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How Big? The Impact of Approved Destination Status on Mainland Chinese Travel Abroad

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How Big? The Impact of Approved Destination Status on Mainland Chinese Travel Abroad

Abstract: China's Approved Destination Status (ADS) policy governs foreign leisure travel by citizens to ADS-designated countries. To model the effects of ADS on Chinese visitor arrivals, we specify a model of demand for a representative Chinese consumer who values trips to n differentiated foreign destinations. Using panel data for Chinese visitor arrivals for 61 countries from 1985 to 2005, we estimate fixed effects models accounting for selection effects and a semiparametric matched difference-in-differences (DID) model. The semiparametric matched DID estimates indicate that ADS increased Chinese visitor arrivals annually by 10.5 to 15.7 percent in the three-year period following ADS designation.

1. INTRODUCTION

International trade in tourism services has grown rapidly since the 1970s. The World Tourism Organization (UNWTO) estimates that between 1975 and 2000 international tourist arrivals grew 1.3 times as fast as the world economy (UNWTO, 2007b). In 2003 international tourism expenditures (excluding international transportation services) represented 6 percent of global exports of goods and services measured in U.S. dollars; the percentage rises to 29 percent if only service exports are considered (UNWTO, 2007b). While Europe and North America still dominate global trade in tourism services, the Asia-Pacific region has seen the most rapid growth in recent decades (UNWTO, 2006a). One reason for this impressive growth has been the ongoing dismantling of restrictive barriers by countries on resident travel abroad. The most striking effects of outbound travel liberalization can be seen in Japan, which allowed its citizens to travel abroad for pleasure beginning in 1964, and South Korea, which fully liberalized overseas pleasure travel for its residents in 1989 (Mak, 2004, Ch. 9).[1] In both countries, an explosion of overseas travel followed their respective dismantling of restrictive travel barriers. In 2007, just prior to the global financial crisis, Japan and South Korea ranked seventh and ninth, respectively, in international tourism expenditures (UNWTO, 2010, p. 13).

The impacts of these various travel liberalization measures on international travel and tourism have not been carefully estimated or studied. This paper provides a framework for estimating the impact of liberalization measures on tourism flows and applies it to mainland China's (hereafter "China") "Approved Destination Status" (ADS) policy, which governs foreign leisure travel by China's citizens. China's ADS policy allows its citizens to take pleasure trips abroad on group package tours to countries that have negotiated an ADS agreement. By 2010, China ranked third in international tourism expenditures after Germany and the United States (UNWTO 2011, p. 10). China is now Asia's largest source of international outbound tourists.

We proceed with our analysis by first specifying a model of consumer demand for differentiated travel destinations to provide a theoretical basis for understanding how Chinese visitor flows to particular destinations are related to changes in trade costs. We then utilize a number of econometric frameworks to estimate the magnitude of the response of Chinese visitor arrivals to a country's implementation of an ADS agreement: a fixed effects model for 61

[1] South Korea began to liberalize overseas travel in a limited way in 1983 (Mak, 2004, Ch. 9).

countries using annual visitor arrival data from 1995 to 2005; a fixed effects model estimated for a smaller sample of 41 matched countries on common support; and a semiparametric matched difference-in-differences (DID) model for the common support sample. The semiparametric DID estimates for an outlier-adjusted sample indicate that ADS increased Chinese visitor arrivals in the early ADS recipient countries between 10.5 and 15.7 percent annually during the three-year period following ADS designation.

2. CHINESE TOURISM AND ADS AGREEMENTS

Compared to some of its richer Asian neighbors, China is a latecomer to international outbound pleasure travel. Between the founding of the People's Republic of China in 1949 and 1982, few residents of China traveled to foreign destinations but for government officials, students, and a few businessmen. In 1983 China allowed citizens from Guangdong Province to travel to the British colony of Hong Kong on organized tours to visit family. Similar tours to Macau were initiated in 1984, and over the next few years, residents from other provinces with family members in Macau or Hong Kong were also allowed to visit. Prior to 1990, China only allowed its nationals to travel for official, education, and business reasons; after 1990 it added leisure travel to this list.[2] Unlike Japan and South Korea, China did not relax its prohibition on leisure travel in a single stroke, but instead began a process of gradual liberalization that entailed China negotiating agreements with selected countries that allowed visits by tour groups traveling on tightly controlled, prepaid package tours. Initial agreements with Malaysia, Singapore, and Thailand came into effect in 1991, allowing mainland Chinese citizens to travel on tours organized by the Chinese Travel Service (CTS) (Lim and Wang 2005, p. 2247; WTTC 2003, p. 22).

Beginning in 1995, the Chinese National Tourism Administration (CNTA) formalized China's Approved Destination Status (ADS) policy. Government-selected Chinese travel

[2]Of course, some officially sanctioned business trips may have included some "unofficial" days for leisure travel or been entirely leisure travel.

agencies were allowed to market prepaid package tours to countries with ADS.[3] A typical ADS agreement allows Chinese travel agencies to apply to a destination country's government for visas for all members of a tour group. By reducing the cost of obtaining a visa, providing for package tours, and legitimizing foreign pleasure travel, ADS agreements paved the way for potentially large increases in overseas Chinese travel.

Table 1 provides a list of countries receiving and implementing ADS agreements each year through 2012, and Figure 1 plots the cumulative number of countries with ADS as well as the number of departures of Chinese nationals from China to foreign destinations from 1995 through 2010. The number of countries with ADS status grew from 6 in 1995 to 9 in 1999, with Australia and New Zealand becoming the first Western countries to receive ADS status. Between 1999 and 2003, the number of countries with ADS agreements increased to 28, with 11 of the 19 new awards to countries in Asia. During 2004, the number of agreements almost doubled, as China negotiated ADS agreements with 26 European countries.[4] Over the next three years, 28 more countries received ADS status, with the United States receiving ADS status in late 2007. By 2012, 113 countries had received and implemented ADS agreements. All countries that continued to provide formal diplomatic recognition to Taiwan's government remained without ADS agreements.

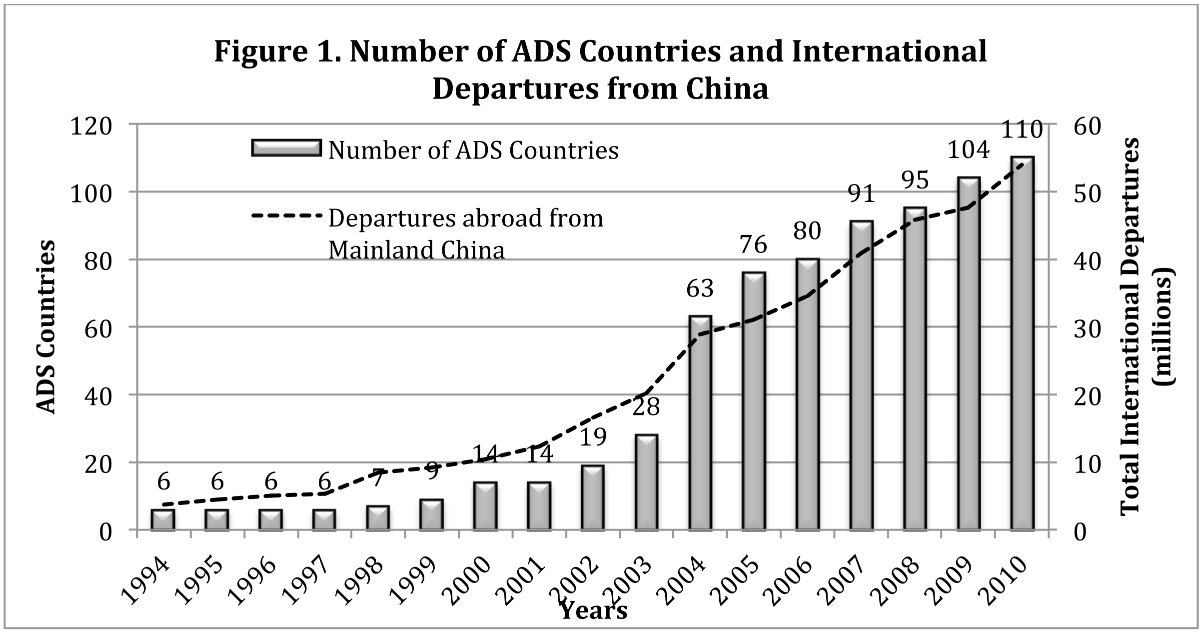
[3] Non-ADS countries were allowed to market their tourist destinations at trade fairs and could open trade offices in China. Mainland Chinese residents could then travel as individuals to these countries, pending visa approvals from China and the non-ADS destination country.

[4] Not all ADS recipients are countries. For example, Hong Kong and Macau received ADS when they were colonies of the United Kingdom and Portugal, respectively, and their agreements remained in force after the two colonies were returned to China. The Northern Mariana Islands, a U.S. commonwealth, received ADS status in 2005, well before the United States received ADS status in 2007. Tahiti, a department of France, received ADS status in 2008.

