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Research Notes and Reports

Evaluating museum free admission policy

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This paper aims to evaluate the causal effect of free admission policy of public museums on the number of visits. Free charge of public museum is a topic that has been debated for a long time. The nature of museum has been recognized as an educational institution since the early nineteenth century (Hooper-Greenhill, 1991). Based on the view of educational function, public museums are suggested to be funded by central government, and politicians take museum free admission policy as one of the principal cultural policy achievements. National museums and galleries in England sponsored by Department for Culture, Media and Sport (DCMS) introduced free admission policy since December 2001. Compared to the period before 2001, visits increased by 158% in 2011 (DCMS, 2015). Being inspired in part by the free admission policy in England, visitors can enjoy 17 museums and galleries in Paris free of charge in the first half of 2008. According to the tourism report published by Office of Tourism and Congress of Paris, nine of the top visitor sites in 2009 are free museums.

The issue of charging by museum is a source of political debate, however, the academic studies on the effect of charging or not charging are relative absent. Bailey and Falconer (1998) mentioned that many concerns should be taken into account when deciding whether public museums should charge. Maddison and Foster (2003) argued that museum free admission policy would lead to a certain level of cost of congestion, and the benefit of the increase in visits is hard to evaluate. Cowell (2007) used the data from DCMS and found that total number of museum visits is growing year by year from 2001 to 2004. Cowell (2007) also suggested that the future study on the impact of museum free admission policy needs to evaluate "the likely number of additional visits which is ascribed directly to free admission". This paper, motivated by Cowell (2007)'s suggestion, uses the data of museums in Taiwan from 2004 to 2011, and employs the difference-in-difference (DID) methodology (Abadie, 2005) to evaluate the changes in the number of museum visits causally induced by the free admission policy. The finding in this study could be expected to add to the literature of museum admission policy.

Our panel data of museum attendance is obtained from "Visitors to the Principal Scenic Spots in Taiwan 2004–2011" which is published by the Taiwan Tourism Bureau. Fig. 1 plots the monthly average number of museum visits in Taipei City and New Taipei City over the sample period. As Fig. 1 shows, the curve of museums in Taipei City and private museums lies mostly above the curve of public museums in New Taipei City before 2010. After the implementation of public museum free admission policy, the difference between both curves shrinks over time. The number of public museum attendances in New Taipei City even exceeds the corresponding value of Taipei City and New Taipei City during the first two months of 2010.

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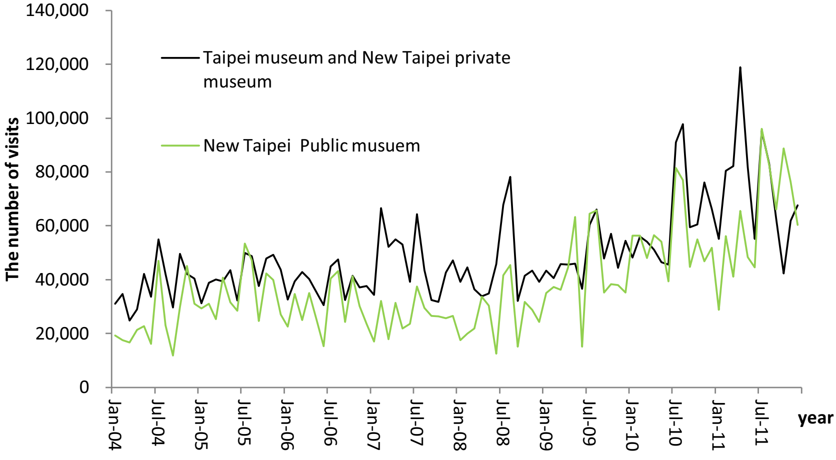

Fig. 1. Monthly average number of museum visits in Taipei City and New Taipei City from January 2004 to December 2011.

In order to promote arts and culture, New Taipei City government inaugurated public museum free admission policy in January 2010. The common traditional methodology to measure the policy effect in previous studies is to compare the number of museum visits before and after policy implementation. However, such measurement may be spurious. For example, visits may be boosted by time trend or other factors during the observing period, not by free admission policy per se. The DID estimator comes from the comparison of the difference between treatment and control groups before and after policy implementation. The role of control group is to eliminate interventions caused by time trend or other factors which are common to treatment and control groups.

The treatment group in our DID strategy is public museums in New Taipei City, and control group is private museums in New Taipei City and museums in Taipei City. The DID estimator for the change in the number of museum visits (denoted by *Y*) ascribed to free admission policy is:

$$\Delta^{Free} = \left(Y^{After\_Free}_{treatment} - Y^{After\_Free}_{control}\right) - \left(Y^{Before\_Free}_{treatment} - Y^{Before\_Free}_{control}\right) \quad (1)$$

The DID estimator (Δ^{Free}) can be captured by the estimates of γ_3 (the coefficient of interaction of *Treatment* and *Free*) in the Eq. (2):

$$Y = \gamma_0 + \gamma_1 Treatment + \gamma_2 Free + \gamma_3 Treatment \times Free + \beta' X + \varepsilon \quad (2)$$

where *Treatment* is a dummy variable, equal to 1 if the sample is belong to treatment group; *Free* is also a dummy variable, equal to one if observing time period is after the introduction of the free admission policy in January 2010; *X* is a vector of control variables including the relative humidity for each month (*Wet*), macroeconomic conditions and full set of monthly dummies. Macroeconomic conditions contain the monthly number of inbound tourists to Taiwan (*ARR*), GDP per capita (*GDP*) and the value of NTD per US dollar (*EXG*) are included in our empirical analysis.

We first employ pooled OLS to estimate Eq. (2). Although we control for background factors as possible as we can, problems of serial correlation and omitted variables bias (OVB) could also exist. To address OVB, we further use random-effect and fixed-effect models to measure the DID estimator.

Our analysis results based on 1,786 observations are reported in Table 1. Using pooled OLS to measure the DID estimator, one can see that the introduction of free admission policy increases the number of museum visits significantly by 15,111 (the coefficient of interaction of *Free* and *Treatment*). The DID estimator from pooled OLS by using panel data may have problems of serial correlation and OVB. The value of Hausman test is 13.13 with a *P*-value of 0.34, which implies that our data has limited problem of OVB and suggests that random-effect model is more appropriate to measure the DID esti-