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# The Lottery Receipt's Effect on Tax Declaration in Urban China

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# The Lottery Receipt's Effect on Tax Declaration in Urban China

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## Abstract

China has introduced lottery receipt experiment (LRE) to capture taxation base.

In this paper, we did some estimations based on individual data from the "Chinese Household Survey on Consumers' Preference and Satisfaction 2006," and found that LRE in the six biggest city, Shanghai, Beijing, Chengdu, Guangzhou, Shenyang, Wuhan, in China has promoted consumers' tax declaration by asking for official receipts. We also give suggests to the government to improve the system, for example, by largely raising the prize or by giving the consumer not lottery but direct cash back as presented in Wan (2009a, 2009b, and forthcoming).

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## 1 Introduction

Indirect (e.g. sales) tax collection is difficult because it is hard for the government to monitor the economic dealings. Thus, tax evasion is a very serious issue in the world and especially in China, just as shown in Wan (2004, 2006, 2009a, 2009b, and forthcoming). In most countries, to cheat, the seller incurs costs, and to audit the seller, so does the government. To solicit the information on a transaction known only to the seller and buyer, many Asian governments (e.g. Taiwan, Mainland China, Korea, Phillipines) have set up a lottery receipt system and has tried it out in many areas. Wan (2009a) shows that if the government gives a proper subsidy (e.g. issue a lottery receipt or tax deduction) to the consumer under a complete competitive market, the consumer will voluntarily and fully declare the tax so that the seller cannot cheat, and that the cheating cost can be totally saved while the auditing cost can be partially or totally saved under some condition (Pareto improving and efficiency); the optimal indirect taxation becomes practicable. In Wan (2009b), the estimation is performed based on panel data for 1998-2003 from a total of 37 districts in Beijing and Tianjin. It is found that the lottery receipt experiment (LRE) has significantly raised the business tax revenue, its growths as well as total tax revenues.

However, there is no any research on the LRE based on individual data set. In

this paper, we try to use a rich micro data set to clarify the LRE's impact on consumers' tax declaration by asking for and receiving official receipts. We found that the evidence based on individual data in the "Chinese Household Survey on Consumer Preferences and Satisfaction 2006" supports that the LRE has promoted consumers' tax declaration.

Section 2 contains a brief introduction on the data set. Section 3 describes the econometric method and the estimation results. Finally Section 4 concludes.

## **2 Individual 'Panel' Data Set**

In February in 2006, the 21st Century Center of Excellence Program "Behavioral Macrodynamics based on Surveys and Experiments" of Osaka University performed a survey of Chinese households in the six biggest city, Shanghai, Beijing, Chengdu, Guangzhou, Shenyang, Wuhan, where LRE were introduced in 2003, 2002, 2004, 2001, 2002 and 1998, respectively. 250 households were randomly sampled in each city, and totally 1,500 households data were obtained by directly interviewing the respondents. The questions and answers on lottery receipt are included in the questionnaire are as follows, and the numbers in the square brackets "[ ]" followed the answers will be used in the next section as dependent or independent variables.

Question 1: Did you ask for and receive an official receipt when you went

shopping or eating out before the Lottery Receipt System worked in your residence?

479 respondents answered 'Yes,' while 1021 respondents answered 'No.'

Question 2: (for the 479 respondents who answered 'Yes' in Question 1) How often did you ask and receive an official receipt? I asked for and received an official receipt per ( ? ) times shopping or eating out.

On average 2.53 times.

Question 3: (for the 479 respondents who answered 'Yes' to Question 1) Why did you ask and receive an official receipt? (Multiple choices are OK)

3.1) Because I needed official receipt for accounting;

174 respondents answered 'Yes.' [b32\_2\_1]

3.2) Because additional payment was not required when I asked for the official receipt;

74 respondents answered 'Yes.' [b32\_2\_2]

3.3) Because tax revenue gives both the country and myself benefits;

316 respondents answered 'Yes.' [b32\_2\_3]

3.4) Others.

11 respondents answered 'Yes.' [b32\_2\_4]

Question 4: (for all the 1,021 respondents who answered 'No' to Question 1)

Why did you not ask for and receive an official receipt? (Multiple choices are OK)

4.1) Because additional payment was required when I asked for the official receipt;

63 respondents answered 'Yes.' [b32\_3\_1]

4.2) Because it was very troublesome to ask and receive the official receipt;

763 respondents answered 'Yes.' [b32\_3\_2]

4.3) Because the lottery was not printed on the official receipt;

193 respondents answered 'Yes.' [b32\_3\_3]

4.4) Others.