Table 1. ADS Agreement by Year

Year	Recipient	Cumulative total with ADS
1983	Hong Kong, Macau	2
1988	Thailand	3
1990	Malaysia, Singapore	5
1992	Philippines	6
1998	South Korea	7
1999	Australia, New Zealand	9
2000	Brunei, Cambodia, Japan, Myanmar, Vietnam	14
2002	Egypt, Indonesia, Malta, Nepal, Turkey	19
2003	Croatia, Cuba, Germany, Hungary, India, Maldives, Pakistan, South Africa, Sri Lanka	28
2004	Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Ethiopia, Finland, France, Greece, Iceland, Ireland, Italy, Jordan, Kenya, Latvia, Liechtenstein, Lithuania, Luxembourg, Mauritius, Netherlands, Norway, Poland, Portugal, Romania, Seychelles, Slovenia, Slovakia, Spain, Sweden, Switzerland, Tanzania, Tunisia, Zambia, Zimbabwe	63
2005	Antigua and Barbuda, Barbados, Brazil, Chile, Fiji, Jamaica, Lao PDR, Mexico, Northern Mariana Islands, Peru, Russia, United Kingdom, Vanuatu	76
2006	Bahamas, Grenada, Mongolia, Tonga	80
2007	Andorra, Argentina, Bangladesh, Bulgaria, Uganda, Morocco, Monaco, Namibia, Venezuela Oman, Syria	91
2008	French Polynesia, Israel, Taiwan, United States	95
2009	Cape Verde, Dominican Republic, Ecuador, Ghana, Guyana, Mali, Montenegro, Papua New Guinea, United Arab Emirates	104
2010	Canada, Lebanon, Federated States of Micronesia North Korea, Uzbekistan, Serbia	110
2011	Iran	111
2012	Madagascar, Columbia	113

Source: CNTA: http://www.cnta.gov.cn/html/2009-5/2009-5-13-10-53-54953.html.



Following the establishment of ADS, aggregate outbound travel from China grew modestly at first, as outbound departures from China increased at an average annual rate of 6.6 percent between 1995 and 1999. The next seven years saw a substantial increase, with growth increasing at an annual average rate of 26 percent between 1999 and 2005 (Table 2). The number of outbound Chinese travelers reached 57.4 million in 2010 (UNdata, 2011) and was forecast by the UNWTO in *Tourism 2020 Vision* to reach 100 million by 2020 (UNWTO, 2001).[5]

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[5] In 2010, 63 percent of the outbound travelers made trips to Hong Kong or Macau (Table 2).

Table 2. China's Domestic and Foreign Tourism

Year	PRC Chinese arrivals in Hong Kong and Macau (millions)	Domestic tourists in China (millions)	Departures from China to foreign countries, HK, and Macau (millions)
1994	2.19	524	3.73
1995	2.79	629	4.52
1996	2.99	640	5.06
1997	2.89	644	5.32
1998	3.99	695	8.43
1999	4.84	719	9.23
2000	6.07	744	10.47
2001	7.43	784	12.13
2002	11.01	878	16.60
2003	14.15	870	20.22
2004	21.76	1,102	28.85
2005	23.00	1,212	31.03
2006	25.58	1,390	34.52
2007	30.35	1,610	40.95
2008	28.48	1,710	45.84
2009	28.95	1,900	47.66
2010	35.91	2,100	57.39

Sources: See appendix.

3. A DIFFERENTIATED DESTINATION MODEL OF VISITOR ARRIVALS

To model choice of travel destinations by Chinese consumers, we specify a model of consumer demand for an array of close substitutes—foreign tourism destinations—and a composite good—tourism destinations within China. An alternative strategy would be to specify a gravity model, the workhorse of empirical international trade (Arita et al., 2011). There are, however, several reasons why a differentiated product model is more appropriate for our purposes. First, it intuitively fits actual consumer choice among alternative country destinations, as both pleasure travelers typically perceive country destinations as imperfect but close substitutes. Second, the model's use of a constant elasticity of substitution (CES) utility function allows us to derive a set of n demand functions for Chinese travel to n countries with well-understood properties. Third, our measure of trade—China visitor arrivals—provides a measure of the quantity of Chinese tourism exports to each country rather than the value of tourism exports, the typical unit of analysis in a gravity model. Fourth, the gravity model provides a framework within which aggregate accounting relationships within and across countries and industries can be explicitly modeled. However, the small number of travelers emanating from China means that such constraints are unlikely to be binding and that modeling of these constraints is likely to add unnecessary complexity to the model. Finally, gravity models using export data from just one country or which do not include multilateral resistance terms are typically not identified exactly (Baier and Bergstrand 2007).

Our model is built around the assumptions that a representative Chinese consumer uses two-stage budgeting to first allocate a portion of income each year to domestic and foreign tourism and then to divide the tourism budget amongst trips to foreign destinations and trips to a composite domestic tourism destination. Gorman (1959) showed that for a consumer to maximize total utility by maximizing the sub-utility function with the chosen budget, it must be assumed that the utility achieved from each of these sectors is separable from the utility achieved in other sectors.[6] Consider, then, a sub-utility function for a representative Chinese consumer with homothetic CES preferences for travel to *n-1* other countries. The representative Chinese consumer maximizes:

(1) $$\left(\sum_{i=1}^{n} (\delta_{it})^{(1-\sigma)/\sigma} VA_{it}^{(\sigma-1)/\sigma} \right)^{\sigma/(\sigma-1)}$$

subject to the budget constraint

(2) $$\sum_{i=1}^{n} p_{it} VA_{it} = \alpha_t GDPCHINA_t$$

and

(3) $$p_{it} = e_{it} \cdot t_{it} \cdot p_{it}^{F}$$

where (p_{it}) is equal to the yuan price of a trip to country i, p_{it}^{F} is the price in foreign currency of a trip to country i, e_{it} is the nominal exchange rate between China and country i, t_{it} is a measure of

[6] One implication of a separable tourism utility function is that consumer choice among destinations depends only on the prices set by firms in competing countries.

trade costs for the standardized trip between China and country i, VA_{it} is visitor arrivals from China in country i, σ is the time-invariant elasticity of substitution, δ_{it} is a time-varying parameter representing preferences by the representative Chinese consumer for trips to country i, and $GDPCHINA_t$ is nominal Chinese GDP at time t.

From the Lagrangian,

$$(4)\quad L=\left(\sum_{i=1}^{n}(\delta_{it})^{(1-\sigma)/\sigma}VA_{it}^{(\sigma-1)/\sigma}\right)^{\sigma/(\sigma-1)}+\lambda\left((\sum_{i=1}^{n}p_{it}VA_{it})-\alpha_t GDPCHINA_t\right)$$

we obtain the first-order conditions,

$$(5)\quad [(\sigma-1)/\sigma]\left(\sum_{i=1}^{n}(\delta_{it})^{(1-\sigma)/\sigma}VA_{it}^{(\sigma-1)/\sigma}\right)^{1/(\sigma-1)}(\delta_{it})^{(1-\sigma)/\sigma}(VA_{it})^{-1/\sigma}=\lambda s_{it}p_{it}$$

where i=1, … n-1 are foreign country destinations and n is the composite domestic tourist destination, with s_{it}=1, and

$$(6)\quad \sum_{i=1}^{n}(p_{it}VA_{it})-\alpha_t GDPCHINA_t=0\,.$$

Solving for the Marshallian demand function for country destination i at time t, we obtain:

$$(7)\quad VA_{it}=\delta_{it}\left(\frac{\alpha_t GDPCHINA_t}{p_{it}}\right)*\frac{(\delta_{it}p_{it})^{1-\sigma}}{\left(\sum_{i=1}^{n}(\delta_i p_{it})\right)^{1-\sigma}}$$

The denominator of the last term in (7) is the standard CES price index of trips from China to all domestic and world destinations, P_t. This specification in (7) contains several assumptions regarding China tourism and trade costs. First, Chinese tourism flows do not affect the price of tourism in any of the destination countries. Second, any mark-up to Chinese tourists over the price charged to domestic tourists in destination countries (who do not bear travel costs to their country) reflects the additional costs of transacting with Chinese tourists. And finally, the additional trade costs are paid by foreign tourism providers and are fully passed on to Chinese tourists.

Substituting for p_{it} (equation 3) and substituting P_t, for $\left(\sum_{i=1}^{n}(\delta_i p_{it})\right)^{1-\sigma}$, we obtain:

$$(8) \qquad VA_{it} = \left(\frac{\alpha_t GDPCHINA_t}{e_{it} p_{it}^F t_{it}} \right) * \frac{(\delta_{it} e_{it} p_{it}^F t_{it})^{1-\sigma}}{P_t}$$

Multiplying and dividing the expression by the price of a trip inside China (p_{ct}) and taking logs, we obtain:

$$(9) \qquad \ln(VA_{it}) = \ln(\alpha_t) + \ln(RGDPCHINA_t) + (1-\sigma)\ln(\delta_{it}) - \sigma \ln(t_{it}) - \sigma \ln(RER_{it}) - \ln(\frac{P_{ct}}{P_t})$$

where $RGDPCHINA_t$ is China's real aggregate GDP in year *t*, and RER_{it} is China's real exchange rate with country *i* in year *t*. To facilitate empirical analysis, we make the assumption that trade costs, $\ln(t_{it})$, can be decomposed into a binary time-varying ADS indicator and a country-specific time-invariant trade cost. As a proxy for the time-varying quality differences across destinations (δ_{it}), we use real GDP per capita in the destination country *i* in year *t*, $DEST\_GDP_{it}$.

