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Inter-American Development Bank
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Tourism policy, a big push to employment? Evidence from a multiple synthetic control approach [*]

Victoria Castillo [†] *Lucas Figal Garone* [‡] *Alessandro Maffioli* [§] *Lina Salazar* [**]

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Abstract

This paper investigates the impact of tourism policy on employment, using the Tourism Development Policy (TDP) implemented in the Argentinean province of Salta during the years of 2003 to 2010 as a case study. Following the Synthetic Control Method for comparative case studies, we use a combination of non-treated Argentinean provinces to construct a synthetic control province which resembles relevant characteristics of Salta before the TDP implementation. Given the dual focus of the evaluated policy – one specific sector in one province – we also construct a synthetic control for the tourism sector using a combination of other sectors for Salta, and other sectors from other provinces. This novel approach based on multiple dimensions of the donor pool allows us to test the robustness of the estimated impact. We find that TDP implementation increased tourism employment in Salta by an average of 11 percent per year, for an overall impact of around 112 percent between 2003 and 2013. The analysis also suggests that larger impacts of the TDP occurred from the second to the seventh years after policy implementation. Results are robust across a series of placebo tests and sensitivity checks.

JEL Classification: E24, E65, H40, J49, L83, N56

Keywords: Tourism, employment, policy evaluation, synthetic control method, economic development, Argentina

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1. Introduction

For decades, governments have assumed that tourism policies are important instruments to boost job creation and growth. However, to date, little empirical evidence has been produced to support this assumption and very few studies have properly dealt with the methodological challenges related to the identification of the policy effects in this area.

Two problems make the evaluation of tourism policies particularly challenging. First, tourism policies usually take place at the aggregate level, affecting an aggregate entity (e.g. country, region, state, province) selected on the basis of its unique characteristics with regard to its tourism potential (Winters et al., 2013). This implies that all individuals or firms that belong to the treated zone are in some way affected by the intervention. Second, tourism industry is characterized by externalities and agglomeration economies – mainly within a geographic unit –, making indirect effects an important issue to be considered when estimating a proper counterfactual (Angelucci and Di Maro, 2010).

In this paper, we analyze the link between tourism policy and employment, using the Tourism Development Policy (TDP) implemented in the Argentinean province of Salta as a case study. The TDP is especially interesting as it was designed by the Government of Salta with the explicit objective of boosting the province economy. In the early 2000's, the province of Salta occupied the twelfth place among the 24 Argentinean provinces in terms of share of tourism employment on total employment.[1] In 2003, the Salta government started a large-scale tourism policy with the objective to expand the sector as a key engine in the province economic development. Ten years later, Salta has climbed to the sixth place. Throughout this period, employment in the

[1] Argentina is a federal state composed by 23 provinces plus the autonomous City of Buenos Aires. Provinces are fully autonomous – they enact their own constitutions, organize their local governments, and own and manage their natural and financial resources – except on certain specific topics that they delegate to the federal government.

hospitality sector has nearly quadrupled from approximately 500 to 2,000 formal employees.

Our empirical strategy is based on the Synthetic Control Method (SCM), an econometric technique to perform data-driven comparative case studies developed by Abadie and Gardeazabal (2003) and extended in Abadie et al. (2010). Specifically, we use a combination of other Argentinean provinces to construct a "synthetic" control province that resembles Salta, in relevant characteristics, before the TDP implementation. The donor provinces used to construct the synthetic control are selected by an algorithm that assign weights based on donors similarity to Salta before the treatment with respect to relevant covariates and past realizations of the outcome variable (i.e. tourism employment). The subsequent evolution of the synthetic Salta without a large-scale tourism policy is then compared to the actual Salta to identify the impact of the TDP.

Our results show that after TDP implementation, tourism employment in the province of Salta increased by an average of 11 percent per year, for an overall impact of around 112 percent between 2003 and 2013. The analysis also suggests that larger impacts of the TDP occurred during five years, from the second to the seventh year after policy implementation, and progressively decreased in the last three years of observation until disappearing. The findings are robust across a series of placebo tests and sensitivity checks.

This analysis is based on a unique database. Specifically, we use data from 1996 to 2013 with monthly information of the different economic sectors at the provincial level. This data allows to evaluate the timing of the TDP effects on tourism employment in a ten-year window after its implementation has taken place as well as to create a counterfactual using almost eight pre-treatment years. The data also gives flexibility to control for relevant cofounders, takes into consideration relevant issues

related to the tourism industry such as seasonality, and at the same time, allows us to implement a battery of placebo studies and robustness checks to validate our findings.

The contribution of this paper is twofold. First, to the best of our knowledge, this is the first paper that evaluates the impact of an economic development policy using SCM. Until now, SCM has been used to evaluate the effect of the introduction of reforms such as the California's Tobacco control program (Abadie et al., 2010) or events such as the economic liberalization processes (Billmeier and Nannicini, 2013), the terrorist conflicts in the Basque Country (Abadie and Gardeazabal, 2003), catastrophic natural disasters (Cavallo et al., 2013), and the German reunification (Abadie et al., 2014). This contribution is particularly relevant for the debate on the effectiveness of tourism policy. The few existing studies that attempt to evaluate the impacts of this policy uses simulation models – from relatively simple input-output models (I-O models) to social accounting matrices (SAMs) and, more recently, multiregional computable general equilibrium models (CGE models) and economy-wide models (Mitchell and Ashley, 2010). These approaches, however, do not directly address the issue of causality and often fail to provide fully convincing evidence on the policy's net effects.

Second, this is the first application of SCM that uses a multiple set of donors to test for the robustness of its results. First, the core of the empirical analysis uses the comparison between the province of Salta and a synthetic Salta constructed using other non-treated Argentinean provinces as donor pool. To test the robustness of this comparison we also perform the analysis comparing Salta's tourism sector with a synthetic control constructed using as donor pools, other sectors from the Salta province, and other sectors from other provinces. The consistency of the findings using this multiple synthetic control approach further confirms the validity of the results.

The rest of this study is organized as follows. Section two discusses the rationale behind the implementation of tourism policies and its relevance in relation to

employment. Section three describes the background of the TDP in the Salta province. Section four presents the empirical methodology, and section five describes the dataset and the sample used for the empirical estimations. Section six, presents the results obtained from the different estimations followed by a set of placebo tests and sensitivity checks presented in section seven. Finally, section eight concludes.

2. Tourism, Employment, and Market Failures

Tourism is one of the largest industries worldwide, particularly in terms of employment. According to the World Tourism Organization (WTO), in 2013, the tourism industry employed one in eleven of all jobs in the world, represented nine percent of the world's GDP (direct, indirect and induced impact), and generated six percent of the world's exports.[2] Moreover, annual international tourist arrivals worldwide have jumped from 25 million in 1950 to more than one billion in 2013. Remarkably, 47 percent of these journeys ended in a developing country destination and growth rates of international arrivals in developing countries outperformed developed economies.

Tourism expansion has always been considered to significantly contribute to growth and economic development. [3] Nevertheless, expanding tourism is not a development objective in itself. The benefits of expanding this sector come from its positive impacts on foreign exchange earnings through tourism receipts, economic growth, and job creation.

In developing countries, tourism's ability to generate employment has been acknowledged as one of the major advantages of this sector, considering both formal and informal employment (Sinclair, 1998). Tourism is widely considered to be a diverse and labor-intensive industry and thus, an effective generator of a wide range of employment

[2] WTO (2014a).

[3] Abundant work in economics has emphasized the link between tourism and growth and economic development. Sharpley and Telfer (2002) well documented and discussed theoretical and empirical research in this literature.

opportunities (Telfer and Sharpley, 2008). Furthermore, tourism employs more women and young people than most industries, as well as people with low level of education, fostering an environment of inclusiveness and empowerment for vulnerable groups (UNDP, 2011). In addition, given its low entry barriers, tourism provides investment opportunities for entrepreneurs to create small-scale-firms and generate employment.

Three types of employment can be created through the expansion of tourism sector: direct, indirect, and induced. Direct employment is the employment related to tourists' direct expenditure on goods and services. It refers to employment in hotels, restaurants, transport, and tour operators, among others. Indirect employment refers to jobs created in sectors that provide goods and services directly to affected firms (backward linkages). For instance, food suppliers, merchants, mechanics, etc. Finally, induced employment refers to the additional jobs resulting from the effects of the tourism multiplier, i.e. from the spending of income earned by tourist business owners and employees outside the tourism industry (Dwyer et al., 2004).

Despite the substantial positive effects of tourism on employment creation, economic growth, and foreign currency receipts, it has not been until recently that the sector has gained relevance in the public policy debate (Hawkins and Mann, 2007; OECD, 2010). Thus, an important question to be addressed is to what extent it is justified to use public intervention in order to promote tourism. As pointed out by Winters et al. (2013), the justification for public intervention in tourism is mainly twofold.

First, the economic benefits of tourism are unlikely to take place at a socially optimal level if investment is left solely to the private sector. Because of geographical proximity and industry complementarities, agglomeration economies and externalities

are quite relevant in the tourism industry.[4] Under such conditions, investment decisions become interrelated and the profitability of a particular investment becomes a function of other complementary investments.[5] Without proper coordination among investors, the market would therefore fail to assign resources optimally.[6] For instance, hotel owners may underinvest in accommodation capacity knowing that returns to their investment depend also on the investment decisions of restaurant owners and other local investors in recreational activities. Similarly, public investment in complementary infrastructures (such as roads, water and sanitation, public lighting) may also be hampered by the lack of coordination with the private investment needed to generate an adequate flow of visitors.

Second, public intervention in tourism has also been justified from a poverty alleviation perspective, mainly through job creation. At present, there is broad consensus regarding tourism's potential to alleviate poverty, particularly in developing countries (see Mitchell and Ashley, 2010). Many developing countries are in fact endowed with natural, cultural and historical resources that, with proper coordination and planning, could be at the core of a profitable and sustainable tourism industry, generating jobs and incomes for the local population.

3. Salta's tourism development policy

The Salta province is located in the northwest of Argentina (NOA, for its acronyms in Spanish). This province has an area of 155,488 square kilometers – six percent of the nation's territory – sharing borders with six Argentine provinces and three countries, Chile, Bolivia and Paraguay (Figure 1). The population, in 2001, reached about 1

[4] Almost by definition the tourism industry is geographically concentrated because of its dependence on the natural or cultural attractions of a specific territory. In addition, the strong complementarities among services and products boost the effects of externalities, making coordination among local agents even more important.

[5] On this topic see the seminal work by Rosenstein-Rodan (1943).

[6] For a review on coordination problems in development, see Hoff (2001). On clusters and coordination failures, see also Rodriguez-Clare (2005).

million – three percent of the country total –, with an average density of seven persons per square kilometer and an urbanization rate of 78 percent.[7]

In the early 2000s, Salta was one of the least developed provinces in the country with respect to social indicators. The local economy was relatively underdeveloped, being agriculture and its complementary industries the most important economic activities. The province's GDP per capita in 2001 was US$ 4,000 about half of the country's GDP per capita (US$ 7,500).[8]

Despite its stagnant economy, Salta has been historically recognized as a tourist destination due to its natural and cultural heritages. The diversity of its natural resources ranges from the Andean highland plateau (the *"Puna"*) and the Chaco forests to the subtropical forest in the Yungas Biosphere Reserve. The uniqueness of its landscapes, characterized by colorful hillsides, ravines, mountain peaks, volcanoes, and salt flats, can be found in several protected areas that cover 18 percent of its territory. Salta is also recognized by its various tours offered to visit the many wineries located in the highest vineyards of the world. This distinctive feature has led to the construction of the "Museo de la Vid y el Vino" (Grape and Wine Museum) located in the touristic city of Cafayate. The uniqueness of its natural assets is complemented with a large cultural heritage, including native and aboriginal communities, colonial and archaeological sites as well as cave paintings. Further, the province offers internationally recognized attractions such as the monumental *"Tren a las Nubes"* (Train to the Clouds) – one of the highest railways in the world – and the prestigious Museum of High Altitude Archaeology (MAAM). Finally, the province's tourism potential is magnified by its privileged location. Considered the main port of entry to the NOA region and sharing borders with Chile, Bolivia, and Paraguay, the province offers

[7] Argentina National Population, Households, and Dwelling Census, 2001.
[8] National Statistical and Census Institute (INDEC).

convenient access to regional circuits (i.e. *Qhapaq Ñan* and the Great Inca Road) increasingly popular among international tourists.

After going through a long economic recession that started in 1998, Argentina suffered a severe crisis in 2001. During the 1990s, the Argentine Peso/Dollar exchange had been pegged at one-to-one. As a consequence of the crisis, the Argentine Peso suffered a large devaluation and the government declared the default of its sovereign debt. Although in 2002 the GDP contracted by 10.8 percent, in 2003 began a period of economic growth and expansion for the country.

Following the economic collapse in 2001, the relative importance of the tourism sector in the national and provincial economies grew significantly. The deep peso's devaluation was indeed expected to increase the demand from both Argentinian and international tourists by significantly reduce the costs of Argentinean destinations relative to the international ones. On this basis, in the early 2000s the forecasts for medium and long-run growth in tourist arrivals were extremely optimistic.

In this context, Salta's tourism industry could significantly contribute to revitalize the post-crisis economy and boost local employment. For this reason, in 2003, Salta's government decided to implement a set of policy interventions to support tourism expansion: the Salta's Tourism Development Policy (TDP). The beginning date of the TDP can be associated with the approval of the first loan for tourism development received by the province from a multilateral organization, i.e. June 2003.

The TDP was designed and implemented as a coordinated set of interventions meant to produce a structural change in the tourism industry and become a crucial part of the province's development strategy. The program was based on three key pillars. First, the TDP provided for the construction and modernization of tourism and transport infrastructure – including highways to access Salta city, the international airport, and bus terminals –, and the restoration of the historical and cultural heritage.

Second, the TDP included tax credits for the construction, expansion, and remodeling of hotels and similar establishments. Third, the TDP provided for the strengthening of the tourism institutional setting with increased budget for the Tourism Secretariat – eventually elevated to the status of ministry –, the creation of a public-private Provincial Tourism Council, and the launch of a integrated promotion campaign at the national and international levels.

A fundamental feature of the TDP was also the partnership with the Inter-American Development Bank (IDB), which provided first multilateral development bank's loan to the Salta to support a specific industry. The IDB's involvement was in many ways a turning point for Salta's tourism policy, not only because it ensured funding for the key components of the TDP, but mainly because it signaled and ensured the Government long term commitment with the TDP and the development of the tourism industry.