137 respondents answered 'Yes.' [b32\_3\_4]

Question 5: Did you ask for and received a lottery receipt when you went shopping or eating out in 2005?

834 respondents answered 'Yes,' while 666 respondents answered 'No.'

Question 6: (for the 834 respondents who answered 'Yes' to Question 5) How often did you ask for and receive a lottery receipt? I asked for and received a lottery receipt per ( ? ) times shopping or eating out.

On average 1.81 times.

Question 7: (for the 834 respondents who answered 'Yes' to Question 5) Why did you ask for and receive a lottery receipt? (Multiple choices are OK)

7.1) Because I needed receipt for accounting purpose;

153 respondents answered 'Yes.' [b33\_2\_1]

7.2) Because additional payment was not required when I asked for the receipt;

57 respondents answered 'Yes.' [b33\_2\_2]

7.3) Because tax revenue gives both the country and myself benefits;

373 respondents answered 'Yes.' [b33\_2\_3]

7.4) Because the lottery was printed on the receipt;

663 respondents answered 'Yes.' [b33\_2\_4]

7.5) Others.

9 respondents answered 'Yes.' [b33\_2\_5]

Question 8: (for the 666 respondents who answered 'No' to Question 5) Why

did you not ask for and receive a lottery receipt? (Multiple choices are OK)

8.1) Because additional payment was required when I asked for the lottery receipt;

26 respondents answered 'Yes.' [b33\_3\_1]

8.2) Because it was very troublesome to ask for and receive the lottery receipt;

420 respondents answered 'Yes.' [b33\_3\_2]

8.3) Because I thought that it was very difficult to get the lottery prize even if I had the  
lottery receipt;

247 respondents answered 'Yes.' [b33\_3\_3]

8.4) Others.

89 respondents answered 'Yes.' [b33\_3\_4]

### **3 Empirical results**

#### **3.1 Results by simple comparisons**

For the 1,021 respondents who did not ask for and receive official receipts before the LRE, 384 respondents ( $384/1,021=37.6\%$ ) asked for and received lottery receipts per 2.039 times shopping or eating out after the LRE, and 331 respondents ( $331/384=86.2\%$ ) answered that the reason is “because the lottery was printed on the receipt.” Therefore, the frequency of receiving receipt was significantly and largely increased by the LRE (p-value = 0.000 by difference test).

For the 479 respondents who did ask for and receive official receipts before the Lottery Receipt System worked: they asked for and received official receipts per 2.532 times shopping or eating out, while after the LRE 450 respondents of them did ask for and receive official receipts per 1.620 times shopping or eating out, and 332 respondents ( $332/450=73.7\%$ ) answered that the reason is “because the lottery was printed on the receipt.” Therefore, the frequency of receiving receipt was also significantly increased by the LRE (p-value = 0.000 by difference test).

### 3.2 Results by estimation

We define ``freq" as a dependent variable for estimation. The ``freq" means the frequency of receiving receipts, thus is equal to the reciprocal of the answer of Questions 2 (Before the LRE, how often did you ask and receive an official receipt? I asked for and received an official receipt per ( ? ) times shopping or eating out.) and 6 (After the LRE, how often did you ask and receive an official receipt? I asked for and received an official receipt per ( ? ) times shopping or eating out.). If the respondent does not receive receipts, then the ``freq" will be zero because the reciprocal of the infinity (I asked for and received an official receipt per *infinity* times shopping or eating out.) is equal to zero. We also define the frequency of receiving receipts before the LRE as ``freq\_before," while the one after LRE as ``freq\_after." The other variables are defined in the last section. The summary statistics of all variables are shown in Table 1.

We use four linear probability models to empirically capture the lottery receipt effect on the frequency of receiving receipts. The estimation results by the Ordinary Least Square (OLS) with the White robust standard errors are summarized in Table 2. We have interests on the results of the variables that directly show the reasons before and after the lottery receipt system.

In Table 2, the key variables are b32\_3\_2, b32\_3\_3, b33\_2\_4. b32\_3\_2 and b32\_3\_3 have significantly negative effects on ``freq\_before," while have significantly positive effects on ``freq\_after." b33\_2\_4 has significantly positive impact on ``freq\_after." According to these results, it is found that lottery receipt system have significantly positive effect on the frequency of asking receipts.

However, when we turn to see the b33\_3\_1, b33\_3\_2, b33\_3\_3, and b33\_3\_4, we found these variables all have significantly negative effects on ``freq\_after." Thus, the lottery receipt system in China in 2005 can not completely solve the tax evasion problem, and it needs improvements. For example, as suggested by Wan (2009a), the government may give the consumer not lottery number but proper cash back.