With respect to the final term in equation (9)—$\ln(P_{CT}/P_T)$, we lack adequate information on either P_{ct} and P_t, but we have good information on the aggregate number of Chinese tourists taking foreign trips (Q_t) and domestic trips (Q_{ct}). Since $\partial Q_T / \partial P_T < 0$ and $\partial Q_{TC} / \partial P_{TC} < 0$, we use $\ln(Q_T / Q_{TC})$ as a rough, clearly imperfect proxy for $\ln(P_{CT}/P_T)$. Adding a standard iid error term, we obtain our baseline regression specification:

$$(10) \qquad \begin{aligned} \ln(VA_{it}) = {} & \beta_0 + \beta_1 ADS_{it} + \beta_2 \ln(China\_GDP_t) + \beta_3 (DEST\_GDP_{it}) + \beta_4 REALEX_{it} \\ & + \beta_5 (\frac{Q_{ct}}{Q_t}) + \alpha_i + \varepsilon_{it} \end{aligned}$$

4. EMPIRICAL STRATEGY AND DATA DESCRIPTION

Estimates of the baseline regression model using fixed effects will be identified only if the treatment of countries with an ADS agreement is uncorrelated with the error term, ε_{it}. This generally entails two assumptions (Abadie 2005). The first is that visitor arrivals in the treated and untreated countries are the same in the absence of the ADS treatment. To account for the obvious differences in visitor arrival flows to the countries in our sample, the baseline regression includes scale variables and other factors that affect visitor flows to a country. The second is that differences in the effect of ADS on visitor arrival flows not be systematically related to "treatment" with an ADS agreement.

Our empirical strategy to obtain unbiased estimates of the effect of an ADS treatment on destination visitor arrivals from China has three components. First, we estimate fixed effects specifications of our baseline model augmented by ADS lagged one and two years, as prior knowledge indicates that visitor flows from China could take some time to respond to the conclusion of an ADS agreement. Second, we estimate our baseline specification without $DEST\_GDP_{it}$. Third, we estimate the baseline specification including a time-varying covariate ($NADS_t$) for the cumulative number of countries that have implemented an ADS agreement during or prior to year *t*. Inclusion of NADS serves to capture trade diversion effects which may occur when additional countries receive ADS. Finally, we estimate the baseline specification using a sample in which Macau and Hong Kong are coded as domestic rather than foreign travel destinations, a change that affects the value of ln (Q_T/Q_C).

Next, we re-estimate our earlier panel regressions using a trimmed, balanced sample. To construct this sample, we estimate two alternative specifications of a probit selection equation and compare estimated treatment propensity scores. Panels (i.e., countries) are deleted from the sample when estimated propensity scores for treated countries are above the highest propensity scores for untreated countries and when estimated propensity scores for untreated countries are below the lowest propensity scores for the treated countries. In order to proceed with regression analysis using the trimmed samples, the distributions of the covariates of the untreated and treated variables in the trimmed sample should be balanced, i.e., very similar in their statistical properties. We employ two commonly used test for balanced distributions—a *t*-test for equality of covariate means in treated and untreated panels and a test for bias, i.e., a test for equality of covariate means in treated and untreated panels scaled by the square root of the sum of the variances. Both test results for all covariates are consistent with the hypothesis of balanced covariate distributions for the untreated and treated panels of all covariates in the selection equation. With the necessary condition for balance satisfied, we proceed to re-estimate earlier panel specifications using the trimmed balanced sample.

The third and final component of our empirical analysis uses a semiparametric matching estimator to obtain the average treatment effect of ADS from the trimmed sample. This estimator allows us to obtain country-specific and average estimates of the effect of ADS on visitor arrivals in ADS-treated countries in the common support sample (Imbens 2003; Abadie

2005). Consider the expected effect (α) of receipt of ADS status (ADS_{i1}=1) on Chinese visitor flows to those treated countries with similar characteristics $\mathbf{X_i}$:

(11) $\alpha(\mathbf{X_i}) = E(VA_{i1}^1 - VA_{i1}^0 \mid X_i, ADS_{i1} = 1)$

where the superscripts refer to a multi-year period before (superscript=0) and after (superscript=1) receipt of ADS and E is an expectations operator. From (11), we derive the average effect of treatment on treated (ADS) countries:

(12) $\alpha = E\alpha(\mathbf{X_i}) = E\{E(VA_{i1}^1 - VA_{i1}^0 \mid \mathbf{X_i}, ADS_{i1} = 1)\}$.

Since VA_{i1}^0 is not actually observed, we follow Imbens (2003) and Abadie (2005) in making the following identifying assumption,

(13) $E(VA_{i1}^0 - VA_{i0}^0 \mid \mathbf{X_i}, ADS_{i1} = 1) = E(VA_{i1}^0 - VA_{i0}^0 \mid \mathbf{X_i}, ADS_{i1} = 0)$,

i.e., that countries that were recipients of ADS would have had the same trajectories of visitor arrivals as the countries that were not recipients of ADS, conditional on $\mathbf{X_i}$.[7] Using Rosenbaum and Rubin's (1983) classic finding that comparing countries with similar probabilities of transiting to treatment is equivalent to comparing countries with similar $\mathbf{X_i}$, we define:

(14) $p_i = p(\mathbf{X_i}) = \text{Prob}(ADS_{i1} = 1 \mid \mathbf{X_i})$

where p_i is the country propensity score for ADS status and is bounded by 0 and 1. After using estimated propensities scores to trim the sample (see above), we follow the methodology set forth in Imbens (2003) and Imbens and Wooldridge (2009) to estimate a conditional average treatment effect for the common support sample. We use kernel matching to derive a data set on common support, where each treated (untreated) country has at least one untreated (treated) match with a propensity score within a set radius of the treated (untreated) country's propensity score. Section 7 provides details on the matched DID estimator.

Table 3 provides summary statistics for all variables used in our selection and fixed effects regressions, and the Appendix provides information documenting sources for each variable. We pay particular attention to description of the binary treatment variable (ADS) and

[7] Persson and Tabellini (2007, pp. 7-8) and Abadie (2005, p. 6) note that this assumption is the analog to the selection on observables assumption made in cross-section studies.

Table 3: Data Description

Variable	Obs.	Units	Mean	s.d.	Min	Max
ADS_{it}	1323	binary	0.15	0.36	0.0	1.00
$Ln(DISTANCE)_i$	58	kilometers	8.38	0.64	6.31	9.37
$REALEX_{it}$	1093	-	-0.78	2.96	-8.32	3.49
$Ln(DEST\_GDP)_{it}$	1258	dollars	7.95	1.55	4.62	10.57
$Ln(CHINA\_GDP)_t$	11	yuan	27.35	0.56	26.44	28.27
$ETHNICITY_i$	58	percent	0.02	0.10	0.00	0.78
$WORLD\_HERITAGE_i$	58	count	7.48	8.50	0.00	41.00
$NADS_t$	11	count	-	-	2.00	38.00
$UNVOTES1_i$	58	count	4.14	5.52	0.00	18.00
$UNVOTES2_i$	58	count	1.83	3.23	0.00	16.00

to the outcome variable, Chinese visitor arrivals to 61 countries and Hong Kong and Macau from 1985 to 2005.

The ADS binary variable is surely not a strictly exogenous variable, as it measures the relaxation by the Chinese government of a non-tariff barrier to trade in tourism services that was previously imposed by the same government. Visual examination of the sequence of China's ADS agreements reveals distinct patterns in the selection of ADS countries and the timing of agreements (See Table 1). There are at least six clusters of ADS agreements that were awarded to friendly countries from a particular region were announced within a short period of time.[8] The clusters consist of countries in Asia (12 countries between 1991 and 1998), South America (10

[8] China has never negotiated ADS agreements with countries that have diplomatic relations with Taiwan's government.

countries between 2000 and 2001), Africa (35 countries between 2005 and 2006), Europe (24 countries between 2001 and 2004), and the Pacific Islands (5 countries between 2005 and 2006).[9]

We identify two potential sources of error in measuring the ADS dummy variable. First, the ADS variable is coded as zero (no ADS agreement in year *t*) or one (ADS agreement concluded at some point during year *t*). This assumes that all ADS agreements are identical.[10] If there is some variation in the ADS agreements, then the estimated coefficient on the ADS dummy will reflect the impact of both weak and strong ADS agreements on visitor flows. The effect is to bias the estimated coefficient downwards. Second, the ADS variable is coded as one when an ADS agreement is concluded on January 1 or December 31 of the calendar year. The coded variable will more accurately measure the presence of group tours when the conclusion

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[9] There are several potential reasons behind the decision of the Chinese government to cluster its ADS negotiations by region. One may be lower negotiation costs for the several Chinese government agencies involved in ADS policymaking and diplomacy. Another stems from the relationship between the demands by Chinese consumers for travel to countries within the region. Consider, for example, ADS awards to a cluster of South American countries during 2004 and 2005. Liberalizing travel to a cluster of countries far from China would allow Chinese tourists to see several of these countries in one trip, thereby potentially raising the value of a costly trip to the region. Alternately, if countries in a region are close substitutes for Chinese consumers, the Chinese government could decide to sequentially conclude ADS agreements with particular countries in a region to steer large initial flows of visitors to favored countries.