Overall, the TDP was the cornerstone for tourism development in Salta. Through the implementation of this policy, Salta´s government built an integrated large-scale approach to expand and develop the tourism industry. Furthermore, the TDP had the merit of mitigating the dynamic inconsistencies which can prevent subsequent governments from giving continuity to policies that require long implementation periods. In other words, the TDP helped to overcome internal policy changes within the government, as well as changes of government, allowing the province to implement a long-term intervention to support tourism development.

4. Identification strategy: constructing a synthetic version of Salta

This study analyses the impact of the Salta's TDP on its fundamental outcome, namely tourism employment. The tourism industry is composed by various sub-sectors that provide touristic services such as accommodation for visitors, food and beverage serving

activities, railways, roads, water and air passenger transport, transport equipment rental, travel agencies, etc. (WTO, 2014b).[9] In this paper, we focus on evaluating employment in the hospitality sector, which is the cleanest measure of tourism employment.

Specifically, this measure includes employment in hotels, camping grounds, and other establishments providing accommodation services to visitors on a commercial basis. We choose this measure because the hospitality sector is by far the most representative sector of the tourism industry and the one that can better reflect its structural change. The analysis of other sub-sectors of the tourism industry is more likely to be contaminated or influenced by the performance of other industries different than tourism.

The identification of the TDP's impact on tourism employment is rather challenging. First, a pure time-series econometric analysis of the evolution of tourism employment would be contaminated by the economic recovery that started in Argentina in the second-half of 2002 after the steep devaluation of the Argentine peso. Secondly, the province of Salta differed from other Argentinean provinces in characteristics that might influence tourism employment growth. For this reason, a simple comparison of the evolution of tourism employment in Salta and in the rest of Argentina would not only capture the TDP's effect but would also reflect structural differences in the determinants of tourism employment. To overcome these identification issues we then need to find a province (or group of provinces) that has had the same secular trend in tourism employment before the TDP, and likely would have had the same secular behavior in the absence of the TDP.

[9] According to WTO the tourism industry includes the following sectors: accommodation for visitors, food and beverage serving activities, railway, road, water and air passenger transport, transport equipment rental, travel agencies and other reservation services activities, cultural activities, sports and recreational activities, retail trade of country-specific tourism characteristic goods, and other country-specific tourism characteristic activities.

To deal with this challenge, we use a Synthetic Control Method (SCM), an empirical approach developed by Abadie and Gardeazabal (2003) and extended in Abadie et al. (2010). The idea behind this approach is that, when the policy intervention takes place at an aggregate level and affects an aggregate entity (e.g. province or a sector), a combination of comparison units often provides a better comparison for the unit exposed to the intervention than any single unit alone. Under this approach, a synthetic control is a weighted average of the available control units, constructed to approximate the most relevant characteristics of the treated one. In our case, the SCM is used to estimate the counterfactual situation of Salta in the absence of the TDP by looking at the tourism employment trend in an artificial province (i.e. the synthetic Salta).

We observe $J + 1$ provinces over T periods. Among these, only Salta is exposed to the intervention of interest. The J remaining provinces serve as potential controls. This set of controls units is conventionally called the "donor pool". Our sample includes a positive number of pre-intervention periods, T_0, as well a positive number of post-intervention periods, T_1, with $T = T_0 + T_1$. In this context, it is useful to think in terms of potential outcomes in a panel setup. The treatment effect for Salta at time $t = T_0 + 1, \dots, T$ is defined as

$$\tau_{St} = Y_{St}(1) - Y_{St}(0) = Y_{St} - Y_{St}(0) \quad (1)$$

where $Y_{St}(1), Y_{St}(0)$ are the Salta's potential outcomes with and without treatment, respectively. We aim to estimate the vector $(\tau_{S,T_0+1}, \dots, \tau_{S,T})$, that is, the impacts of the TDP throughout time. Because $Y_{St}(1)$ is observed, to estimate τ_{St} we just need to estimate $Y_{St}(0)$, i.e. the contrafactual trajectory of tourism employment in Salta without the TDP.

Suppose a general model for the potential outcomes of all provinces. The observed tourism employment for province i at time t is

$$Y_{it} = Y_{it}(0) + \tau_{it} D_{it} \tag{2}$$

where $i = 1, \dots, J+1$ and D_{it} takes the value of one when $i = S$ and $t > T_0$. Following Abadie et al. (2010) we express $Y_{it}(0)$ using a linear factor model

$$Y_{it}(0) = \delta_t + \upsilon_{it}$$

$$Y_{it}(0) = \delta_t + \theta_t X_i + \lambda_t \mu_i + \varepsilon_{it} \tag{3}$$

where δ_t is a vector of common time-specific effects (factors) with constant individual-effects (factor loadings) across provinces and υ_{it} is an error that can be divided into a vector of relevant observed predictors for tourism employment X_i –time invariant or time varying, and pre- or post-treatment as long as they are not affected by the policy – , a vector of unknown time-specific parameters θ_t, a province-specific unobservable μ_i, an unknown common factor λ_t, and an unobserved transitory shocks at the province level ε_{it} with zero mean for all i.

Notice that, while the traditional differences-in-differences (fixed-effects) model would restrict the impact of unobservable province heterogeneity to be constant over time – i.e. $\lambda_t = \lambda$ for all t –, the factor model presented allows the impact of these confounding unobserved characteristics to vary with time. We can think, for instance, in λ_t as the devaluation in Argentina in 2002 (common shock across provinces) and μ_i as the heterogeneous impact of the peso devaluation on province i according to its tourism potential.[10]

As defined above, the synthetic Salta is a weighted average of the provinces in the donor pool. That is, the synthetic Salta can be represented by a $(J \times 1)$ vector of weights $W = (w_1, \dots, w_J)'$ such that $w_i \geq 0$ for all $i \neq S$ and $w_1 + \cdots + w_J = 1$. Each

[10] See Bai (2009) for panel data models with interactive fixed effects.

particular value of the vector W represents a potential synthetic control for Salta, that is, a particular weight average of control provinces. Using the linear factor model just described, Abadie et al. (2010) prove that as long as the number of pre-intervention periods in the data is large relative to the scale of the transitory shocks and, we can choose w^* such that

$$\sum_{i=1}^{J} w_j^* Y_{j,T_0} = Y_{S,T_0} \quad \text{and} \quad \sum_{i=1}^{J} w_j^* X_j = X_S \tag{4}$$

then

$$\hat{\tau}_{St} = Y_{St} - \sum_{i=1}^{J} w_j^* Y_{jt} \tag{5}$$

is an unbiased estimator of τ_{St} for $t \epsilon \{T_0 + 1, \dots, T\}$, i.e. the impact of the TDP.

As in the case of a common lagged dependent variables model, the identifying assumption in the SCM is independence of treatment status and potential outcomes conditional on lagged outcome variable and other observable confounders.[11] Particularly in the context of SCM, matching on pre-intervention values of tourism employment and relevant predictors of employment (not affected by the intervention), helps to control for observed and unobserved determinants of employment as well as for the heterogeneity of the effect of these determinants in order to estimate the causal effect of the policy.

Since condition (4) can hold exactly only if $Z_S = (Y_{S,T_0}, X_S)$ belongs to the convex hull of $Z_j = \{(Y_{1,1}, X_1) \dots (Y_{J,T_0}, X_J)\}$, in practice, W^* is estimated in a non-parametric fashion and is selected so that condition (4) holds approximately. Abadie and

[11] See Dehejia and Wahba (1999) for an example of matching strategies based on lagged dependent variables. See also chapter five in Angrist and Pischke (2009).

Gardeazabal (2003) and Abadie et al. (2010) propose choosing W^* as the value of W that minimizes the distance

$$\|Z_S - Z_j W\| v = \sqrt{(Z_S - Z_j W)' V (Z_S - Z_j W)} \quad (6)$$

where V is a symmetric and positive semidefinite matrix that reflects the relative importance assigned to each employment predictor. Although this inferential procedure is valid for any choice of V, the choice of V influences the mean squared prediction error (MSPE) of the estimator, that is

$$MSPE\ (Y) = \frac{1}{T_0} \sum_{t=1}^{T_0} [(Y_{St} - \sum_{i=1}^{J} w_j^*(V)\, Y_{jt})^2]. \quad (7)$$

In order to assign larger weights to variables that have large predictive power on tourism employment, we choose V^*as the value of V that minimizes MSPE for tourism employment in the entire pre-treatment period.[12] The weights for the synthetic control are then given by $W^* = W^*(V^*)$. In other words, we minimize equation (7), for $W^*(V)$ given by equation (6).[13]

Overall, the synthetic control algorithm estimates the missing counterfactual for Salta ($Y_{St}(0)$) as a weighted average of tourism employment for provinces in the donor pool. The weights are chosen so that pre-treatment values of tourism employment and covariates of the synthetic Salta are, on average, similar to real Salta. Then, if real Salta and synthetic Salta have similar behavior over the extended pre-treatment period, a discrepancy in tourism employment following the intervention is interpreted as

[12] We follow Abadie and Gardeazabal (2003), Abadie et al. (2010) and Billmeier and Nannicini (2013).

[13] We use the *synth()* routine developed by Abadie et al. (2011). In particular, we use the data-driven fully nested optimization procedure that searches among all (diagonal) positive semidefinite *V*-matrices and sets of *W**-weights for the best fitting between Salta and a convex combination of the control units (i.e. the synthetic Salta) in terms of the pre-treatment values of the outcome variable.

produced by the intervention itself, that is, as a causal effect of the TDP on tourism employment.

The main attractive features of this approach are: i) transparency – SCM provides a systematic way to choose comparison provinces, making explicit the relative contribution of each one and the similarities between Salta and the synthetic Salta; ii) safeguard against extrapolation – weights are restricted to be positive and sum to one; iii) flexibility – the set of potential control provinces can be appropriately restricted to provinces with a tourism employment trajectory driven by a similar structural process as Salta and that were not subject to structural shocks during the sample period; and, iv) weaker identification assumption – it allows for the effect of unobservable confounding factors to vary with time.

On the other hand, a limitation of the SCM is that it does not allow using traditional (large-sample) approaches to statistical inference because of the small nature of the data, the absence of randomization, and the fact that probabilistic sampling is not employed to select sample units. Then, following Abadie et al. (2010, 2014) we apply a set of placebo tests to produce quantitative inference.

5. Data and Sample

The dataset used in this analysis is a monthly sector-level panel dataset at the provincial level for the period from 1996 to 2013. This data is collected by the Observatory of Employment and Entrepreneurial Dynamics (OEDE, for its acronyms in Spanish) at the Ministry of Labor, Employment, and Social Security in Argentina.[14] The Salta's TDP started in June 2003 providing almost 7.5 years (89 months) of pre-intervention data. The sample period begins in 1996, the year when the OEDE started collecting this data and finishes in June 2013, the last complete year of information.

[14] Given the confidentiality of the data, the estimations were conducted following the OEDE microdata policy, which implies working in situ under the supervision of its staff and with blinded access to sensible information.

This period corresponds to a decade of post-treatment analysis which is a reasonable period to predict and measure the effect of this policy.

The list and description of all variables used in the empirical analysis is provided in the data appendix, along with data sources. The outcome variable is employment in the "Hotel & Other accommodation establishments" sector (3-digit SIC sector)[15] as a proxy for tourism employment. For the pre-treatment covariates we rely on a standard set of tourism employment predictors: employment, number of firms, average wage, average size of firms, average age of firms, GDP, informality, population, population with university level, road paving and public lighting (see the data appendix for details).

The benefits of using this database are several. First, the data includes detailed information on the type of industry where jobs are created, which allows for a precise identification of the hospitality sector. As mentioned, this sector is the one that best represents the patterns of employment in the tourism industry and therefore, it is the most adequate to estimate the impacts of the TDP. Second, the dataset also includes monthly data on several indicators related to tourism employment. This is crucial given the seasonality of tourism demand. Third, the database covers a long period of time (18 years) allowing us both to estimate a counterfactual based on a long pre-treatment period as well as to measure the effects of the TDP in the short- and long-terms. Fourth, the dataset has national coverage. It has records on the employment in every firm in the country with at least one formal employee. Finally, the database was constructed following several consistency analysis performed by OEDE which ensures its reliability. All these features, not only allow us applying the SCM, but also implementing several placebo and robustness tests to check the validity of the results.

[15] The Standard Industrial Classification (SIC) is a system for classifying industries by a four-digit code.

Because the synthetic Salta is constructed as a weighted average of potential control provinces – with weights chosen so that synthetic Salta best reproduces the values of a set of predictors of tourism employment in Salta before the policy takes place –, it is important to exclude from the donor pool those provinces that were subject to structural shocks in tourism employment. For this reason, those provinces that implemented other large-scale tourism policy during the period under study were not included in the donor pool.[16]

Finally, to minimize biases caused by interpolating across provinces with very different characteristics and with outcomes driven by a different structural process, we also discarded Buenos Aires, the Autonomous City of Buenos Aires and Cordoba. Therefore, the final donor pool includes the remaining 19 provinces i.e. Catamarca, Corrientes, Chaco, Chubut, Entre Ríos, Formosa, Jujuy, La Pampa, La Rioja, Mendoza, Misiones, Neuquén, San Juan, San Luis, Santa Cruz, Santa Fe, Santiago del Estero, Tucumán and Tierra del Fuego.[17]

6. Results

Figure 2 plots the employment trends in tourism in Salta and the rest of the Argentinean provinces in the donor pool. From this figure it seems clear that the entire donor pool would not be a suitable comparison group for Salta. In fact, even prior to TDP implementation, the time series of tourism employment in Salta differed with rest of the country. While pre-treatment trends in employment are somewhat similar, after June 2003 trends began to diverge drastically pointing to a potential impact of the policy.

[16] This is the case of the province of Río Negro. Rio Negro received in 2003 a large-scale IDB program to support the modernization of production, in which the tourism industry was one of the target industries. Rio Negro also participated in two other IDB programs: Improvement of the Competiveness of Tourism (2005) and Consolidation of Wine Tourism (2006).

[17] Our results are robust to the inclusion of all discarded provinces as well as other tourism employment predictors.

