibition tourism also takes this opportunity to shine. Wuzhen Internet International Convention and Exhibition Centre is not only built for the future World Internet Conference, but also for being the main place to undertake conferences and exhibitions tourism.

The results support my guess that Wuzhen Theatre Festival promotes local tourism revenue. This festival has such a great impact on the local tourism industry in Tongxiang that it can be seen in the SCM based on the annual data. The festival not only affects the local tourism in the 11 days, but also has a far-reaching impact on the planning of destination and image building. This also proves that the

theatre festival is a successful application of the "Wuzhen Model". This is not only statistical evidence that Wuzhen Theatre Festival should continue to be supported and held. At the same time, it also verified a successful development model as a reference for other ancient town tourism destinations or traditional cultural destinations.

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