[10] ADS agreements have expanded in scope over time and have some country-specific features. For example, initial agreements with Australia (1999), New Zealand (1999), and Japan (2000) only allowed residents of Shanghai, Beijing, and Guangzhou to travel to these countries. In the case of travel to EU countries, approved Chinese travel agencies began imposing hefty deposits to ensure their clients would return with their groups. The United States initially required personal interviews at U.S. consulates for all tourism visas but has liberalized its rules somewhat in 2012 to allow for some visa renewals without an interview. By contrast, ADS agreements between China and other countries typically allow visa applications from Chinese leisure travelers to be processed in bulk and without personal interviews.

date is early in the year rather than later in the year. This effect biases the measured ADS variable upward and biases the estimated ADS coefficient downwards.

Our sample of visitor arrivals from mainland China covers 61 countries, including the leading international tourism destinations (in terms of total number of foreign visitors) during the years 1995 to 2005. Our main source is the World Tourism Organization's *Yearbook of Tourism Statistics* (UNWTO, 2004b). See Table 7 for the list of countries included in the sample, which covers over 80 percent of the international trips by mainland Chinese. For instance, the 2007 edition of the *Yearbook* showed that in 2005, the 110 countries reported to have ADS received 8.10 million visitor arrivals from China, while the 61 countries in our sample accounted for 7.39 million of these visitors. Our analysis excludes mainland Chinese visitor arrivals in Hong Kong and Macau since we consider them to be domestic destinations after reunification with China in 1997 and 1999, respectively. Data for many small countries, for example the Pacific Island countries, reported few visitors from China, had missing years of data, and/or displayed suspicious volatility in the volume of visitor arrivals, so we excluded them from our sample. France reported arrivals of mainland Chinese together with arrivals from other East Asian nations and therefore had to be dropped. We dropped the Philippines when we judged the year-to-year fluctuations in arrivals from China to be implausible. Additionally, two other countries (Monaco and Myanmar) had to be dropped when critical explanatory variables, such as GDP per capita, were unavailable for most years in the sample.

The UNWTO data were selectively checked against arrivals statistics compiled by individual country national tourism administrations (NTAs) when we were uncertain about the consistency of the UNWTO data from year to year. When our review of visitor arrival figures from NTAs suggested that the UNWTO data contained coding errors or referenced out-of-date figures, we instead used data from the NTA sources.[11] Because a few countries included in the data set did not report visitor arrivals from China for every year between 1995 and 2005, the final data set is an unbalanced panel.

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[11] For example, in some cases the UNWTO database reported visitor arrivals for "Chinese nationals" one year and visitor arrivals for "Chinese residents" the next year. We caught very few inconsistencies. We have constructed a consistent series of visitor arrivals for each country by correcting or adjusting inconsistent series using data reported by NTAs.

5. FIXED EFFECTS REGRESSION RESULTS USING FULL SAMPLE OF COUNTRIES

We estimate equation (10) using fixed effects with robust standard errors clustered by country. Results from seven specifications are reported in Table 4. Column 1 reports results using only contemporaneous *ADS*, column two adds *ADS* lagged one period, and column 3 adds *ADS* lagged two periods. The next four specifications also incorporate this lag structure. Column 4 reports results when we delete $DEST\_GDP_{it}$ from the regression. Column 5 reports results when we add $NADS_t$, which measures the cumulative number of ADS agreements conferred by China through year t. Column 6 reports results when $ln(Q_{CT}/Q_T)$ is deleted from the fixed effects regression to test the sensitivity of regression estimates to the use of this rough proxy for $ln(P_{CT}/P_T)$. Column 7 reports results when $ln(Q_{CT}/Q_T)$ is deleted and $NADS_t$ is put back into the regression.

In most respects, the seven specifications yield similar results for both ADS and control variables. Estimated coefficients on each control variable as well as the contemporaneous and lagged ADS variables have the same signs in each of the seven specifications. Estimated coefficients on $\ln(REALEX_{it})$ are negative and statistically insignificant at the ten percent level, while estimated coefficients on our proxy for destination quality—$\ln(DEST\_GDP_{it})$—are each positive and all statistically significant at least at the ten percent level. We note the preference for higher income destinations, with estimated destination GDP elasticities ranging from 0.93 to 1.070. Estimated coefficients on $ln(CHINA\_GDP_t)$ can also be interpreted as overall income elasticities for Chinese outbound trips. The six estimated elasticities range between 0.90 and 1.42 and are all statistically significant at the one percent level.[12] Two specifications include a time-varying control for the total number of ADS agreements in force during the calendar year ($NADS_t$). As expected, the estimated coefficient on $NADS_t$ is negative in both specifications and

[12] The UNWTO's 2020 Vision forecasts (UNWTO 2001) assumed that growth in per capita income would be the primary driver of international tourism from China. The research team assumed a per capita income elasticity of demand for Chinese outbound travel of 2.0. Our estimate is, however, derived from aggregate rather than per capita GDP. Personal communication between Shawn Arita and the UNWTO lead economist on the organization's research team for the 2020 forecasts.

Table 4. Fixed Effects Regressions on Arrivals from China, 1995-2005

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ADS_{it}	0.175**	0.166**	0.276***	0.187**	0.193**	0.173**	0.194**
	(0.0816)	(0.0824)	(0.0926)	(0.0807)	(0.0839)	(0.0798)	(0.0829)
$L.ADS_{it-1}$	0.0796	0.192**		0.0810	0.0910	0.0783	0.0920
	(0.0638)	(0.0864)		(0.0629)	(0.0672)	(0.0662)	(0.0687)
$L2.ADS_{it-2}$	0.199**			0.214**	0.208**	0.191*	0.205**
	(0.0973)			(0.0882)	(0.0957)	(0.0987)	(0.0961)
$\ln(REALEX_{it})$	-0.164	-0.174	-0.177	-0.158	-0.0699	-0.208	-0.0776
	(0.140)	(0.142)	(0.143)	(0.133)	(0.134)	(0.141)	(0.132)
$\ln(DEST\_GDP_{it})$	0.947*	1.018*	1.070**		0.977*	0.927*	0.972*
	(0.543)	(0.530)	(0.520)		(0.541)	(0.544)	(0.540)
$\ln(CHINA\_GDP_t)$	0.902***	0.902***	0.912***	1.145***	1.335***	0.955***	1.419***
	(0.241)	(0.240)	(0.240)	(0.191)	(0.303)	(0.236)	(0.291)
$\ln(Q_{TC}/Q_T)_t$	0.367**	0.352**	0.338**	0.345**	0.198		
	(0.155)	(0.156)	(0.157)	(0.152)	(0.133)		
$NADS_{it}$					-0.0113*		-0.0128**
					(0.00568)		(0.00568)
CONSTANT	-25.15***	-25.63***	-26.27***	-24.22***	-36.34***	-24.66***	-37.63***
	(4.919)	(4.837)	(4.710)	(5.073)	(7.616)	(4.937)	(7.489)
$Per(ADS_{it})$	.187**	0.176**	0.313***	0.202**	0.208**	0.185**	0.210**
	0.097	0.097	0.121	0.095	0.101	0.094	0.100
$Per(L.ADS_{it-1})$	0.081	0.208**		0.082	0.093	0.079	0.094
	0.069	0.104		0.068	0.073	0.071	0.075
$Per(L2.ADS_{it-2})$	0.214**			0.233**	0.225**	0.205**	0.222**
	0.118			0.109	0.117	0.117	0.117
N	555	555	555	563	555	555	555
adj. R^2	0.545	0.542	0.538	0.536	0.549	0.542	0.549

Note: Standard errors in parentheses; *=p<0.10; **=p<0.05; *** =p<0.01

statistically significant at the ten percent level in one specification (column 5) and the five percent level in the other (column 7).[13]

All estimated coefficients on contemporaneous and lagged ADS variables are positive, with precision of estimation varying somewhat across specifications. Since we are primarily interested in the percentage impact of an ADS agreement on visitor flows from mainland China, we use methods developed by van Garderen and Shah (2002) to transform the estimated coefficients into exact semilogarithmic elasticities. A separate reporting of estimated elasticities in Table 4 [Per(ADS_{it}), Per(ADS_{it-1}), Per(ADS_{t-2})] reveals that each elasticity is positive in each of the seven specifications. ADS_{it} is statistically significant at the five percent level in all specifications, while ADS_{it-2} is statistically significant at the five percent level in all specifications (columns 6). ADS_{it-1} is statistically significant in only one of the specifications (column 2). Summing statistically significant ADS coefficients in each specification yields a range of elasticity estimates from 0.313 to 0.435 and an average estimated elasticity of 0.378.[14]

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[13] The Appendix Table reports results from the seven specification estimates using a sample that includes Hong Kong and Macau. All estimated ADS coefficients have positive signs but are smaller in magnitude in some specifications than their counterparts reported in Table 4.