As explained above, synthetic Salta was constructed as the convex combination of provinces in the donor pool that best reproduced the values of predictors for tourism employment in Salta in the pre-policy period. Table 1 displays the weights for each donor province in the synthetic Salta. The reported weights indicate that tourism employment in Salta in the pre-policy period is best reproduced by a combination of Jujuy, Santa Fé, Tucumán, Formosa and Neuquén. Intuitively, the results to the counterfactual estimation are reasonable. The algorithm constructed a synthetic Salta composed by a combination of some neighboring provinces with similar development indicators and tourism dynamics (Jujuy, Tucuman and Formosa), and some provinces with a more relevant and high-potential tourism industry (Santa Fe and Neuquén).

Next, the estimated weights are used to obtain the synthetic Salta and compare it with real Salta in pre-treatment characteristics. The results displayed in Table 2 show that synthetic Salta is very similar to real Salta in all covariates used in the estimation. In contrast, the weighted average of all provinces in the country and the provinces in the NOA – region of Salta – do not seem to provide a suitable control group. In fact, the average value of the covariates is rather different between real Salta and these groups of provinces.

Figure 3 displays the tourism employment trajectory for real Salta and its synthetic counterfactual from 1996 to 2013. Tourism employment in the synthetic Salta closely resembles the trend of this variable for real Salta during the entire pre-policy period, especially during the months previous to the beginning of the TDP. This confirms that the combination of provinces in the donor pool can effectively reproduce Salta's characteristics before TDP implementation.

The estimate of the impact of the TDP on tourism employment in Salta is given by the difference between real Salta and its synthetic counterpart after policy implementation, which was considered to be June 2003. From this date onward, the two

lines diverge noticeably. The discrepancy between the two lines suggests a large positive effect of TDP on tourism employment.

Figure 4 plots the yearly gaps in tourism employment between real and synthetic Salta. The magnitude of the estimated impact of TDP is substantial. Over the 2003-2013 period, tourism employment increased by an average 11 percent per year due to the TDP, for an accumulated impact of 112 percent from May '03 baseline level (Figure 5). This means that around 60 percent of the growth in tourism employment in the period 2003-2013 was due to the TDP. Finally, Figure 6 shows that the average impact in annual tourism employment increased during the first years of treatment, followed a relatively constant path between the fourth and seventh years, and decreased in the last years of analysis (2010-2013) until disappearing.

In terms of jobs creation, the magnitude of the impact is approximately 750 new formal jobs generated in the hospitality industry. To compute the total amount of jobs created through the TDP we would use an estimate of the employment multiplier for the hospitality sector in Salta. Although the identification of such multiplier is beyond of the scope of our analysis, on the basis of the last available input-output matrix of Argentina we can conservatively assume a multiplier of around two.[18] This implies that a total of 1,500 new jobs were eventually created through the TDP.

6.1. First alternative synthetic unit: combination of sectors from Salta

So far, the empirical analysis focused on the comparison of tourism employment between Salta and the synthetic Salta constructed on a donor pool of non-treated Argentinean provinces. However, given the dual focus of the evaluated policy – one specific sector in one province – we can construct an alternative synthetic trajectory of the tourism employment in Salta using a combination of other sectors from the same

[18] The last complete input-output matrix for Argentina refers to 1997, INDEC (2001).

Salta province in order to resemble the tourism sector. This exercise allows us to perform a rather innovative robustness test for our main results.

Figure 7 depicts the multiple dimension of the donor pool. This multiple dimension not only allows constructing an alternative synthetic control but also, as will be discussed in section seven, implementing two unit-placebos: provinces and sectors.

The synthetic control was re-constructed as the convex combination of sectors from Salta that best reproduced the values of predictors for tourism employment in Salta in the pre-policy period. In this case, the donor pool includes 48 economic sectors from Salta.[19] Figure 8 and 9 represent the evolution of the employment gap between the real tourism sector and the synthetic tourism sector. This gap corresponds to a TDP's impact of around 10.6 percent per year between 2003 and 2013. This is very similar to the 11 percent effect estimated using a combination of provinces as synthetic control. The resulting synthetic sector is mainly a combination of the following sectors: repair of personal and household goods, other mining and quarrying, activities auxiliary to insurance and pension funding, retail sale of food, beverages and tobacco in specialized stores, maintenance and repair of motor vehicles, and other business activities.

6.2. Second alternative synthetic unit: combination of other sectors from other provinces

As shown in Figure 7, another alternative to construct a synthetic tourism sector for Salta is using other sectors from different provinces as the donor pool. In this case, the number of control units in the donor pool rises considerably (around 900 sector-province units).[20]

[19] We use all 3-digit sectors from Salta that are observed in the entire period of analysis. We do not include the main sectors that could be also affected by the policy under study, i.e. restaurants (552), activities of travel agencies (634), and recreational, cultural, sporting and membership activities (91-92). Our results are robust to the inclusion of discarded sectors.

[20] We do not include other sectors from Salta, and the tourism sector and the main tourism related sectors of other provinces.

Figure 10 and 11 show the evolution of the employment gap between the tourism sector and this second synthetic tourism sector. This gap corresponds to a TDP's impact of around 12 percent per year between 2003 and 2013, for an accumulated impact of 120 percent from May '03 baseline level. This alternative synthetic sector is mainly a combination of sectors from Jujuy (other business activities, maintenance and repair of motor vehicles, real estate activities on a fee or contract basis, wholesale of machinery, equipment and supplies, repair of personal and household goods, other mining and quarrying, and activities auxiliary to insurance and pension funding) and Tucumán (manufacture of wood and of products of wood and cork, except furniture, other mining and quarrying, and activities auxiliary to insurance and pension funding).

Overall, the results obtained using both, other sectors of Salta and other sectors from other provinces as donor pools, reinforce our confidence that the comparison with synthetic Salta is correctly estimating the true TDP's impact.

6.3. Relevance, quality, and sustainability of the TDP impact

Having identified robust positive effects on tourism employment, the question is then whether the TDP actually induced the expected structural change of the Salta's tourism industry. Following Sinclair (1998), we assess the relevance of the TDP's results by looking at the evolution of the tourism employment as share of total employment in Salta relatively to the other Argentinean provinces. Figure 12 shows that between 2002 and 2012 this ratio almost doubled in Salta, raising from around one percent to two percent.[21] The comparison with other provinces confirms that this growth implied a real structural change for Salta. In fact, while in 2002, Salta was the twelfth out of 24 provinces in terms of the tourism share of total employment,[22] ten years later Salta climbed up to the sixth position.

[21] Consistently with the previous analysis we use the hospitality sector to proxy the changes in the tourism industry.
[22] More precisely, 23 provinces plus the Autonomous City of Buenos Aires.

Another key feature of the TDP's design was the intention to act simultaneously on both the supply (with investment in infrastructure and incentives to private investment) and demand (with a strong promotion campaigns) sides of the tourism industry. Although the assessment of the specific mechanisms that led to TDP's effects is beyond the scope of this study, the available evidence seems to confirm that the TDP actually succeeded in mobilizing both demand and supply. On demand side, since 2002 the number of tourism arrivals in Salta sustainably increased (Figure 13). This rise was accompanied by a large increase in the hotel occupancy rate.[23] Figure 14 shows that, for the 2004-2011 period, the occupancy rate in Salta increased around 90 percent with respect to 2004, the best performance in this indicator among other tourist destinations in Argentina. On the supply side, in addition to the significant growth of the labor force, the data also reveal a much sustained increase in the number of establishments offering hospitality services. In particular, Figure 15 clearly shows how after being stagnant at around 60 units for several years, the number of hospitality establishments almost quadrupled since the beginning of the TDP, reaching 240 units in 2013.

Finally, by promoting the sector's efficiency the TDP was designed not only to create jobs, but also higher quality jobs. This aspect can be assessed by analyzing the wages' dynamic in the Salta's tourism industry. From the simple demand-supply interaction, one would expect that the increased demand for tourism services in Salta triggered an increase in wages in the short run, but that this increase would be eventually worn off by mobility of workers across sectors in the medium-long term. This dynamic is confirmed in Figure 16, which shows the evolution of the ratio between the average wage in the tourism sector and the average wage of other sectors in Salta. The average wage ratio sharply increased after 2004 but then decreased gradually to its

[23] The hotel occupancy rate is obtained by dividing the total number of occupied rooms by the total number of available rooms.

previous level. However, the comparison of the average tourism wage in Salta with those of the other Argentinean provinces provide some evidence of an improvement in the quality of tourism related jobs in Salta after TDP implementation. In particular, figure 17 shows that the average wage ratio increased rapidly after TDP implementation and remained quite constant in the rest of the period under analysis.

In conclusion, the results from this analysis and some ancillary evidence confirm that the TDP effectively achieved its main goals. First, the TDP had a clear structural impact on the tourism industry in Salta. Second, the TDP induced this change by producing a significant shift in both demand and supply sides of the tourism industry. Third, the TDP not only affected the relative size of the tourism industry, but also its efficiency. This final result reinforces the positive expectation on the sustainability of the TDP achievements over time.

7. Placebo & Robustness Tests

To confirm that the gap shown in Figure 4 is the true causal effect of the TDP, we need to conduct some inference and provide evidence on the validity of synthetic Salta as a counterfactual. In comparative case studies such as this analysis, large sample inferential techniques are not well suited because of the small sample nature of the data. Then, following Abadie and Gardeazabal (2003) and Abadie et al. (2010, 2014), exact inferential techniques, similar to permutation tests, to conduct inference will be applied. By systematizing the process of estimating the counterfactual of interest, the synthetic control method enables to conduct some placebo experiments known in the literature as "placebo tests" or "falsification tests".[24] In particular, three versions of placebo test will be applied: provinces, sectors, and in-time placebo.

[24] See Angrist and Krueguer (1999) and DiNardo and Pischke (1997) for applications of similar falsification tests.

The idea behind these placebo tests is that the inherent validity of the results obtained would be limited if the SCM also estimates large effects when iteratively applied to non-treated provinces, non-treated economic sectors or to different dates of the intervention. In other words, our confidence in the large impact of the TDP on tourism employment in Salta would be severely undermined if this estimated effect fell inside the distribution of placebo effects or if the in-time placebo test generates impact in the pre-policy period. Using p-values computed under random permutations of the units (or starting date) assigned to treatment, we can compare the placebo effects and the estimates for Salta's tourism employment.

Finally, two additional robustness checks were performed: (i) the dependence of the results on a particular (positive weighted) control unit, and (ii) the choice of V weights. Overall, the purpose of this entire section is to assess whether the gap on tourism employment might be caused by other external factors rather than the TDP. Specifically, the placebo tests and robustness checks that will be discussed in this section were implemented based on our core empirical analysis that uses the comparison between Salta and a synthetic Salta constructed on the basis of the donor pool of other Argentinean provinces.

7.1. Placebo of provinces

As in classical permutation tests, the intervention was reassigned to units that were not exposed to the intervention. That is, we iteratively apply the SCM to every other control province, shifting Salta to the donor pool. Ideally, the estimated effect in real Salta should be larger than the estimated effect for any other province not exposed to the TDP.[25] Figure 18 displays the results for this placebo test. Comparing against the

[25] Since placebo runs with poor fit prior to the policy do not provide information to measure the relative rarity of estimating a large post-policy gap for a province that was well fitted prior to the policy, we exclude provinces that had a pre-policy MSPE of more than twenty times Salta's. Recall that the MSPE measures the magnitude of the gap in tourism employment between each province and its synthetic counterpart.

distribution of gaps for the 14 remaining untreated provinces, the gap between Salta and the synthetic Salta, appears highly unusual. In fact, the positive effect in Salta is by far the largest of all.

In this context, *p-values* can be constructed by computing the proportion of estimated placebo gaps that are greater or equal to the estimated gap for Salta. Formally,

$$p - value = \Pr(\hat{\tau}^{PL} > \hat{\tau}_S) = \frac{1}{J+1}\sum_{i=1}^{J+1} I(\,\hat{\tau}_{i,T}^{PL} \geq \hat{\tau}_{S,T}\,) \qquad (8)$$

where $\hat{\tau}_{i,T}^{PL}$ is the estimated gap for the last post-treatment period T when province i is assigned to placebo treatment at the same time as Salta. In our case, given that we use 12 provinces plus Salta, the probability of obtaining a greater or equal effect to the one estimated for Salta is $1/13 \cong 0.076$.

In order to obviate choosing a cut-off for the exclusion of ill-fitting placebo runs, we look at the distribution of the ratios of post/pre-policy MSPE. A large post-policy MSPE is not indicative of a large effect if the estimated counterfactual does not closely reproduce employment in tourism prior to the policy. Figure 19 reports the distribution of post/pre-policy ratios of MSPE for Salta and 19 provinces. Salta clearly stands out as the province with the highest MSPE ratio. For Salta the post-policy gap is almost 600 times larger than the pre-policy gap. Because this test includes 20 provinces, if one were to assign the policy at random in our data, the probability of obtaining a post/pre-policy ratio as large as Salta's is $1/20 \cong 0.05$.[26]

7.2. Placebo of sectors

In this second test we assign the intervention to different economic sectors, within the province of Salta, not directly exposed to the TDP. The SCM was iteratively applied to

[26] Both test levels obtained are similar to the levels typically used in conventional tests of statistical significance.

every other sector using our donor pool of provinces to construct the synthetic counterpart. Ideally, the estimated effect for Salta's tourism sector should be larger relative to the effect estimated for a sector not directly exposed to the intervention.[27] The idea is to discard the hypothesis that the growth in tourism employment in Salta is a result of an overall employment growth. If this hypothesis was true, then we should find similar gaps for other sectors. Figure 20 displays the results for this placebo test for the tourism and 36 untreated sectors.[28] The gap for the tourism sector appears highly unusual. In fact, the probability of obtaining a greater or equal effect to the one estimated for the tourism sector is $1/37 = 0.027$.[29]

7.3. In-time placebo

Another way to conduct a placebo test is to randomly reassign the time when the intervention took place (Heckman and Hotz, 1989; Bertrand et al., 2004). Ideally, no impacts will be found in the pre-treatment period. To construct p-values and given that the frequency of our outcome variable is monthly we can choose, for instance, a 24-months window after a placebo starting date to compare the estimated gaps. Figure 21 displays the results of applying SCM using a set of pre-treatment dates (i.e. our placebo dates). We find no evidence of diverging trends between Salta and the synthetic Salta in a two-year window of placebo months. We actually find consistent evidence that the synthetic Salta predicts very well the trends of tourism employment for Salta's over the entire pre-treatment period (Jan '96-May '03). This result is maintained despite the lower pre-treatment information on predictors SCM uses to predict.