When a consumer asks for and receives official receipts, the government can simultaneously know the transaction between a buyer and a seller, then easily collect the sales tax. For a consumer, LRE is given and it is very difficult to consider that he or she moves to a new district because of LRE, thus we controlled for the "self-selection problem" very well and the empirical results here are reliable. The evidence from the micro "panel" data supports that LRE significantly promotes the consumer to declare tax by asking for and receiving official receipts.

#### 4 Conclusion

We controlled for the self-selection problem well by using “panel” individual data. Evidence based on Chinese Household Survey 2006 strongly supports that the LRE has significantly promoted consumers to declare tax. The policy implication here is that the China government had better go on this new system, and further improve the system by largely raising the prize or by giving the consumer not lottery but proper direct cash back as presented by Wan (2009a, 2009b, and forthcoming).

For future research, we must clarify more specifically the consumer preference for the purchases of lottery tickets. Moreover, we must obtain nationwide information and perform detailed analyses based on individual data in underdeveloped rural sectors, including attitudes toward the Lottery Receipt System. Additionally, because playing the lottery is a form of gambling, we must consider the social cost of gambling in relation to social welfare.<sup>2</sup>

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<sup>2</sup> However, tax evasion is penalized in every country when it is detected by government, thus tax evasion is also a form of gambling.

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Table 1: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
(frequency of receiving receipts)					
freq_after	1500	0.4283	0.4476	0	1
freq_before	1500	0.2062	0.3597	0	1
(reasons before lottery receipt system)					
b32_2_1	1500	0.1160	0.3203	0	1
b32_2_2	1500	0.0493	0.2166	0	1
b32_2_3	1500	0.2107	0.4079	0	1
b32_2_4	1500	0.0073	0.0853	0	1
b32_3_1	1500	0.0420	0.2007	0	1
b32_3_2	1500	0.5087	0.5001	0	1
b32_3_3	1500	0.1287	0.3349	0	1
b32_3_4	1500	0.0913	0.2882	0	1
(reasons after lottery receipt system)					
b33_2_1	1500	0.1020	0.3027	0	1
b33_2_2	1500	0.0380	0.1913	0	1
b33_2_3	1500	0.2487	0.4324	0	1
b33_2_4	1500	0.4420	0.4968	0	1
b33_2_5	1500	0.0060	0.0773	0	1
b33_3_1	1500	0.0173	0.1306	0	1
b33_3_2	1500	0.2800	0.4491	0	1
b33_3_3	1500	0.1647	0.3710	0	1
b33_3_4	1500	0.0593	0.2363	0	1
(respondent's age)					
age	1500	41.7547	13.1913	19	69
age_squared	1500	19.1735	11.3054	3.6100	47.6100
(respondent's career dummies)					
company_manager	1500	0.0093	0.0962	0	1
self_employer	1500	0.1207	0.3258	0	1
public_firm_worker	1500	0.1940	0.3956	0	1
public_employee	1500	0.0107	0.1028	0	1
non_worker	1500	0.4227	0.4941	0	1
(income and asset)					
personal_income	1500	0.1383	0.1300	0	2
family_income	1500	0.0559	0.2268	0.0050	5.0000
family_asset	1500	0.3010	0.4002	0	8
(respondent's education)					
high_school	1500	0.4160	0.4931	0	1
college	1500	0.1507	0.3578	0	1
university	1500	0.0927	0.2901	0	1
graduated	1500	0.0067	0.0814	0	1
(city dummies)					
shanghai	1500	0.1667	0.3728	0	1
beijing	1500	0.1667	0.3728	0	1
chengdu	1500	0.1667	0.3728	0	1
guangzhou	1500	0.1667	0.3728	0	1
wuhan	1500	0.1667	0.3728	0	1