[14] Our fixed effects regressions have been somewhat restrictive so far in their modeling of dynamic effects, as only the ADS variable has been modeled with a lag structure. To account for additional covariate lags, we add a lagged dependent variable to the regression. To account for serial correlation between the lagged dependent variable and the error term, we estimate the regression using Blundell and Bond's instrumental variable methods (Blundell and Bond, 1998). Due to our relatively small sample size, we use just two lagged differences of the dependent variable due to a small sample size. Using robust standard errors, we find that estimated coefficients on ADS and ADS lagged one and two periods are statistically insignificant at the 10 percent level.

6. MATCHING ON PROPENSITY SCORES AND DATA ON COMMON SUPPORT

Fixed effects estimates are more likely to generate unbiased coefficient estimates if we restrict the sample to data on common support, i.e., we exclude treated (untreated) observations that are without close untreated (treated) neighbors in their propensity to receive ADS. To identify country panels on common support, we first estimate a cross-section probit equation for the year 2003, with the dependent variable specified as a country's ADS status in 2003. We then conduct a *t*-test to see whether the means of each covariate for treated and untreated samples on common support are statistically different and assess the estimated bias to determine whether the scaled means of each covariate treated and untreated samples on common support are statistically different.

For our selection probit regression, we choose six covariates with the potential to change the probability with which Chinese bureaucrats—often working at different agencies—make the decision to award ADS status to recipient countries. First, bureaucrats may want to award ADS to countries that have populations with larger ethnic Chinese populations. Reasons could include that Chinese tourists will value the tourism experience more when the ethnic Chinese population is higher; will have lower transaction costs due to fewer language and cultural barriers; will establish connections with ethnic Chinese residents that will lead to more trade and investment flows in the future; and will learn more from their trips about foreign institutions and organizations and thereby facilitate transfer of foreign technology to China. To control for this effect, we include $ETHNICITY_i$—an estimate of the percentage of the population that self-declares their ethnicity as Chinese—as a covariate in the selection equation.

Second, there are several reasons for Chinese bureaucrats to favor awarding ADS to countries that are geographically close to China. Shorter travel minimizes the cost of the export gift and given China's low average per capita GDP, one might expect low-cost rather than high-cost gifts to be given. Also, China has substantial incentives to increase its influence in countries closer to China. More stable, wealthier countries on China's periphery would generally reduce its security concerns. Also, the more trade and investment linked to China, the more likely that the periphery country would pay close attention to China's view on regional and global politics.

To control for this effect, we include $DISTANCE_i$, the average number of kilometers between the capitol of the visitor destination and Shanghai and Beijing.[15]

Third, China may have been more likely to negotiate an ADS agreement with countries with which it had a large annual trade surplus. By unilaterally reducing its non-tariff barriers to Chinese visitor arrivals and spending in an ADS country, China confers benefits on capital owners and workers in the ADS country's tourism sector. An "export gift" of new Chinese visitor spending could help to alleviate or forestall trade tensions. To control for this effect, we include $TRADESURPLUS_i$, the value of China's net exports to country *i* normalized by country *i'*s real GDP. Since the value for a particular year may reflect temporary fluctuations in the country's trade account, we use a 7-year arithmetic average covering 1997 to 2003.

Fourth, the Chinese government may have considered the preferences of potential Chinese visitors to visit countries with highly valued tourist attractions. To control for such demand-side effects, we include $WORLD\_HERITAGE_i$, the number of world heritage sites in country *i* in 2003, as a control variable. World heritage sites are the world's premier cultural and natural properties as designated by the United Nations Education Scientific and Cultural Organization (UNESCO). Examples include the Pyramids of Egypt, the Great Barrier Reef in Australia, the Historic Center of Brugge, Belgium, and the Classical Gardens of Suzhou, China.

Fifth, Chinese tourists, like all tourists, are more likely to prefer countries with better infrastructure, access to emergency medical services, services for tourists, and a variety of attractions. Our proxy for these consumer preferences is per capita GDP ($DEST\_GDP_{it}$) in the destination country.

Finally, China is more likely to award ADS to countries with which it has friendly relations. Our proxy for friendly relations comes from 18 votes primarily on global security issues during the 58th session of the 2003 United Nations General Assembly.[16] We posit that the

[15] Distance could also be a factor in the sequencing of ADS awards as the first ADS agreements were made to nearby east and southeast Asian countries in the early and mid-1990s. Since China's per capita GDP in the early 1990s in the coastal provinces was only about 20 percent of the 2006 level, the government may have made awards to nearby countries to minimize expenditures by Chinese tourists on airfares.

[16] See Appendix for data sources.

more frequently a country votes against China in the General Assembly, the less friendly is its overall relations with China. We calculate two measures of non-conforming U.N. votes: $UNVOTES1_i$ counts abstentions as non-conforming votes, while $UNVOTES2_i$ does not. The United States had the most non-conforming votes (16) followed by the United Kingdom (11), Israel (10), Poland (7), Italy and Spain (6), Slovakia, Romania, Albania, Belgium, Germany (5), Turkey, Switzerland, Finland, Bulgaria (4), Australia, Canada, India (3), Russia, New Zealand (2), Korea, and Pakistan (1). All other countries in our sample mirrored China in its "Yes" vote on all 18 resolutions.[17]

We estimate the propensity score using a probit regression model with the covariates discussed above:

$$\begin{aligned} \ln ADS_i = \beta_0 + \beta_1 DISTANCE_i + \beta_2 ETHNIC_i + \beta_3 UNVOTE_{it-1} + \beta_4 DEST\_GDP_i \\ + \beta_5 \ln TRADESURPLUS_i + \beta_6 WORLDHERITAGE_i + \varepsilon_i \end{aligned} \tag{11}$$

We ran two specifications of the probit equation, one with $UNVOTES1_i$ and a second with $UNVOTES2_i$. Results are reported in Table 5 and are very similar for both specifications. Thus, we focus on the regression with $UNVOTES1_i$, which we use to identify data on common support. In the $UNVOTES1_i$ specification, estimated coefficients for all covariates had the predicted signs, the estimated coefficient for $DISTANCE_I$ is statistically significant at the five percent level, and the estimated coefficients for $DEST\_GDP_i$ and $UNVOTES1_i$ are both statistically significant at the ten percent level. The pseudo-R^2 of .34 shows that a substantial proportion of variation has been explained.

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[17] If we code abstentions as non-conforming votes, our results are broadly similar. The U.S. still records the most non-conforming votes (18), followed by Israel (17), the United Kingdom (14), Switzerland, Slovakia, Romania, Poland, Italy (12), Albania, Australia, Belgium, Germany (11), Bulgaria, Canada, Finland, Korea, Turkey (10), India (8), Russia, Japan (7), New Zealand (5), Kazakhstan(4), Pakistan (3), Honduras, Papua New Guinea, and South Africa (1). Votes by all other countries are identical in $UNVOTES1_i$ and $UNVOTES2_i$.

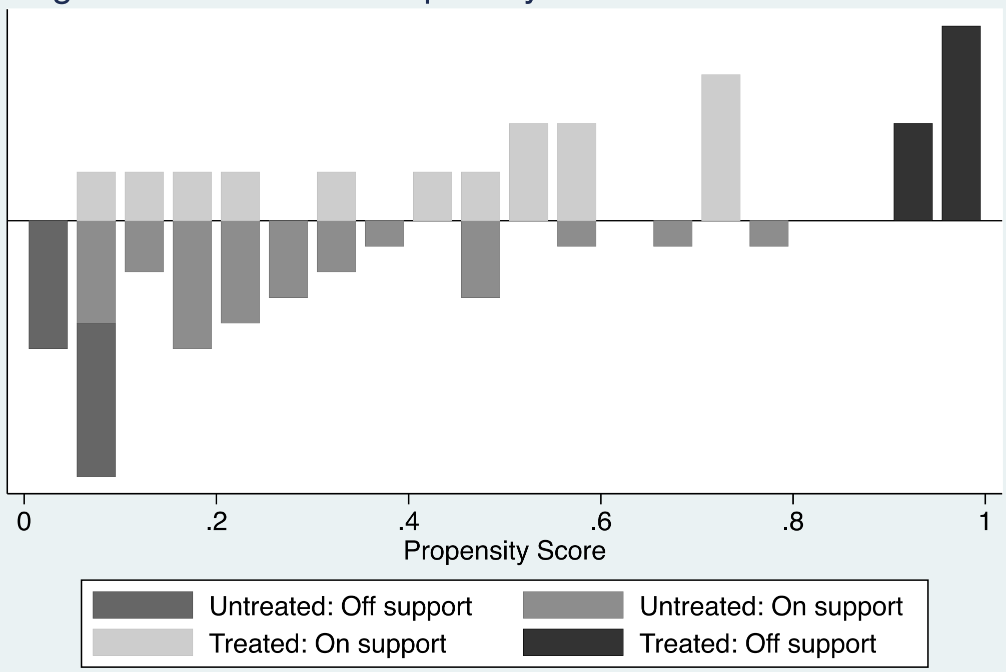
Table 5. Probit Estimates of Propensity Scores
(Dependent Variable: ADS Status in 2003)