Because the TDP started in June '03, to conduct inference we can then use each one of the 87 pre-treatment months as placebo dates of the beginning of the policy and

[27] We use all 3-digit sectors that are observed for all control provinces in the entire period of analysis.
[28] We exclude sectors that had a pre-policy MSPE of more than twenty times tourism sector's.
[29] We use a similar version of Equation 8.

iteratively apply the SCM to Salta.[30] Figure 22 reports the gaps using all pre-treatment months considered plus June '03. The darkest gaps correspond to placebo estimates computed using a starting date closer to the actual one. The lightest gaps, that use few years of pre-treatment information, slightly overestimate the impact while the gaps that uses information near the 2001 crisis as last period of information tend to underestimate the impact of the TDP. Nevertheless, in all the cases the synthetic Salta fits well to real Salta in the actual pre-treatment period, generating no gap in this timespan. Furthermore, the estimated gaps after June '03 are similar to the gap estimated using the actual starting date of the TDP. If a month is chosen randomly, the probability of obtaining, after two years of a placebo starting date of the TDP, a greater or equal effect to the one estimated using the month when the policy actually started is $1/88 \cong 0.011$.

7.4. Leave-out test

As shown in Table 1, the synthetic Salta is estimated as weighted average of Jujuy, Santa Fé, Tucumán, Formosa and Neuquén. In this test, we iteratively apply the SCM to Salta omitting in each iteration, one of these provinces that received a positive weight. This exercise is then extended to rest of the provinces in the donor pool.

The idea of this sensitivity test is to evaluate to which extent our results are driven by any particular province. For instance, the province of Jujuy has the highest weight and could have received negative (positive) spillovers from the TDP. Although the placebo test that randomly reassigns the intervention to other non-treated provinces found no other placebo-impact of the magnitude of Salta's, if the synthetic unit strongly depends on a province that can be negatively (positively) affected by the policy we can be overestimating (underestimating) the impact of the TDP.

[30] We do not use the first two months (January-February, 1996) as placebo months because we need at least two pre-treatment periods to apply the SCM.

Figure 23 displays the results of this "leave-out" test. This figure shows that results are robust to the exclusion of any particular positive (dark grey) and non-positive (light grey) weighted province from our donor pool.

7.5. Cross-validation procedure to choose V weights

As a final test, we check the sensitivity of the results to the V weights. To do this we divide the pre-treatment period originally used to identify the V^* matrix of weights into an initial training period and a subsequent validation period. Then, using predictor data in the training period, the V weights were chosen to minimize the MSPE of the outcome variable in the validation period. Finally, with these latter V weights and the predictors observed in the validation period we estimate a synthetic Salta.[31] This cross-validation procedure allows us to test the robustness of the estimated gap to different choices of V weights while testing how well the synthetic control fits Salta over different validation periods.

Figure 24 shows an example of the first stage of this procedure. Using the first half of the pre-treatment period we obtain the V weights and construct a synthetic control that minimizes the MSPE in the second half, the validation period. As shown in this figure, the synthetic control provides good fit for employment trends in tourism in the validation period. Figure 25 displays the employment trends in tourism for Salta and several versions of synthetic Salta that results from 15 different partitions of the pre-treatment period. As shown in this figure, this cross-validation procedure to choose V weights produces results that are almost identical to the results obtained in Section 6. The darker lines correspond to estimates using a longer training period.

[31] This cross-validation procedure is applied by Abadie et al. (2014).

8. Final remarks

Much has been said about the relevance of the tourism industry for economic growth. Particularly for developing countries, tourism's ability to generate skill and unskilled employment has often been cited as one of its most desirable features. At the same time, a widespread consensus on the role of tourism policy as a tool for economic development has emerged among policy makers. Notwithstanding all this enthusiasm, to this date very few studies have tackled the question about the effectiveness of tourism policies using a rigorous causal analysis.

This study represents the first attempt to rigorously estimate the impact of a large scale tourism development policy. Applying a SCM to the case of Salta in Argentina, we estimate both short- and long-run effects on tourism employment. The results show an average annual impact of 11 percent over the period from 2003-2013. This corresponds to an accumulated impact of approximately 112 percent since the baseline date in May 2003. Specifically, higher impacts of the TDP occurred between the second and seventh years after the policy implementation. Afterwards, over the last years of observation, the impacts decreased until disappearing. These findings are robust across a series of placebo studies and sensitivity checks.

These results and some ancillary evidence confirm that the TDP effectively achieved its goals. The TDP had a clear structural impact on the tourism industry in Salta by producing a significant shift in both demand and supply sides of the tourism industry. In addition, our findings show that TDP affected not only the relative size of the tourism industry, but most likely also its efficiency and, therefore, the likelihood that the structural shift will be sustainable over time.

This study is also the first application of the SCM that can count on multiple synthetic controls for the same treatment case. Taking advantage of the dual focus of the evaluated policy (one specific sector in one province), we developed a synthetic

control province within the same sector, a synthetic control sector within the same province, and a synthetic control sector combining other sectors from different provinces. The consistent and robust results obtained using the multiple synthetic comparators allow us to conclude, with greater certainty, that these findings reflect the true impact of the policy. This novel approach of multiple synthetic controls has the potential to be applied for the evaluation of a variety of productive policy instruments with dual focus (location and industry) such as Cluster Development Programs.

Data Appendix

Source I: Observatory of Employment and Entrepreneurial Dynamics (OEDE) at Ministry of Labor, Employment, and Social Security in Argentina, 1996-2013 (province – 3-digit SIC sector level).

- Employment: number of formal employees. Frequency: Monthly.
- Number of firms. Frequency: Monthly.
- Average wage: ratio of the sum of monthly wages of formal employees to number of formal employees. Frequency: Monthly.
- Average size of firms: ratio of number of formal employees to number of firms. Frequency: Monthly.
- Average age of firms. Frequency: Annual.

Source II: Argentina National Population, Households, and Dwelling Census, 2001 (province level).

- Log of population: logarithm of total population aged 14 and older.
- University level: share of population aged 20 and older with university level completed in the total population.
- Road paving: share of households with access to at least one paved road in the census area in the total households.
- Public lighting: share of households with access to public lighting in the census area in the total households.

Source III: Ministry of the Interior and Transportation, 1993-1998 (province – 3-digit SIC sector level).

- Gross Domestic Product (GDP). Frequency: Annual.

Source IV: Permanent Household Survey, National Statistical and Census Institute, 2003 (province level).

- Informality rate: share of employees aged 18 and older without pension contributions.

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FIGURES & TABLES

Figure 1. Political map of Argentina

Figure 2. Trends in tourism employment: Salta vs. rest of Provinces

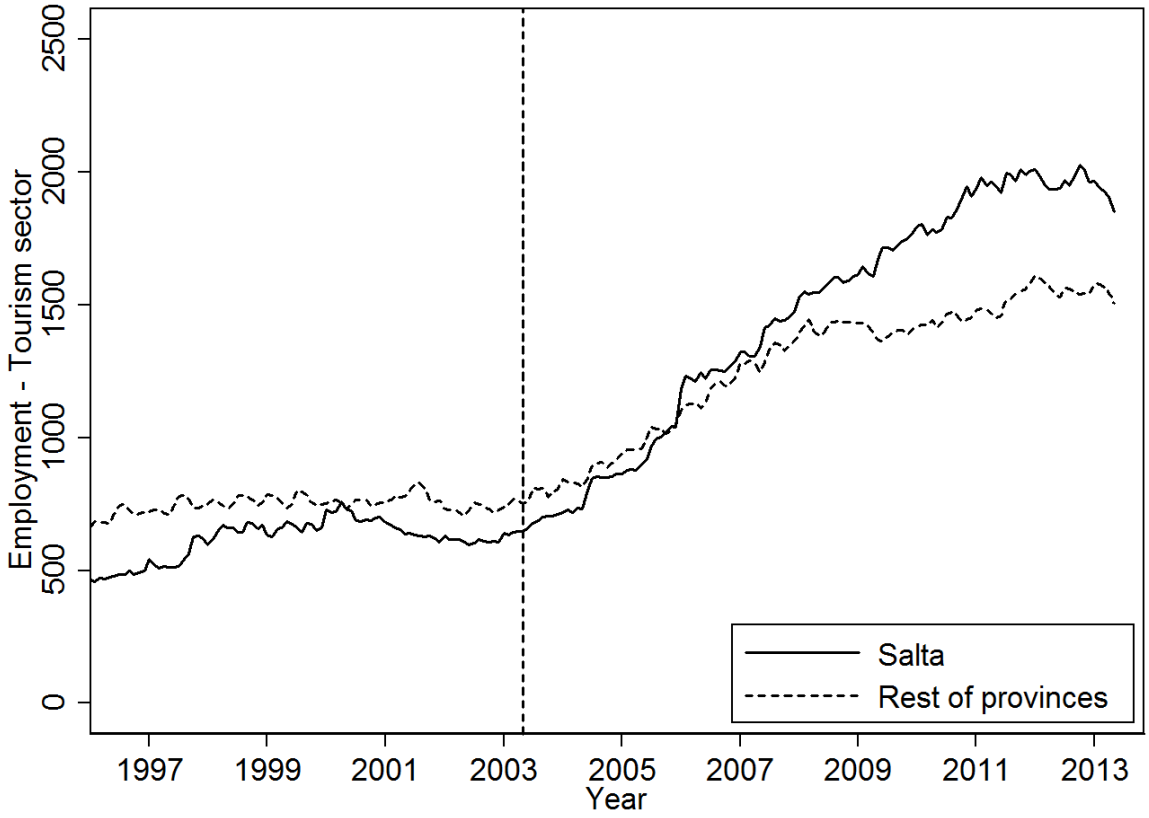


Table 1. Province weights in the synthetic Salta

Province	Weights
Buenos Aires	-
Autonomous City of Buenos Aires	-
Catamarca	0
Córdoba	-
Corrientes	0
Chaco	0
Chubut	0
Entre Ríos	0
Formosa	0.114
Jujuy	0.393
La Pampa	0
La Rioja	0
Mendoza	0
Misiones	0
Neuquén	0.064
Río Negro	-
San Juan	0
San Luis	0
Santa Cruz	0
Santa Fé	0.222
Santiago del Estero	0
Tucumán	0.207
Tierra del Fuego	0

Table 2. Employment predictor means before treatment

	Salta		Average of rest of	
	Real	Synthetic	Provinces	NOA
Tourism sector level				
Employment	617	615	750	459
Number of firms	77	75	93	46
Average Wage	510	512	557	515
Average size of firms	8	8	8	10
Average age of firms	7	8	8	7
Log of GDP	17	17	17	17
Province level				
Log of Employment	11	11	12	11
Log of Number of firms	9	9	9	8
Average Wage	608	645	664	619
Average size of firms	11	11	9	11
Average age of firms	12	12	12	13
Log of GDP	22	22	23	22
Informality	0.52	0.49	0.46	0.52
Log of Population	13	13	14	13
University level	0.02	0.02	0.02	0.02
Road paving	0.52	0.54	0.59	0.49
Public lighting	0.85	0.85	0.84	0.82

Note: Employment, number of firms, average wage, average size of firms, and average age of firms are averaged for the January1996-May2003 period (for both the tourism sector and province level). GDP is averaged for the 1993-1998 period. Informality is measured in 2002-2003, and population, university level, road paving and public lighting are measured in 2001.