Table 2: Lottery Receipt Effect by Linear Probability Model

Dependent Variable Explanatory Variable	Freq_before Model 1	Freq_after Modle 2	Freq_after Model 3	Freq_after Modle 4
freq_before				0.3954 *** (0.0319)
(reasons before lottery receipt system)				
b32_2_1	0.2843 *** (0.0316)	0.0987 ** (0.0353)		-0.0112 (0.0344)
b32_2_2	0.1325 ** (0.0447)	0.0297 (0.0377)		-0.0167 (0.0327)
b32_2_3	0.4363 *** (0.0282)	0.1407 *** (0.0303)		-0.0204 (0.0314)
b32_2_4	0.2209 ** (0.0812)	0.1082 (0.0819)		0.0179 (0.0880)
b32_3_1	-0.0846 *** (0.0203)	0.1067 ** (0.0372)		0.1475 *** (0.0358)
b32_3_2	-0.1520 *** (0.0200)	0.0441 (0.0267)		0.1093 *** (0.0267)
b32_3_3	-0.0987 *** (0.0152)	0.0975 *** (0.0264)		0.1367 *** (0.0262)
b32_3_4	-0.1406 *** (0.0210)	0.0203 (0.0434)		0.0797 (0.0433)
(reasons after lottery receipt system)				
b33_2_1		0.0474 (0.0348)	0.0934 ** (0.0285)	0.0437 (0.0328)
b33_2_2		0.0517 (0.0469)	0.0548 (0.0460)	0.0480 (0.0430)
b33_2_3		0.1360 *** (0.0219)	0.1801 *** (0.0199)	0.1074 *** (0.0217)
b33_2_4		0.1879 *** (0.0261)	0.2249 *** (0.0247)	0.2027 *** (0.0245)
b33_2_5		0.0480 (0.1041)	0.0492 (0.0961)	0.0501 (0.0955)
b33_3_1		-0.2489 *** (0.0494)	-0.1937 *** (0.0517)	-0.2581 *** (0.0416)
b33_3_2		-0.3172 *** (0.0237)	-0.3086 *** (0.0218)	-0.3217 *** (0.0230)
b33_3_3		-0.2608 *** (0.0222)	-0.2361 *** (0.0208)	-0.2658 *** (0.0216)
b33_3_4		-0.2934 *** (0.0419)	-0.3013 *** (0.0275)	-0.2915 *** (0.0406)
(respondent's age)				
age	-0.0042 (0.0028)	-0.0014 (0.0034)	-0.0011 (0.0034)	0.0000 (0.0031)
age_squared	0.0047 (0.0032)	0.0012 (0.0039)	0.0008 (0.0040)	-0.0003 (0.0036)

(respondent's career dummies, company\_employee excluded)

company_manager	-0.0114 (0.0675)	0.0258 (0.0846)	0.0608 (0.0828)	0.0386 (0.0699)
self_employer	-0.0218 (0.0187)	0.0173 (0.0228)	0.0168 (0.0233)	0.0249 (0.0219)
public_firm_worker	-0.0257 (0.0181)	0.0189 (0.0206)	0.0196 (0.0208)	0.0282 (0.0193)
public_employer	0.0359 (0.0687)	0.0637 (0.0677)	0.0760 (0.0709)	0.0530 (0.0608)
non_worker	-0.0411 * (0.0173)	-0.0215 (0.0199)	-0.0268 (0.0199)	-0.0061 (0.0184)

(income and asset)

personal_income	0.0125 (0.0536)	0.0340 (0.0560)	0.0157 (0.0548)	0.0242 (0.0517)
family_income	0.0818 (0.0453)	-0.1010 * (0.0399)	-0.1066 ** (0.0398)	-0.1338 ** (0.0418)
family_asset	-0.0281 (0.0247)	0.0363 (0.0236)	0.0360 (0.0236)	0.0476 (0.0247)

(respondent's education, under\_high\_school excluded)

high_school	-0.0132 (0.0126)	-0.0064 (0.0154)	-0.0042 (0.0154)	-0.0008 (0.0145)
college	-0.0046 (0.0201)	-0.0064 (0.0243)	-0.0044 (0.0242)	-0.0047 (0.0226)
university	-0.0216 (0.0227)	-0.0005 (0.0279)	0.0020 (0.0289)	0.0081 (0.0264)
graduated	-0.0065 (0.0810)	0.1264 (0.0737)	0.1324 (0.0723)	0.1355 * (0.0648)

(city dummies, shenyang excluded)

shanghai	0.0767 *** (0.0219)	0.1424 *** (0.0261)	0.1517 *** (0.0257)	0.1103 *** (0.0242)
beijing	-0.0217 (0.0162)	-0.0654 ** (0.0241)	-0.0717 ** (0.0239)	-0.0580 * (0.0227)
chengdu	0.0420 * (0.0203)	0.1266 *** (0.0266)	0.1276 *** (0.0261)	0.1010 *** (0.0252)
guangzhou	-0.0759 *** (0.0171)	-0.1206 *** (0.0212)	-0.1153 *** (0.0208)	-0.0919 *** (0.0196)
wuhan	-0.0722 *** (0.0174)	-0.0941 *** (0.0238)	-0.0887 *** (0.0237)	-0.0667 ** (0.0223)
constant	0.3099 *** (0.0642)	0.4056 *** (0.0801)	0.4457 *** (0.0791)	0.2877 *** (0.0746)

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N 1500 1500 1500 1500

R-squared 0.7562 0.7174 0.7271 0.7049

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Standard errors in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001