	$UNVOTES2_i$	$UNVOTES1_i$
$DISTANCE_i$	-1.20**	-1.25**
	(0.45)	(0.42)
$ETHNICITY_i$	10.15	9.99
	(17.58)	(17.68)
$TRADE\_SURPLUS_i$	6.43	6.00
	(5.98)	(5.96)
$WORLD\_HERITAGE_i$	0.03	0.02
	(0.03)	(0.03)
$UNVOTES2_i$	-0.22*	
	(0.12)	
$UNVOTES1_i$		-0.10*
		(0.06)
$DEST\_GDP_i$	0.29*	0.28*
	(0.16)	(0.16)
CONSTANT	2.58	3.16
	(4.20)	(4.13)
N	58	58
Log Likelihood	-24.49	-25.38
LR $X^2(6)$	25.74	23.97
Prob > X^2	00.00	00.00
Psuedo R^2	0.34	0.32

Note: See note to Table 4. For data sources, see appendix.

Figure 2 provides a histogram of the density function of the propensity scores for treated and untreated countries, both on and off support. It reveals that most treated (untreated) countries can be paired with corresponding untreated (treated) countries with similar propensity scores, a property that should facilitate matching. Table 6 indicates that roughly equal proportions of the treated observations (29 percent) and untreated observation (30 percent) are off common support. Visual inspection of Figure 2 shows that the propensity scores for all treated countries off common support were substantially higher than the propensity scores for the nearest untreated countries. The visual evidence is, however, not as compelling for untreated countries off common support.

Figure 2. Estimated Propensity Scores: Treated with ADS



A necessary condition for matching methodologies to yield more efficient estimates is for covariates in the treated and untreated samples to be balanced. Table 6 provides two comparisons of the means of the treated and untreated unmatched samples and the treated and untreated matched samples. First, the null hypothesis that the means of the covariates are equal in the treated and untreated samples is rejected by a *t*-test at the ten percent level of statistical significance for $ETHNICITY_i$ and at the one percent level for $DISTANCE_I$. However, a comparison of the means of covariates in the treated and untreated matched samples yields different results: the null hypothesis of equal means for each covariate cannot be rejected by a t-test at the ten percent level of statistical significance.

Table 6. Treated v. Controls: Countries with ADS Agreement in 2003

Treatment Assignment	Off Support	On Support	Total
Untreated	11	27	38
Treated	6	14	20
Total	17	41	58

	Mean Treated	Mean Control	Bias	*t*-test	*p*>|*t*|
$DISTANCE_i$					
Unmatched	7.96	8.60	-106.5	-4.06	0.00
Matched	8.26	8.29	5.2	-0.15	0.88
$ETHNICITY_i$					
Unmatched	0.06	0.00	42.9	1.88	0.07
Matched	0.01	0.01	1.3	-0.33	0.75
$TRADE\_SURPLUS_i$					
Unmatched	0.004	0.00	-4.5	-0.15	0.88
Matched	0.006	0.00	15.6	0.53	0.60
$WORLD\_HERITAGE_i$					
Unmatched	8.10	7.16	11.0	0.40	0.69
Matched	9.36	11.26	-22.2	-0.46	0.65
$UNVOTES2_i$					
Unmatched	0.95	2.29	-46.5	-1.52	0.13
Matched	1.29	1.32	-1.0	-0.04	0.97
$DEST\_GDP_i$					
Unmatched	25.19	24.43	37.2	1.35	0.18
Matched	24.71	24.87	-7.9	-0.21	0.84

Table 7. ADS Propensity Score for Foreign Destinations (2003)

Country	Treated	Propensity Score	Year Awarded ADS
		Outside Common Support	
United States	0	0.00672	2007
Albania	0	0.00673	-
Israel	0	0.00880	2008
Slovakia	0	0.03326	2004
Honduras	0	0.03965	-
Bulgaria	0	0.05137	2007
Botswana	0	0.05321	2006
Romania	0	0.05888	2004
Ghana	0	0.05952	2009
Costa Rica	0	0.06498	2007
United Kingdom	0	0.07172	2005
		Inside Common Support	
Maldives	1	0.07557	2003
Poland	0	0.08084	2004
Chile	0	0.08337	2005
Guatemala	0	0.08635	-
Uganda	0	0.08964	2007
Nigeria	0	0.12585	2006
Belgium	0	0.13103	2004
New Zealand	1	0.14135	1999
Venezuela	0	0.15042	2007
Peru	0	0.15386	2005
Switzerland	0	0.16204	2004
Finland	0	0.16236	2004
Cuba	1	0.18336	2003
Bahrain	0	0.18763	-
Jordan	0	0.20050	2004
Morocco	0	0.20995	2007
Papua New Guinea	0	0.22029	2009
Turkey	1	0.22293	2002
Mongolia	0	0.24866	2006
Nicaragua	0	0.25930	-

Table 7 (continued)

Lebanon	0	0.26000	2008
Ukraine	0	0.28722	-
Kuwait	0	0.31125	-
South Africa	1	0.31618	2003
Spain	0	0.32912	2004
Brazil	0	0.33669	2005
Canada	0	0.39434	2010
Egypt	1	0.41855	2002
Kazakhstan	0	0.45250	-
Saudi Arabia	0	0.45920	-
Italy	0	0.46516	2004
Australia	1	0.49239	1999
Nepal	1	0.51626	2002
Iran	0	0.52727	-
Sri Lanka	1	0.53825	2003
Germany	1	0.55753	2003
Russian Federation	0	0.56542	2005
Pakistan	1	0.57702	2003
Lao	0	0.68411	2005
India	1	0.72105	2003
Cambodia	1	0.72317	2000
Malaysia	1	0.72939	1990
Bangladesh	0	0.76470	2007
	Outside Common Support		
Indonesia	1	0.91227	2002
Vietnam	1	0.94825	2000
Korea	1	0.99083	1998
Thailand	1	0.99678	1988
Japan	1	0.99812	2000
Singapore	1	1.00000	1990

Note: The propensity score is estimated as in column 1 of table 5. Hong Kong and Macau are not included in this selection model.

Imbens and Wooldridge (2009) argue that a better measure of covariate balance is the difference in the estimated means of the treated and untreated observations "scaled by the square root of the sum of the variances" (p. 24). Imbens and Rubin (2010) propose as a rule of thumb for evaluating the scaled mean difference as an indicator of covariate balance that it be less than 0.25. For our treated and untreated observations on common support, scaled differences in the means of the matched treated and untreated samples of all covariates are less than 0.25, with five of the six scaled differences less than 0.156. Thus, both the *t*-test and the bias tests are consistent with a balance sample of treated and untreated panels.

7. FIXED EFFECTS REGRESSIONS USING DATA ON COMMON SUPPORT

How do our fixed effects estimates change when we use the sample on common support rather than our full sample? Results from fixed effects regressions using the sample on common support are reported in Table 8. The signs of the estimated coefficients for control variables are the same in each of the seven regression specifications as those reported in Table 4, but for the estimated coefficients for $ln(REALEX_{it})$ in one specification (column 5). This is not particularly important, as estimated coefficients for $ln(REALEX_{it})$ are statistically insignificant in all specifications for both the full and common support samples. We found two more substantial differences in results for control variables. All estimated coefficients for $ln(DEST\_GDP_{it})$ are positive and statistically significant at least at the ten percent level in full sample estimates whereas all are positive but statistically insignificant at the ten percent level in the common sample estimates. All estimated coefficients for $ln(\text{China}\_GDP_t)$ in the common support specifications are positive but are much higher in all specifications than those in the full sample specification. The seven estimated coefficients range between 1.18 and 1.86, implying much higher income elasticities of visitor arrivals from China than their counterparts reported in Table 4.