Figure 3. Trends in tourism employment: Salta vs. synthetic Salta

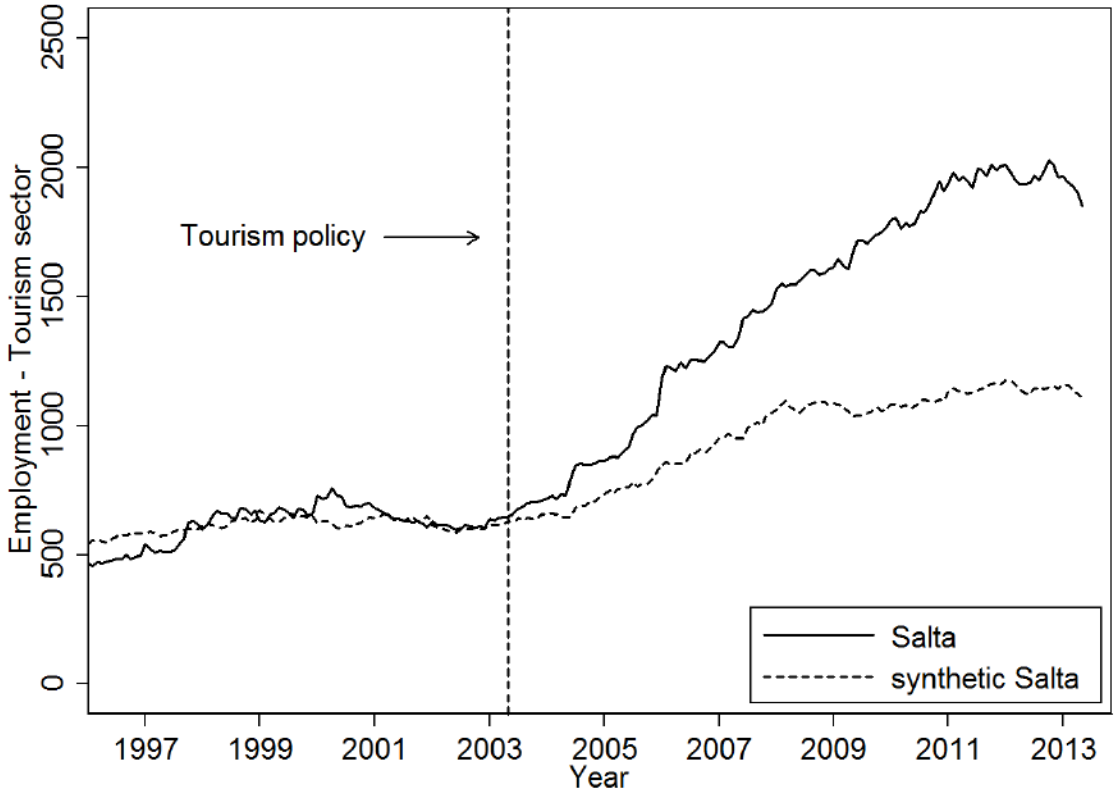


Figure 4. Tourism employment gap between Salta and synthetic Salta

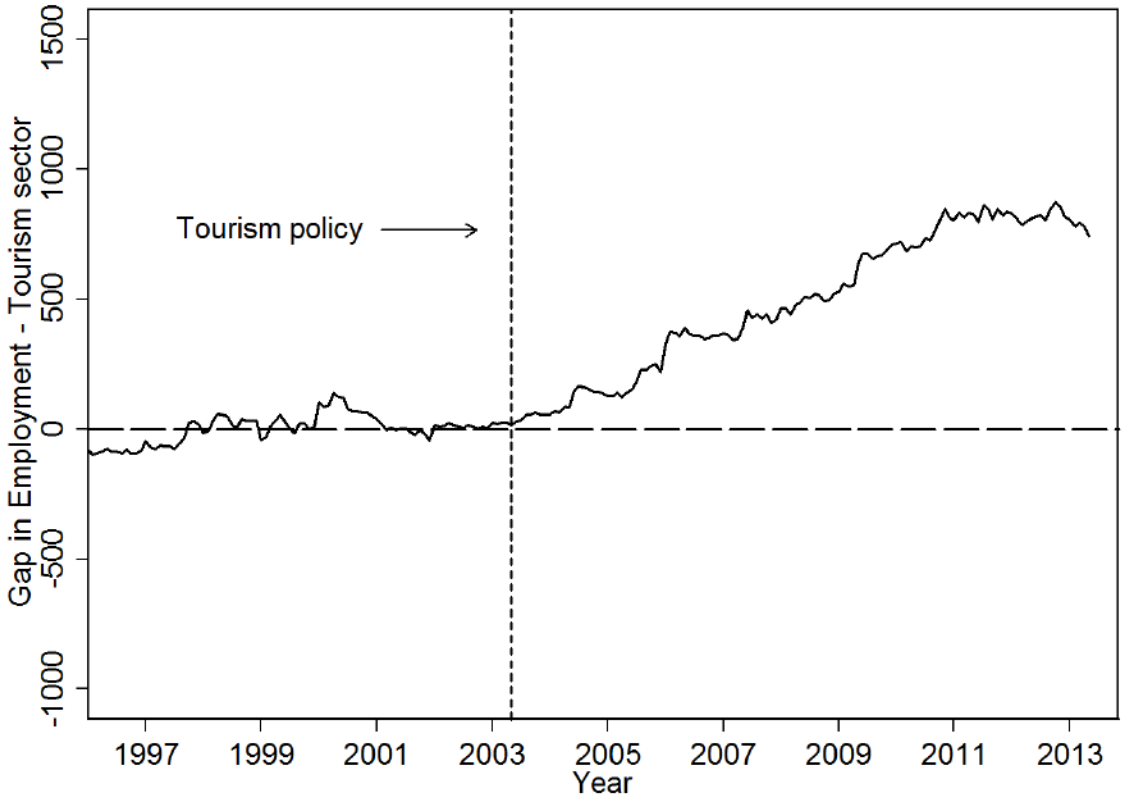


Figure 5. Accumulated impact on tourism employment by month

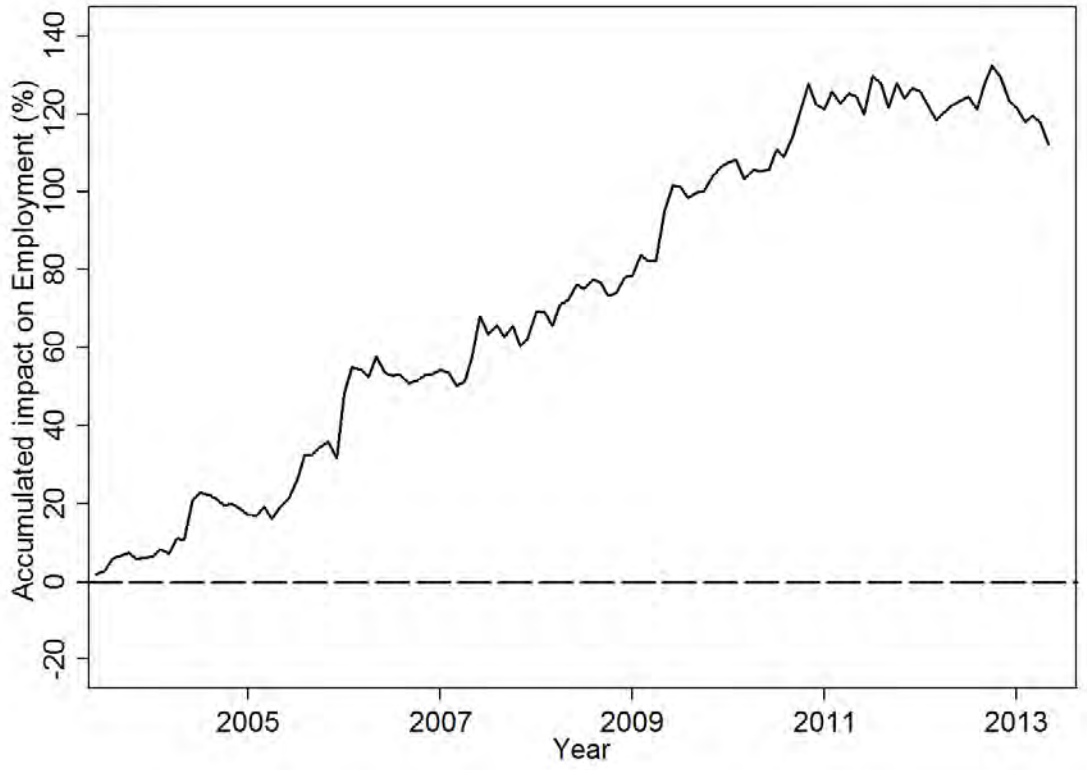


Figure 6. Average impact on tourism employment by year

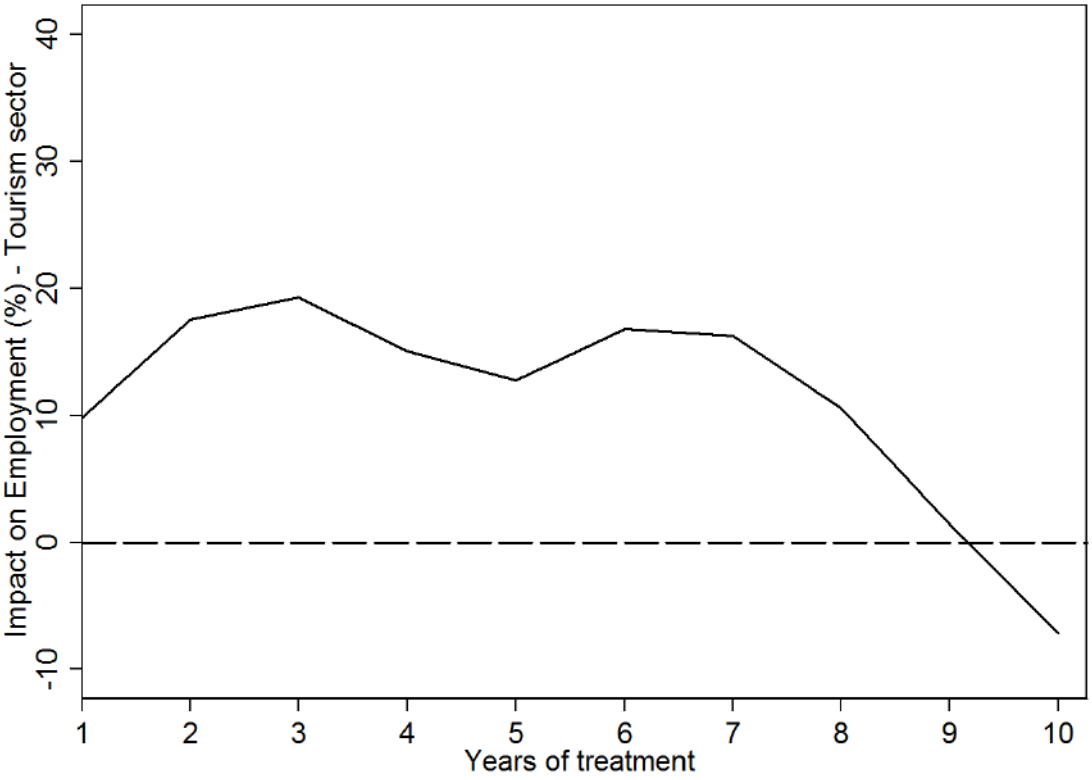


Figure 7. Multiple synthetic control approach

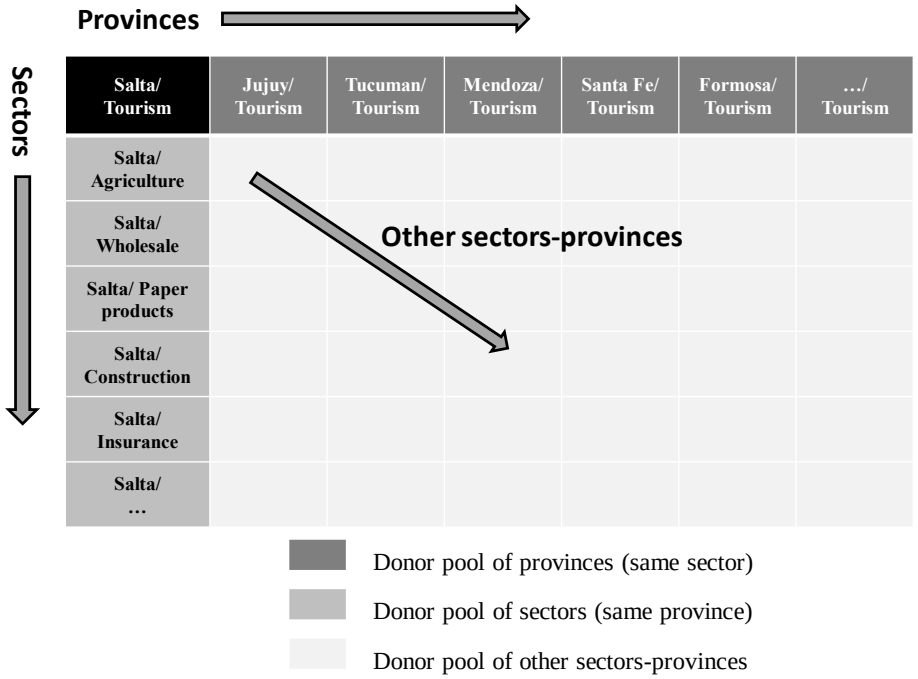


Figure 8. Trends in employment in Salta: tourism sector vs. synthetic tourism sector – donor pool of sectors (same province) –

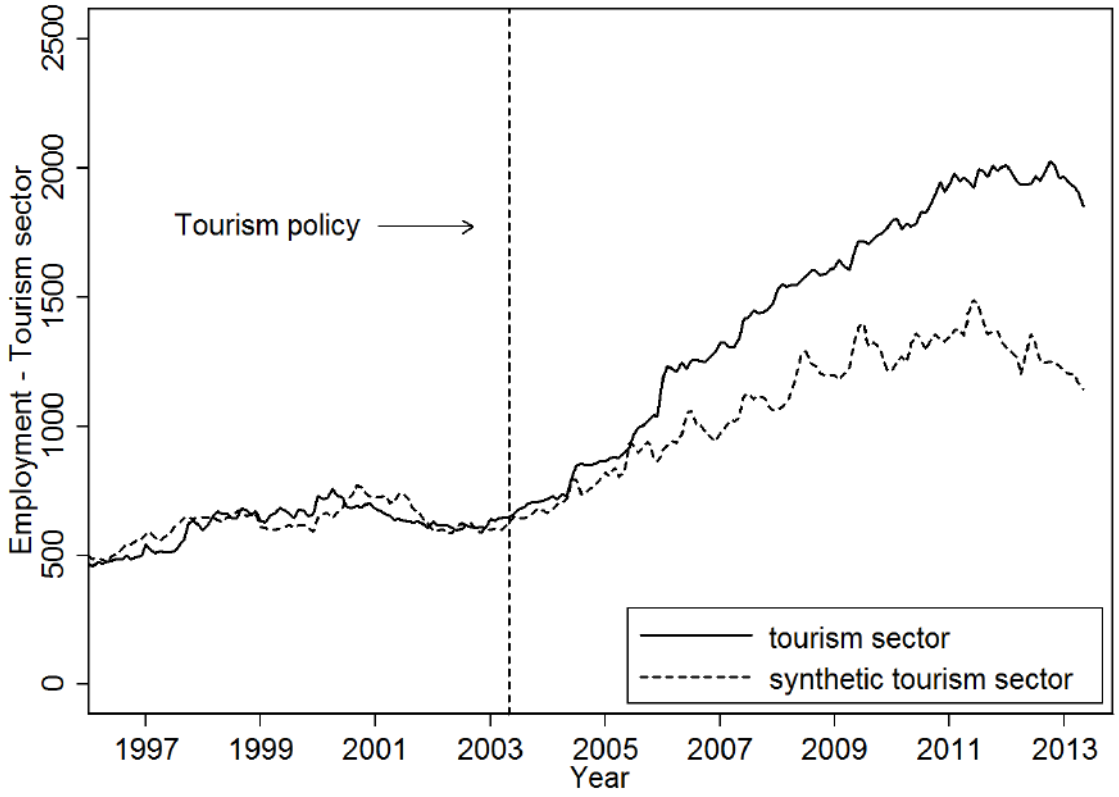


Figure 9. Employment gap in Salta: tourism sector vs. synthetic tourism sector

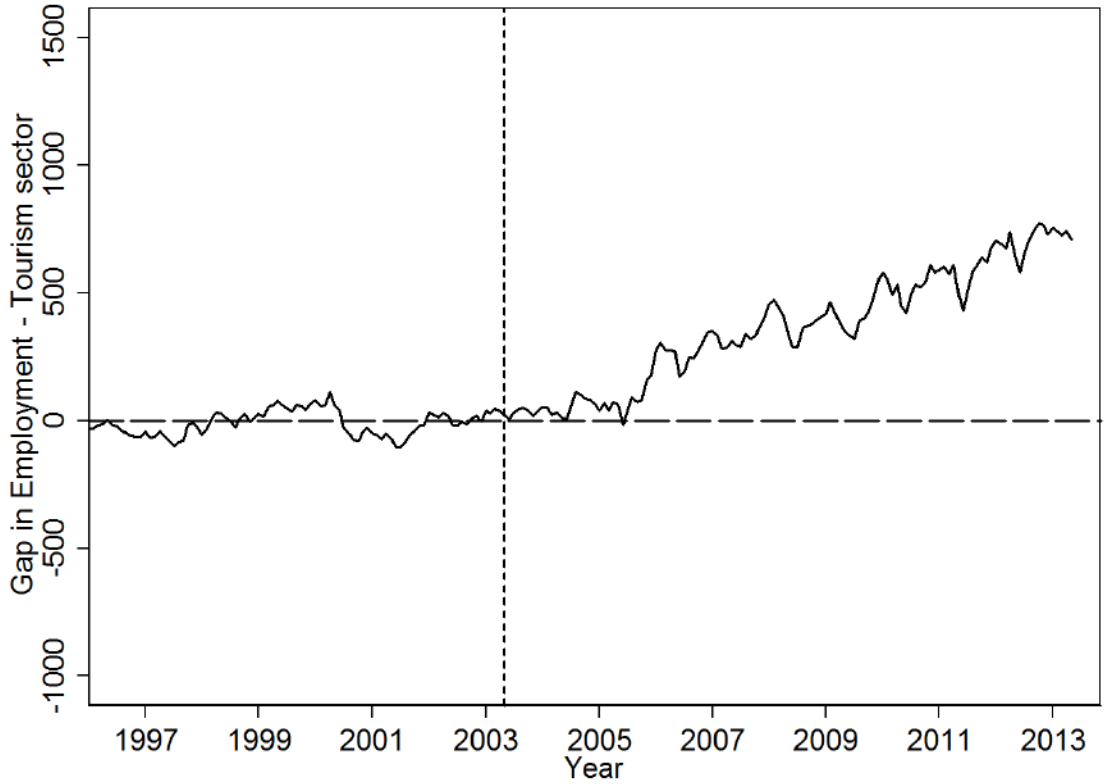


Figure 10. Trends in employment in Salta: tourism sector vs. synthetic tourism sector – donor pool of other sectors-provinces –

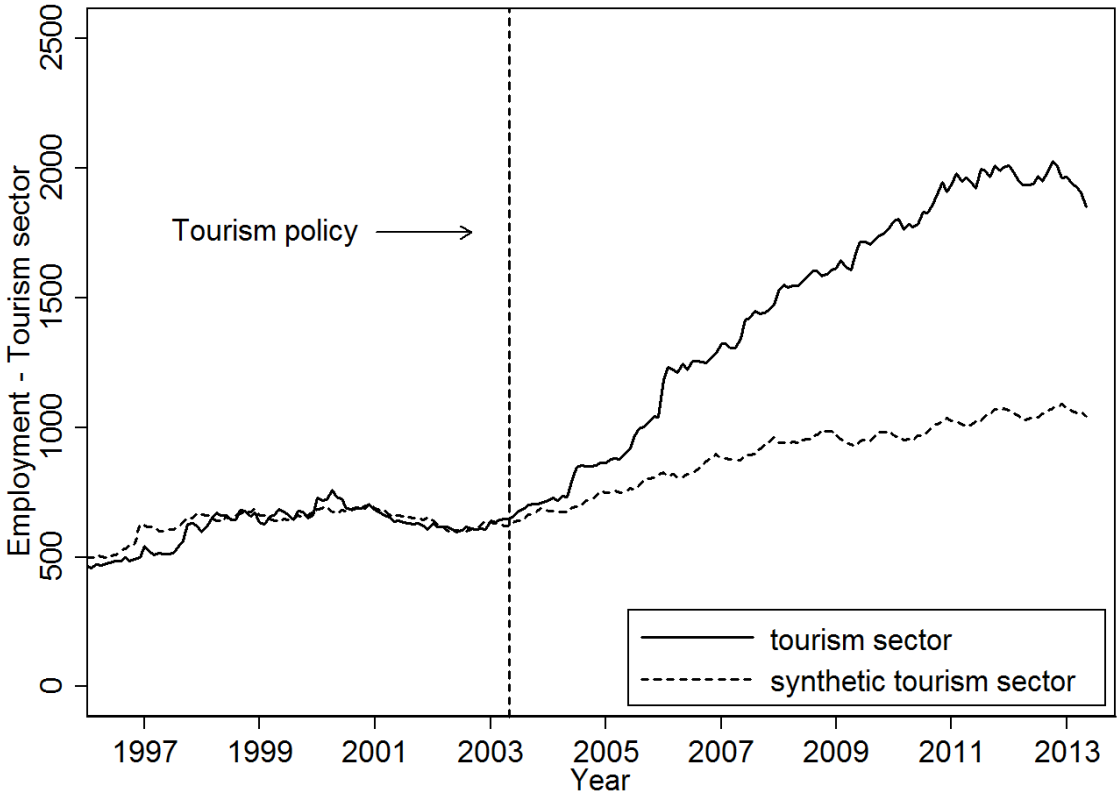


Figure 11. Employment gap in Salta: tourism sector vs. synthetic tourism sector

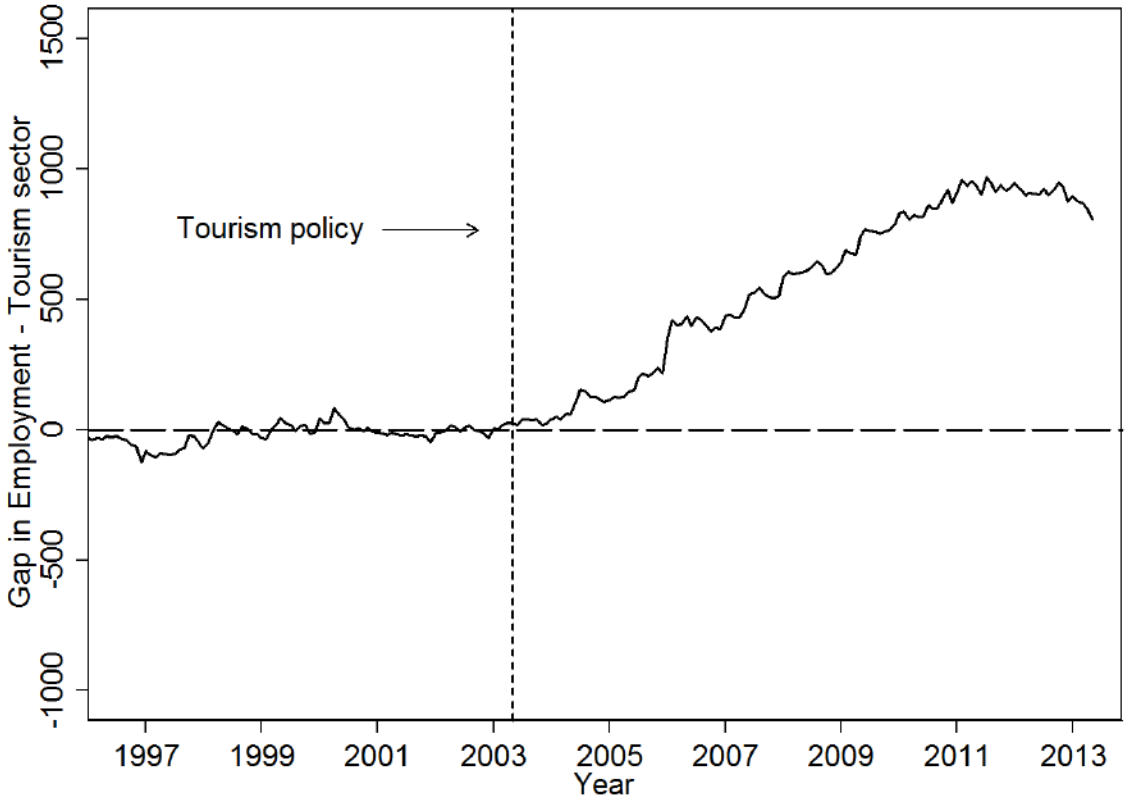


Figure 12. Share of tourism employment in total employment

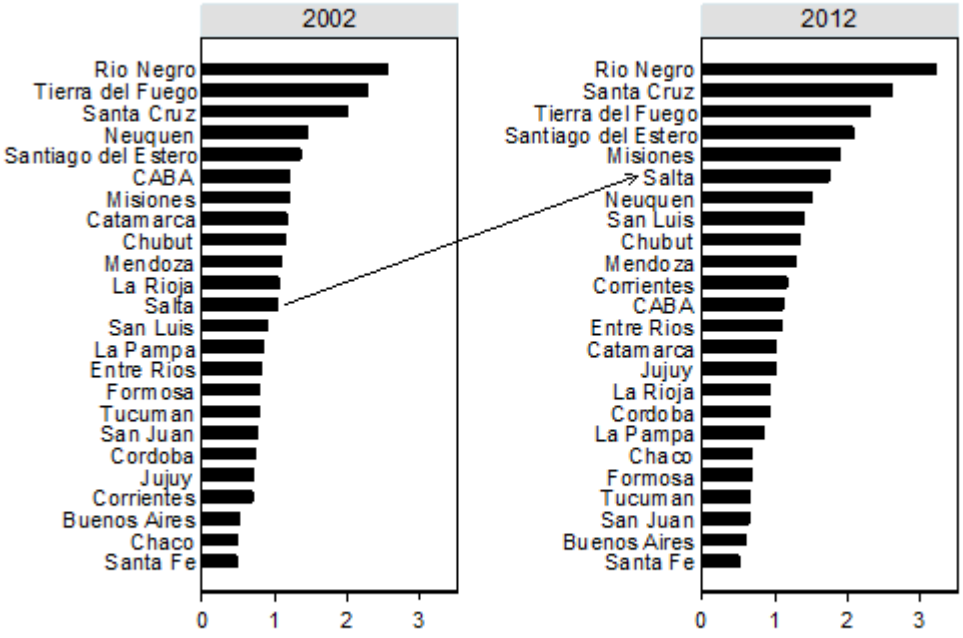
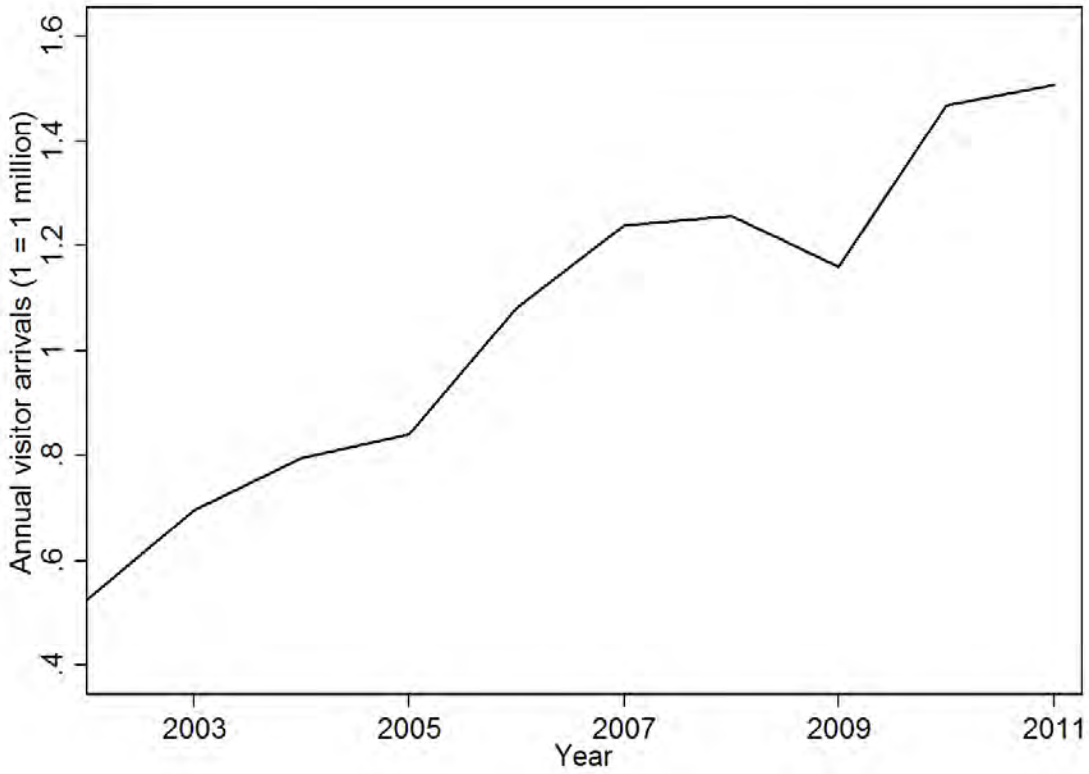
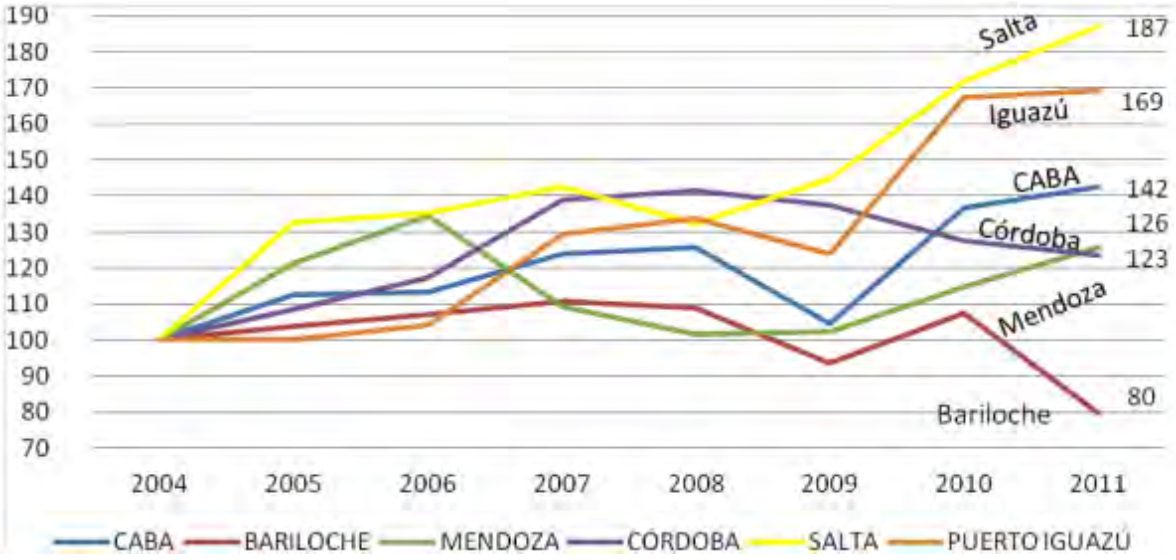


Figure 13. Annual visitor arrivals in Salta



Source: Ministry of Culture and Tourism of the province of Salta.