Since our analysis is focused on the percentage impact of a change in ADS status on visitor arrival flows, we pay close attention to the van Garderen and Shah (2002) transformation of the estimated coefficients on ADS and its lags into percentage impacts on visitor arrivals. We note two major differences between results from the full and the common support sample. First, the estimated percentage change in visitor arrivals during the first year that ADS has been implemented is substantially *lower* for the common support sample than for the full sample, while the estimated percentage change in visitor arrivals during that the third year in which ADS has been implemented is substantially *higher* in the common support sample. Second, the sum

Table 8. Fixed Effects Regressions on Arrivals from China, 1995-2005
(Data set restricted to countries on common support)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ADS_{it}	0.128	0.116	0.215**	0.142*	0.154**	0.122	0.154**
	(0.0776)	(0.0791)	(0.0886)	(0.0813)	(0.0756)	(0.0764)	(0.0748)
$L.ADS_{it-1}$	0.0551	0.181*		0.0450	0.0852	0.0547	0.0869
	(0.0827)	(0.105)		(0.0840)	(0.0891)	(0.0859)	(0.0901)
$L2.ADS_{it-2}$	0.237**			0.277**	0.244**	0.233**	0.243**
	(0.108)			(0.103)	(0.105)	(0.109)	(0.105)
$\ln(REALEX_{it})$	-0.130	-0.127	-0.121	-0.103	0.0115	-0.180	0.00351
	(0.195)	(0.195)	(0.193)	(0.199)	(0.173)	(0.194)	(0.169)
$\ln(DEST\_GDP_{it})$	1.052	1.140	1.167		1.107	1.022	1.100
	(0.824)	(0.807)	(0.795)		(0.842)	(0.817)	(0.839)
$\ln(CHINA\_GDP_{t})$	1.179***	1.180***	1.198***	1.423***	1.803***	1.232***	1.856***
	(0.254)	(0.250)	(0.248)	(0.176)	(0.357)	(0.254)	(0.363)
$\ln(Q_{TC}/Q_{T})_{t}$	0.356*	0.345*	0.338*	0.321*	0.130		
	(0.187)	(0.190)	(0.191)	(0.181)	(0.154)		
$NADS_{it}$					-0.0163**		-0.0172**
					(0.00716)		(0.00725)
CONSTANT	-33.49***	-34.13***	-34.78***	-31.84***	-49.85***	-32.94***	-50.62***
	(4.868)	(4.802)	(4.628)	(5.006)	(10.06)	(4.773)	(10.17)
$Per(ADS_{it})$	0.134*	0.119*	0.235**	0.148*	0.163**	0.126*	0.162**
	(0.088)	(0.088)	(0.109)	(0.093)	(0.088)	(0.086)	(0.087)
$Per(L.ADS_{it-1})$	0.053	0.192*		0.042	0.085	0.052	0.086
	(0.087)	(0.125)		(0.087)	(0.096)	(0.090)	(0.097)
$Per(L2.ADS_{it-2})$	0.260**			0.312**	0.269**	0.255**	0.268**
	(0.135)			(0.135)	(0.133)	(0.136)	(0.133)
N	371	371	371	371	371	371	371
adj. R^2	0.643	0.639	0.637	0.635	0.651	0.641	0.652

Note: Standard errors in parentheses; *=p<0.10; **=p<0.05; *** =p<0.01

of the statistically significant elasticities for ADS and its lags ranges from 0.235 to 0.470. The range of elasticity estimates in the common support sample is larger than in the full sample (a minimum of 0.235 rather than 0.313 and a maximum of 0.470 rather than .435) and the average elasticity is slightly higher, 0.398 rather than 0.378.[18]

8. SEMIPARAMETRIC MATCHED DIFFERENCE-IN-DIFFERENCES ESTIMATES

We follow the five-step approach outlined by Persson and Tabellini (2007) for implementing our difference-in-differences estimator of the effects of ADS on visitor arrivals. (1) Using the same probit regression covariates previously used to calculate propensity scores for the full sample, we estimate propensity scores for the sample on common support. (2) For each country receiving ADS, we calculate average growth rates for the three years prior to ADS and for three years after ADS commences.[19] We label the difference between these two averages as g_i:

(11) $$g_i = \frac{1}{3}\sum_{t}^{t+2} VA_{it}^{g} - \frac{1}{3}\sum_{t-3}^{t-1} VA_{it}^{g}$$

where VA_{it}^{g} is the annual growth of tourist arrivals from period t and t-1. (3) For each control country, we calculate average growth rates for the three years prior to ADS in the treated country and for the three years after ADS commences. We label the difference between the two averages as g_i^j, where j refers to the jth control country. (4) For each treated country, we then compute the country-specific non-parametric difference-in-difference estimator $\hat{\alpha}_i$ i.e., the effect of ADS on treated country i relative to the (weighted) growth of tourism arrivals in the j control countries:

(12) $$\hat{\alpha}_i = g_i - \sum_j w_{i,j} g_i^j$$

where $w_{i,j} \geq 0$ are weights derived from the propensity scores and $\sum_j w_{i,j} = 1$. Some control countries received a zero weight because their propensity to receive ADS was very different

[18] Regressions with a lagged dependent variables estimated using Blundell-Bond instrumental variable methods again yielded estimated coefficients for ADS and ADS lagged one and two periods that were statistically insignificant at the 10 percent level.

[19] The three-year period includes the year in which ADS is awarded.

from the treated country with which they were matched. (5) The average estimated treatment effect of the transition to ADS in the group of treated countries is the simple average of each country's individual treatment effect:

(13) $\hat{\alpha} = \frac{1}{N}\sum_{i}\hat{\alpha}_i$

where N denotes the number of treated countries in our sample.

Computation of the standard error for $\hat{\alpha}$ is complicated by our matching method, in which a control country may be matched to different treated countries at different dates, thereby potentially introducing correlation between the controls for tourism growth across treated countries. We follow Lechner's (2001) methods—as modified by Persson and Tabellini (2007)—and compute upper and lower bounds for the estimated variance of $\hat{\alpha}$.

We report results for each country, for three variants of the sample of countries on common support, and for two different matching methods [20] Consider first the difference in the average growth rate of visitor arrivals for treated countries for the three-year periods before and after treatment with ADS (Table 9, column 1). It is notable that five of the thirteen treated countries—the Maldives, Nepal, Turkey, Sri Lanka, and Germany--had a negative change in the growth rate of visitor arrivals from China. Examination of the circumstances of each country reveals specific negative shocks affecting three of the five countries—the Maldives, Nepal, and Turkey—in the post-ADS window. The Maldives received ADS in December 2002 and registered solid increases in visitor arrivals from China in 2003 and 2004. The -41.06 percent fall in the growth rate of Chinese arrivals to the Maldives over the 2003-2005 period clearly stems from the catastrophic effect of the 26 December 2004 Indian Ocean tsunami on all tourism arrivals to the Maldives during 2005. Nepal received ADS in 2002, but visitor arrivals from China fell after the agreement was concluded due to the violent civil war that intensified over the 2002-2004 period, reaching Nepal's main cities and tourist destinations. Turkey received ADS in December 2001, but the growth rate of visitor arrivals from China fell by 10.56 percent during

[20] Table 9 reports DID results for the three variants of the sample of countries on common support using two different matching methods: Epanechnikov kernel matching and Gaussian kernel matching. Since results from the two methods are broadly similar, we focus our discussion on the overall and country-specific Epanechnikov kernel matching results.

Table 9. Visitor Arrivals from China: Matching Estimates of Effect of ADS Agreement

A. Epanechnikov Kernel Matching Estimates by Country

Country	Change in Growth Rate: Treated Country	Change in Growth Rate: Control Countries (Weighted)	DID Country-Specific Effect
Australia	3.71	-10.44	14.15
Cambodia	16.05	-2.35	18.40
Cuba	14.77	3.28	11.49
Egypt	9.87	1.03	8.84
Germany	-0.34	-9.19	8.85
Maldives	-41.01	-3.91	-37.10
Nepal	-24.85	2.19	-27.04
New Zealand	15.69	-17.99	33.68
Pakistan	32.29	-6.05	38.34
South Africa	4.40	-6.05	10.45
Sri Lanka	-3.76	-12.08	8.32
Turkey	-10.56	-1.02	-9.54

B. Epanechnikov Kernel Matching Estimates for Full Sample and Full Sample without Outliers

	Full sample	Full Sample w/o Maldives	Full Sample w/o Maldives & Nepal
Matching estimate	6.57	10.54	14.30
Lower bound s.d. of estimate	5.77	4.71	3.99
Upper bound s.d. of estimate	5.89	4.88	4.31

C. Gaussian Kernel Matching Estimates for Full Sample and Full Sample without Outliers

	Full sample	Full Sample w/o Maldives	Full Sample w/o Maldives & Nepal
Matching estimate	7.18	11.94	15.73
Lower bound s.d. of estimate	5.92	4.67	3.93
Upper bound s.d. of estimate	6.01	4.77	4.08

the 2002-2004 period due to rising tensions in the Middle East during 2002 and the war in Iraq in 2003. The weighted changes in the growth rates of visitor arrivals from China for control countries matched to each treated country are reported in Table 9, column 2. The changes in the growth rates of ten of the thirteen sets of control countries are negative; the average change is -5.95 percent. These results indicate that comparison of changes in treated countries with changes in control countries changed the sign of ADS treatment for two countries—Sri Lanka and Germany—and substantially changed the magnitude of the treatment effect for seven countries. In the nine countries with positive treatment effects, changes in the growth rate of Chinese arrivals in control countries added more than 8 percent in each country, ultimately accounting for 44.75 percent of the overall treatment effect. The difference-in-differences estimates of ADS treatment were positive in ten of the thirteen treated countries and displayed a sweeping range, from -37.10 percent in the Maldives to 38.34 percent in Pakistan (Table 9, column 3).