Figure 14. Hotel occupancy index (2004 = 100) - Main tourist destinations in Argentina



Source: "IERAL-Fundación Mediterránea" based on the Hotel Occupancy Survey (INDEC)

Figure 15. Number of firms in tourism in Salta

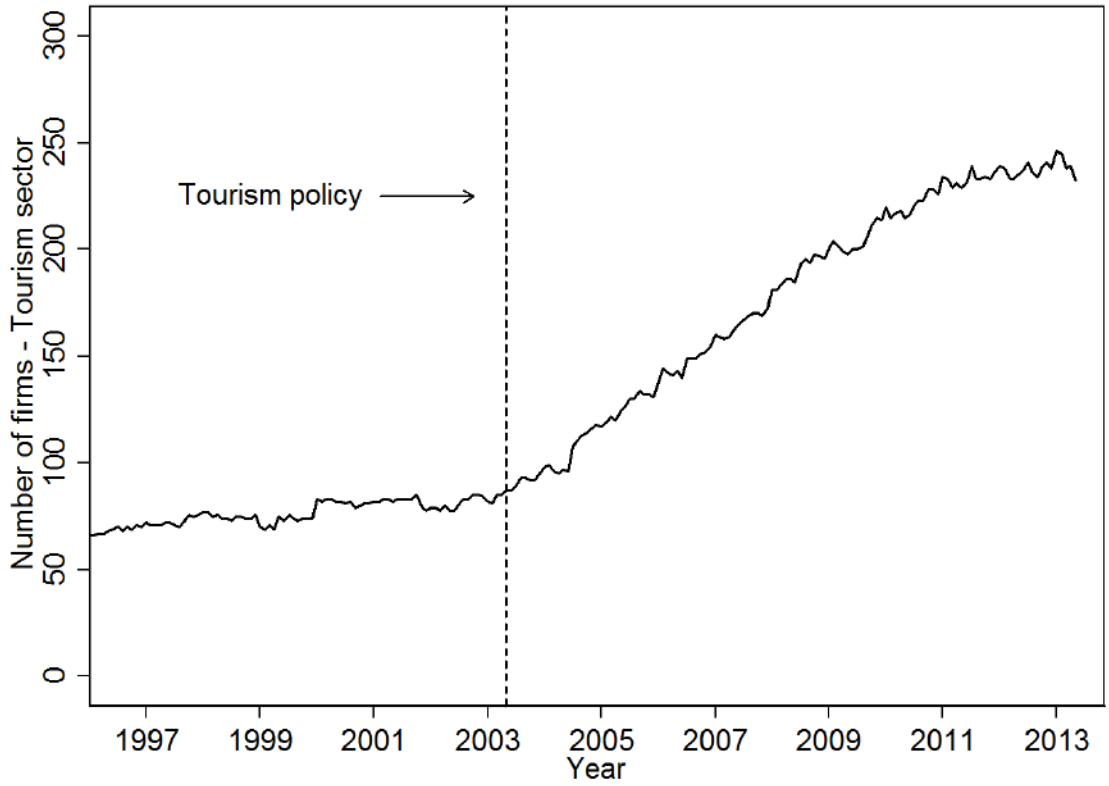


Figure 16. Ratio of average wage in tourism sector and rest of sectors in Salta

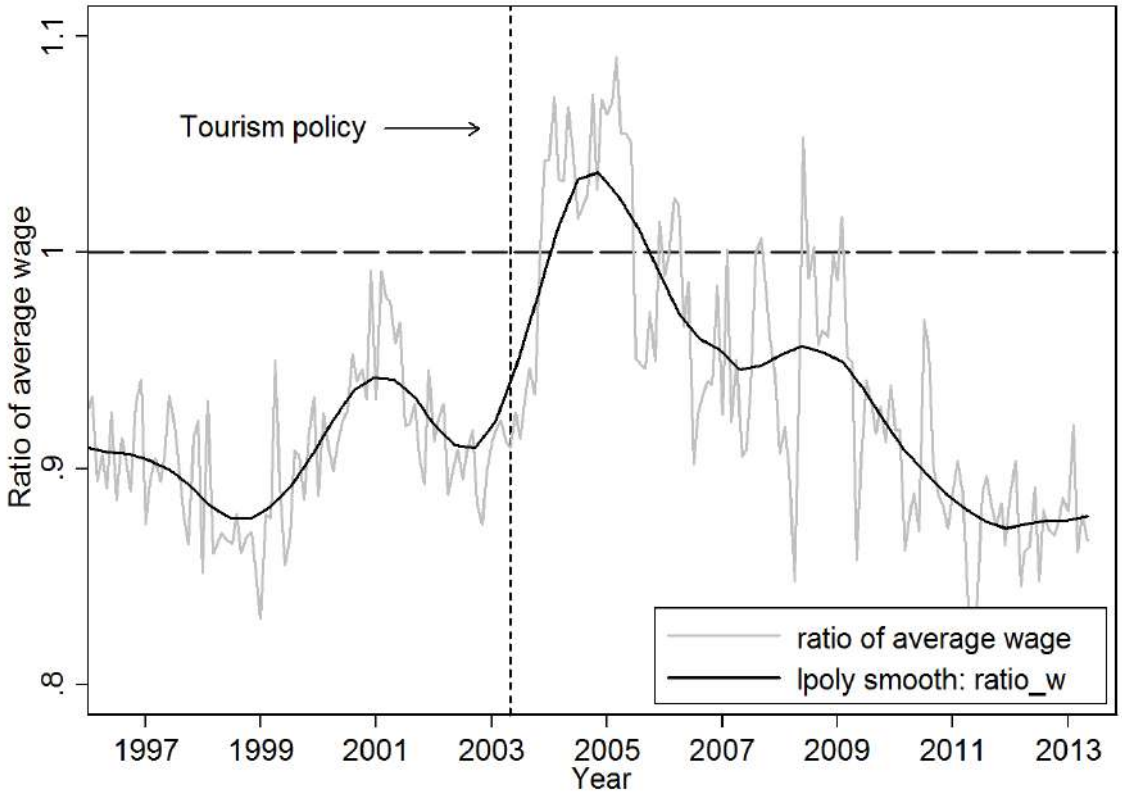


Figure 17. Ratio of average wage in tourism sector in Salta and rest of provinces

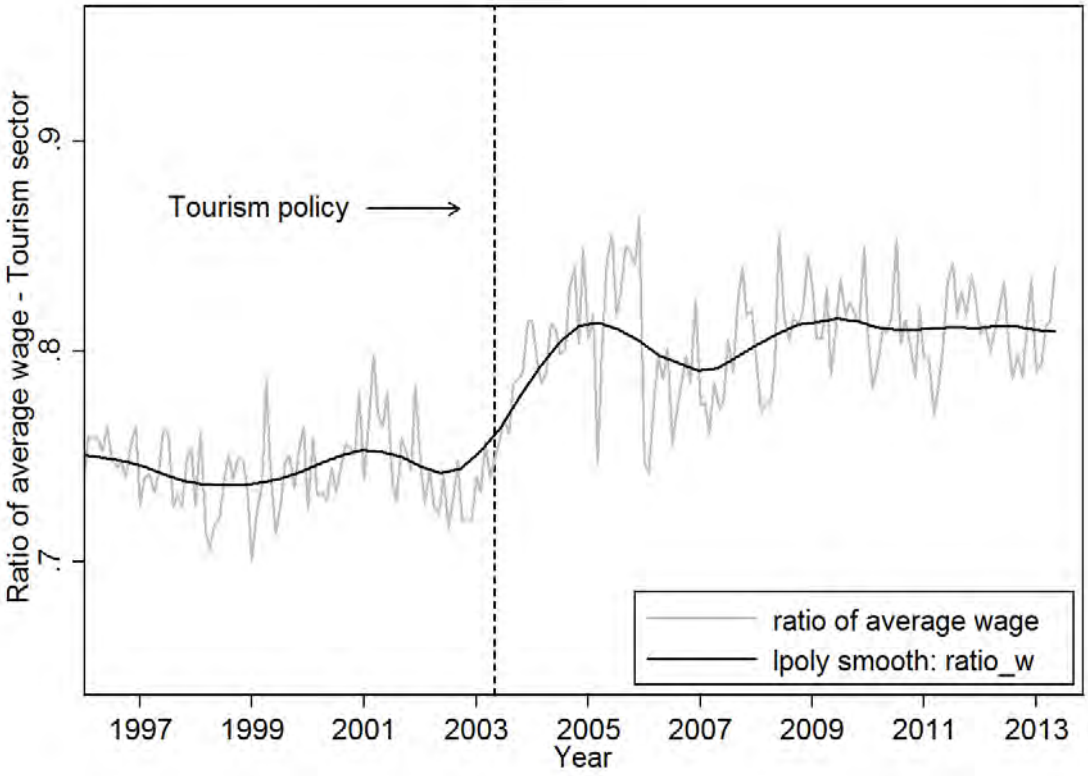


Figure 18. Tourism employment gap in Salta and placebo gaps
(discards provinces with pre-policy MSPE twenty times higher than Salta's)

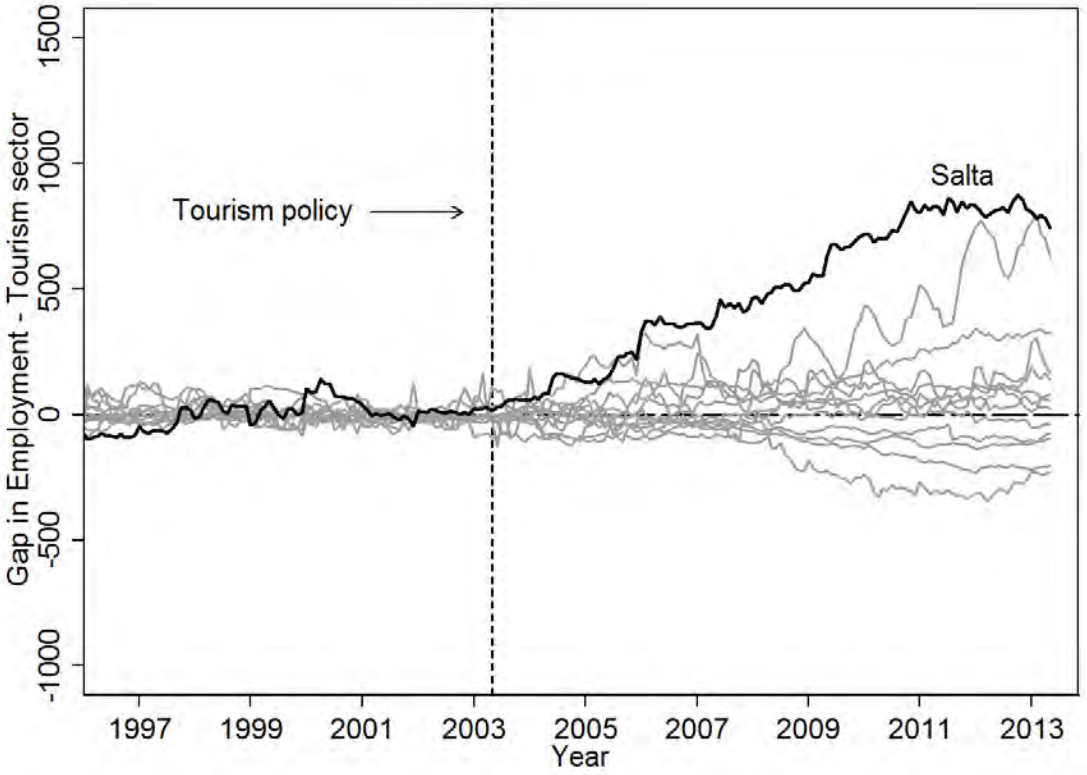


Figure 19. Ratio of post-policy MSPE and pre-policy MSPE: Salta and 19 provinces

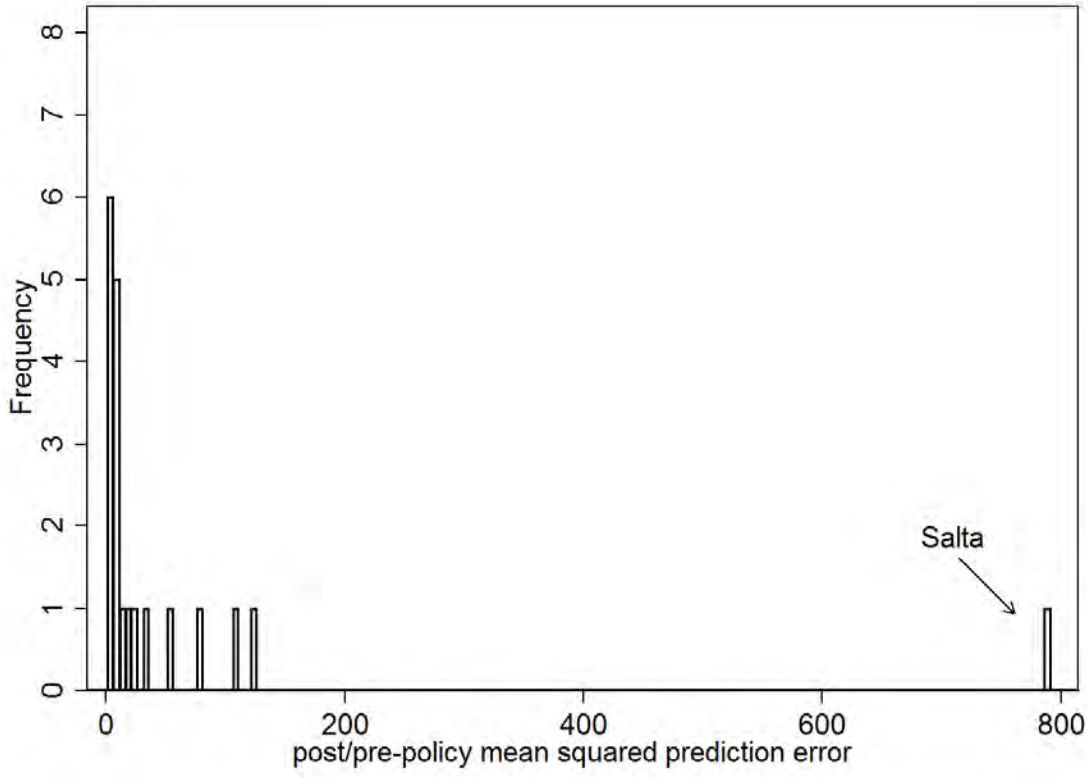


Figure 20. Employment gap in Tourism sector and placebo gaps in 36 sectors in Salta
(discards sectors with pre-policy MSPE twenty times higher than Tourism sector)