In panel B of Table 9, we report difference-in-differences (DID) estimates for three samples of treated countries: the full common support sample, the common support sample without the Maldives, and the common support sample without the Maldives and Nepal. The DID estimate of the average treatment effect for the treated countries for the common support sample is 6.57 percent and is not statistically significant at the 10 percent level. Given the substantial variation in both the sign and magnitudes of the individual country estimates, this finding is not particularly surprising.

How do our results change if we exclude one country from the sample, the Maldives, that after being devastated by the 2004 Indian Ocean Tsunami, had a smaller capacity to receive tourists in 2005 than in 2004? Without the Maldives, the matching DID estimates increase substantially, from 6.57 percent to 10.54 percent, and become statistically significant at the five percent level, using both the upper and lower bounds of the standard deviation of the estimate. How do our results change if we also exclude Nepal, where a long-running civil war with a well-organized Maoist insurgency expanded to cities and tourist areas during the 2002-2004 period? Without the Maldives and Nepal, the matching DID estimates again increase substantially, from 10.54 percent to 14.30 percent, and become statistically significant at the one percent level, using both the upper and lower bounds of the standard deviation of the estimate. Sometimes outliers matter.

9. CONCLUSION

Our empirical work yields two broad results. First, the three econometric methodologies used to estimate the effect of ADS on mainland Chinese trips to foreign destination—fixed effects using the full sample, fixed effects on the common support sample, and semiparametric matched difference in differences—yield very different estimates of the effect of ADS. Fixed effects estimates show that ADS increased mainland Chinese trips to ADS destinations over three years in the full sample by 37.8 percent and the common support sample by 39.8 percent; by contrast semiparametric matched DID estimates show that ADS yielded a much lower (19.7 percent) increase in mainland Chinese trips that was not statistically significant. Only when two outliers are eliminated from the common support samples do the DID estimates become comparable in sign and magnitude with the fixed effects estimates. Second, there is wide variation in both the sign and the magnitude of the DID estimates of the effect of ADS for individual countries. This heterogeneity provides an important clue as to why the DID estimates of the ADS effect for the common support sample were statistically insignificant.

For those who would like to extrapolate from these estimates, some caution is in order. First, our estimates of ADS impact are average treatment effects for treated countries, and they may differ from average treatment effects that could actually be realized for untreated countries. Second, China has been growing so rapidly—8-11 percent real GDP growth annually through 2011—that the use of our surprisingly large income elasticities of visitor arrivals to infer much about future Chinese visitor arrivals could be perilous. If China's growth continues at these rates, its economy will double in size over the next six-to-eight years, putting it far beyond the range of the samples used in this paper.

APPENDIX: DATA SOURCES

$CHINA\_GDP_t$: China Real GDP ($US2000). Data are from World Bank (2006). Statistics retrieved November 2011 from World Development Indicators Online Database.

$DEST\_GDP_{it}$: Destination Real GDP Per Capita ($US2000). Data are from World Bank (2006). Statistics retrieved November 2011 from World Development Indicators Online Database. We dropped Monaco and Myanmar from our sample due to a lack of reliable GDP data.

$DISTANCE_i$: Average kilometers from Shanghai and from Beijing to capitol city of each country. http://www.cepii.fr/anglaisgraph/bdd/distances.htm (last access 8 September 2008).

VA_{it}: Visitor Arrivals from China. Data are from UNWTO (2004a, 2004b, 2007c).

ADS_{it}: Annual binary variable indicating whether a country had implemented an ADS agreement during or prior to the observation year. ADS dates are from the website of the China National Tourism Administration (CNTA). At http://www.cnta.gov.cn/html/2009-5/2009-5-13-10-53-54953.html. (Last access on May 1, 2012.)

$ETHNIC_i$: Percent of Ethnic Chinese in Country Population in 2005. Overseas Compatriot Affairs Commission(OCAC), Republic of China, (2008). Statistics retrieved March, 2008, from http://www.ocac.gov.tw/english/public/public.asp?selno=1163&no=1163&level=B (last access April 9, 2009). Additional data was retrieved from other sources for New Zealand and Cuba. Statistics New Zealand (2006 data) at http://www.stats.govt.nz/census/2006-census-data/quickstats-about-culture-identity/quickstats-about-culture-and-identity.htm?page=para015Master (last access on 9 April 2009). CIA World Factbook, Cuba (2008 data) at https://www.cia.gov/library/publications/the-world-factbook/geos/cu.html (last access 15 May 2009).

$WORLD\_HERITAGE_i$. Number of properties per country on the World Heritage List in 2003. At http://whc.unesco.org/en/list (last access on 9 November 2011).

$TRADE\_SURPLUS_i$: Country Trade Surplus of China. China Net Exports are from the International Monetary Fund, Directions of Trade Statistics Online Database. Last access on 9 November 2011.

Q_{TCt}: Trips taken by Chinese within China. Data for 1994 to 2004 are from National Bureau of Statistics of the PRC, *China Statistics 2005*, Table 19-7. At http://www.allcountries.org/china_statistics/19_7_statistics_of_domestic_tourism.html. Last access on 10 April 2009. Data for 2005-2010 are from National Bureau of Statistics of China, *Statistical Communiqué of the People's Republic of China,* annual report. At http://www.stats.gov.cn/english/StatisticalCommuniques/ (last access on 19 March 2012).

Q_{Tt}: Total Foreign Travel by China's Residents. National Bureau of Statistics of China, *Statistical Communiqué of the People's Republic of China,* annual report. At http://www.stats.gov.cn/english/StatisticalCommuniques/ (last access on 19 March 2012).

$UNVOTES1_i$: United Nations General Assembly votes made by each country on 18 resolutions offered during the 58th session of the U.N. General Assembly. Votes pertain to items #64 through #79, which primarily cover disarmament, nuclear proliferation, and nuclear test bans. The variable is count data ranging from 0 to 18, each country's value coded as the number of the country's votes that conflict with China's votes. We do not count a country's abstention on a resolution as in conflict with China's "yes" vote. Data are from United Nations (2003).

$UNVOTES2_i$: Same as UNVOTES1 except that we count a country's abstention on a resolution as a vote in conflict with China's "yes" vote.

PRC ARRIVALS IN HONG KONG AND MACAU: UNWTO (2004b) and UNWTO (2007c) for data through 2005. Data for 2006 to 2010 are from Tourism Commission, Government of Hong Kong (2011) and Tourist Office, Macau Government (2012).

Appendix Table 1. Fixed Effects Regressions on Arrivals from China**
(Includes Hong Kong and Macau)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ADS_{it}	0.145	0.137	0.235**	0.154*	0.154*	0.136	0.154*
	(0.0875)	(0.0879)	(0.0991)	(0.0877)	(0.0880)	(0.0841)	(0.0870)
$L.ADS_{it-1}$	0.0675	0.170*		0.0688	0.0791	0.0716	0.0840
	(0.0668)	(0.0873)		(0.0655)	(0.0686)	(0.0661)	(0.0683)
$L2.ADS_{it-2}$	0.179*			0.201**	0.181*	0.168	0.179*
	(0.101)			(0.0903)	(0.0993)	(0.101)	(0.0992)
$\ln(REALEX_{it})$	-0.171	-0.180	-0.181	-0.162	-0.120	-0.241	-0.126
	(0.145)	(0.147)	(0.148)	(0.139)	(0.146)	(0.150)	(0.146)
$\ln(DEST\_GDP_{it})$	1.157**	1.209**	1.247**		1.203**	1.121**	1.207**
	(0.508)	(0.496)	(0.487)		(0.518)	(0.503)	(0.519)
$\ln(CHINA\_GDP_{t})$	1.447***	1.430***	1.434***	1.703***	1.533***	1.007***	1.420***
	(0.262)	(0.264)	(0.263)	(0.249)	(0.286)	(0.230)	(0.273)
$\ln(Q_{TC}/Q_{T})_{t}$	0.410**	0.395*	0.391*	0.365*	0.195		
	(0.204)	(0.204)	(0.204)	(0.207)	(0.199)		
$NADS_{it}$					-0.00896		-0.0117**
					(0.00597)		(0.00568)
CONSTANT	-41.74***	-41.61***	-42.01***	-39.31***	-43.43***	-27.55***	-39.48***
	(8.088)	(8.130)	(8.068)	(7.505)	(8.627)	(5.173)	(7.655)
$Per(ADS_{it})$	0.152*	0.142*	0.259**	0.162**	0.162*	0.1941*	0.162*
	0.101	0.100	0.124	0.102	0.102	0.096	0.101
$Per(L.ADS_{it-1})$	0.067	0.180**		0.069	0.080	0.072	0.085
	0.071	0.103		0.070	0.074	0.070	0.074
$Per(L2.ADS_{it-2})$	0.190*			0.218**	0.193	0.177*	0.190*
	0.119			0.110	0.118*	0.118	0.118
N	577	577	577	585	577	577	577
adj. R^2	0.557	0.555	0.553	0.543	0.559	0.553	0.559

Note: See note for Table 4.

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