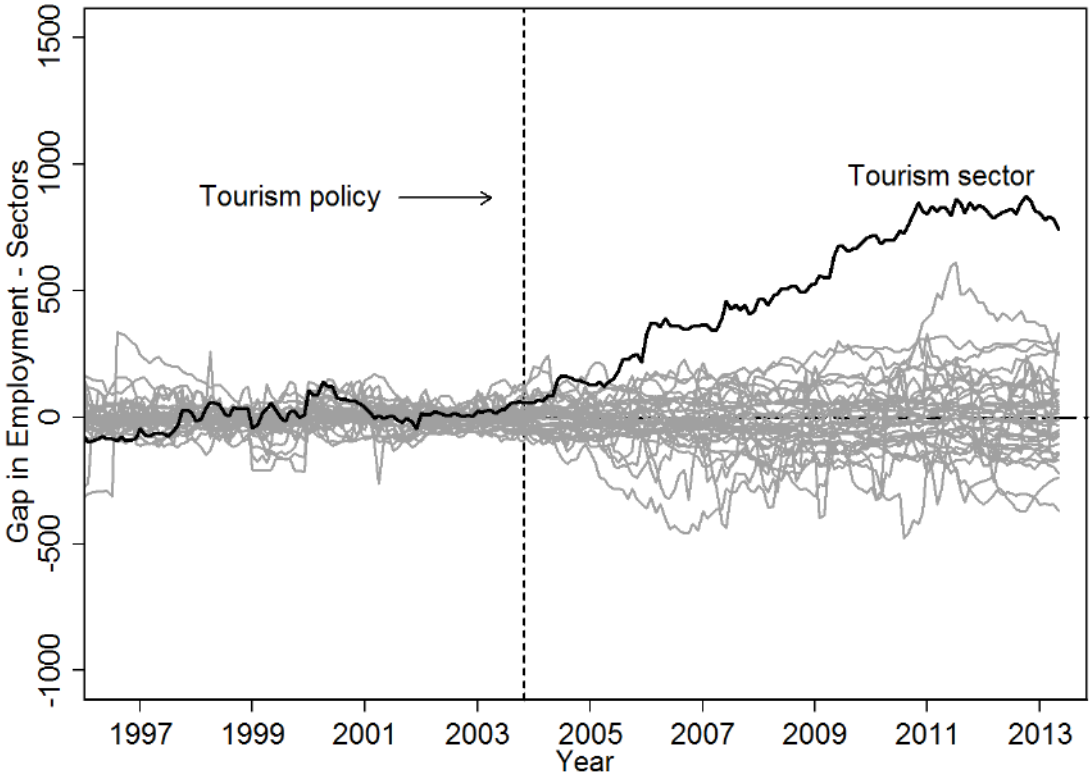


Figure 21. Trends in tourism employment: Salta vs. synthetic Salta
(placebo starting dates: June-2002/2001/2000/1999/1998/1997/1996)

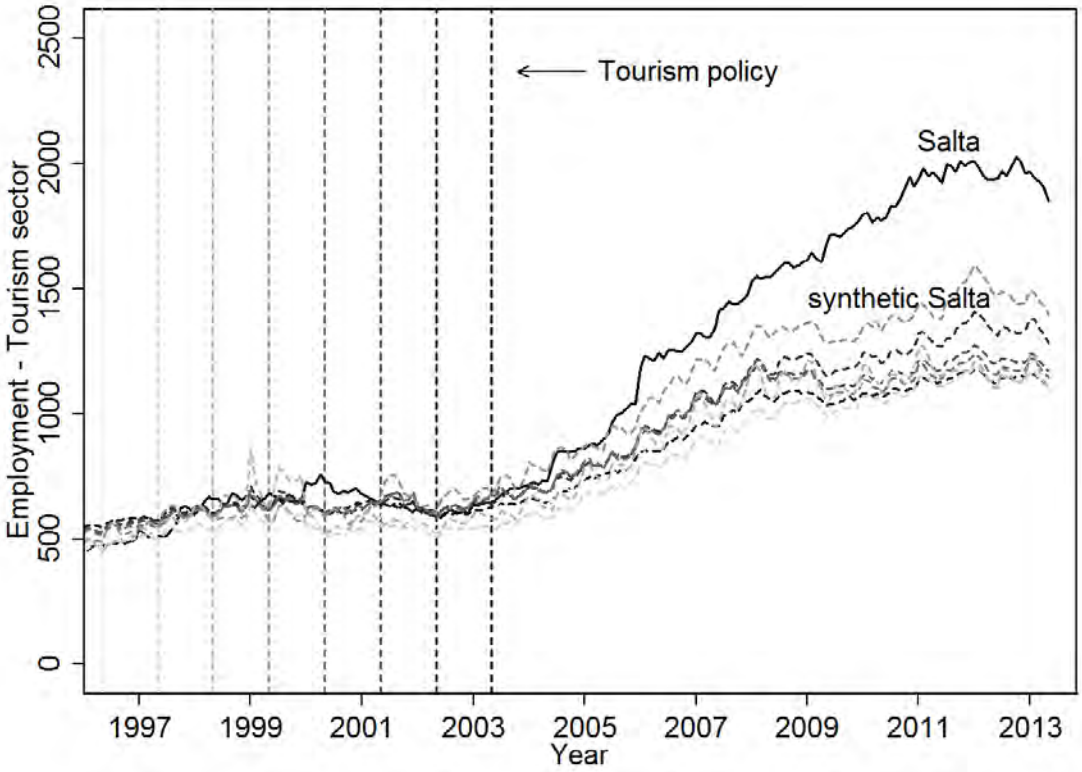


Figure 22. Tourism employment gap between Salta and 87 synthetic Salta placebos

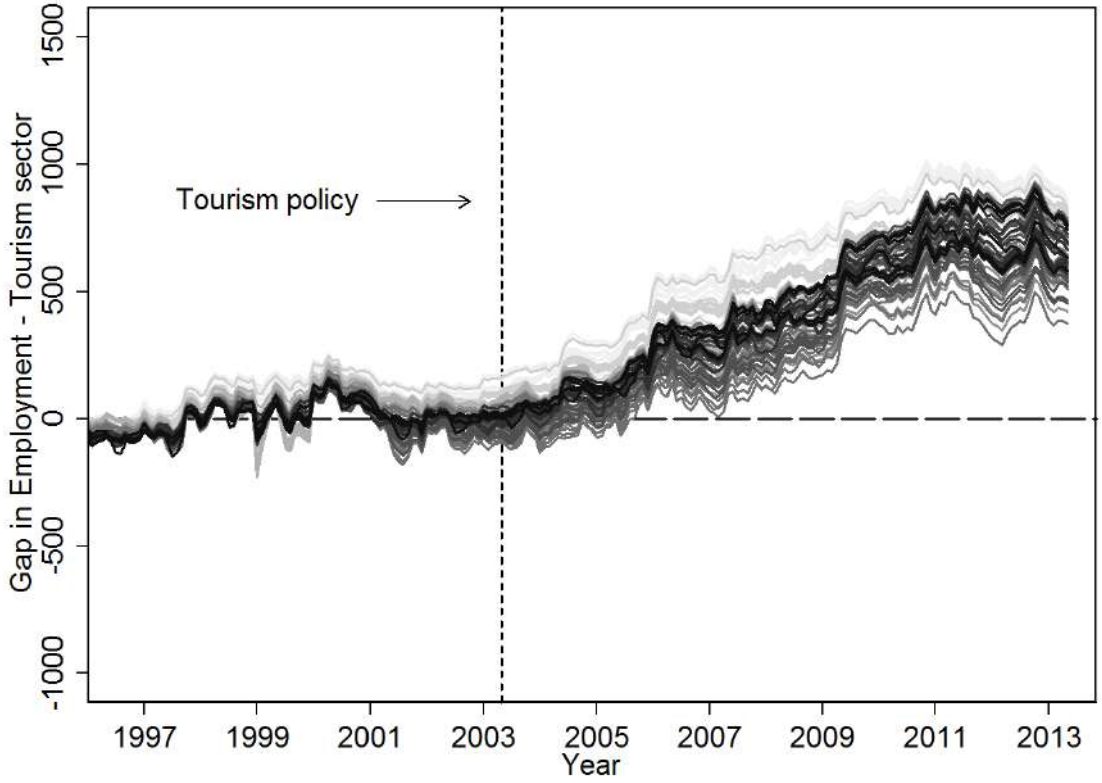


Figure 23. Leave-one-out distribution of the synthetic control for Salta

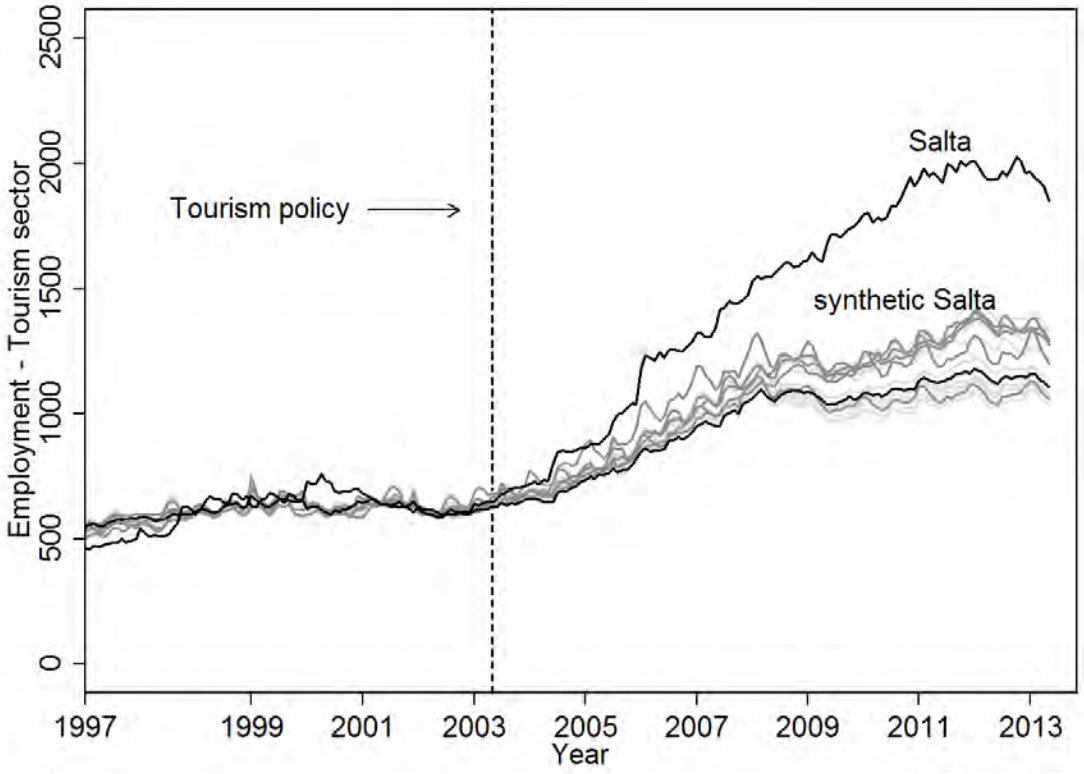


Figure 24. Trends in tourism employment: training and validity period (pre-treatment period)

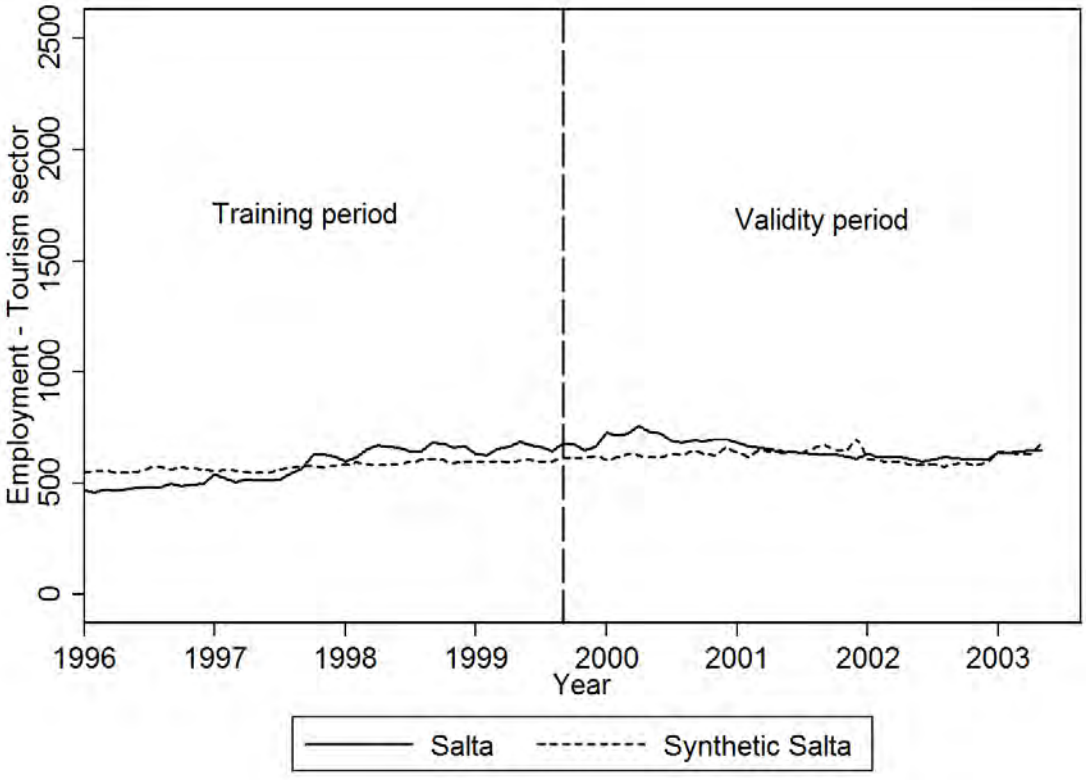


Figure 25. Trends in tourism employment using cross-validation weights for predictors