The Incentive to Declare Taxes and Tax Revenue: The Lottery Receipt Experiment in China*

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Abstract

Business tax collection is difficult because it is hard for the government to monitor the economic dealings. 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, the Chinese government has set up a lottery receipt system and has tried it out in many areas. The paper shows that if the government gives a subsidy (e.g. issue a lottery receipt) to the consumer, 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 auditting cost can be partially saved (Pareto improving and efficiency); the optimal taxation becomes practicable. 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 has significantly raised the business tax revenue, its growths as well as total tax revenues. Also, evidence based on individual data in the Chinese Household Survey 2006 supports that lottery receipts have promoted consumers' tax declaration.

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1 Introduction

1.1 The Light and Shadow of China's Economy

Since 1978, China has shifted to a market economy, by including the rural contract work system and promoting private companies, and since the 1980s, introducing stock markets and special economic zones. In 1994, decentralization separated the local and central governments, including the taxation system.[1] After the 1978 shift, the China's economy has been growth averaging 9.6% annually during 1979-2004.[2] However, as clear as shown in Fig. 1, the central government's budget deficit since 1982 has become a serious concern, with the ratio of budget deficit to public expenditure peaking at -15.7% in 2000.

Moreover, the Gini coefficient, measuring the degree of economic inequality, has shown a upward trend in China. Nationwide it was 0.39 in 1995, then rose to 0.40 in 2000 and 0.47 in 2004. In the urban sector, it rose from 0.16 to 0.21 and 0.32 in 1978, 1990 and 2003, respectively, with the rural sector recording 0.21, 0.31 and 0.37.[3] Clearly, the degree of economic inequality in China has been growing and has reached a dangerous line.[4]

To sustain future economic growth and stability, these two significant issues must be addressed. The implementation of an efficient and fair tax

[1] From Fig. 1, the ratio of public income to GDP has changed to be in an upward trend since 1994, it may be caused by this decentralization.

[2] In 2007, China experienced 11.5% economic growth, and it is expected to achieve over 10% growth in 2008.

[3] The per capita income in the urban sector was as about 3 times as that in the rural sector, hence the nationwide Gini coefficient was much higer than those in the urban and rural sectors.

[4] If the Gini coefficient is over 0.45, the society will be likely to be politically unstable. See Hayami (1997) for details.

collection system which China presently lacks, might serve as an effective and reasonable means for doing so. Economists have been aware of the seriousness of these issues: Shiller (2004) provided six pieces of advice regarding the Chinese economy, with his first recommendation for the creation of an effective taxation system; and Krugman (2004) noted that since there is almost no tax collection system anyway, the possibility that the Chinese government itself will go bankrupt is not zero, either.

1.2 Tax Evasion in China

Given the lack of the technical and intellectual ability to create a tax collection system, all government efforts to improve tax collection would be in vain. To collect the business (similar to Japan's consumption tax, i.e., about five percent of total sales), income, and wealth taxes, the government needs to obtain private and corporate financial records of transactions, income, and wealth. However, unless the government is willing to pay the significant cost of monitoring the economic dealings and collection processes, such information will not materialize. Owing to the asymmetry of information between the government and taxpayers, those involved might be tempted to underreport the due tax amounts.

Woller (1999) claims that China's shrinking tax burden is partly due to nearly endemic levels of tax evasion. 'The Economist' (1989) points out that in 1989, the tax authorities of Shanghai seized the books of 10,361 private businessmen and found that 8,953 of them had evaded tax. As high as 86% of the 163,000 registered businessmen in Shanghai (3.2% of the city's workforce) may have evaded taxes, probably 100% of the unregistered ones

did. According to Li (1995), tax evasion in China is estimated to have cost the government a loss of around 100 billion Yuan a year[5].

Fisman and Wei (2004) examine the relationship in China between the tariff schedule and the "evasion gap," which is defined as the difference between Hong Kong's reported exports to China at the product level and China's reported imports from Hong Kong. They have found that a one-percentage-point increase in the tariff rate is associated with 3 percent increase in evasion.

Due to such serious tax evasion, it is difficult for the China's government to capture the real economic activity, thus the part of economy not be reached into the national accountings but becomes underground. Bajada and Schneider (2005) find that the size of China's underground economy during 1991-1995 and 2000-2001 averaged 10.2% and 13.4% of the official GDP, respectively. Based on the report (2005) of the first census 'China Economic Census 2004,' China's National Statistical Bureau adjusted the national accounting. For example, they found that both GDP and the service industry in 2004 were undervalued to the exact of 14.39% and 13.33% of GDP, respectively.[6]

1.3 Other Literarure on Tax Evasion

Allingham and Sandmo (1972) and Yitzhaki (1974) are pioneers in analyzing how a risk-averse taxpayer chooses an optimal unreported income to

[5]Yuan is Chinese currency. One US dollar was about equal to be 6.82 Yuan in August 2008.

[6]GDP was re-estimated based on the informaion including the number of nationwide employees. In 2004, GDP was 15.99 trillion Yuan, but as much as 2.3 trillion Yuan was undervalued, of which 2.13 trillion Yuan was for the service industry.

maximize the expected utility under the governmental auditing. Since then there are enormous theoretical and empirical studies on tax evasion. Andreoni et al. (1998) make a comprehensive survey of this literature. It has been theoretically found that tax enforcement, auditing, tax rate, income level and social norms, etc. should have impacts on tax evasion. Cowell (1990, Chapter) lists the empirical studies on the extent of tax evasion and the black economy in nineteen major countries. Crane and Nourzad (1994), O'Higgins (1989), and Alm et al. (1991) emprically examine the determinants of income tax evasion in the U.S., U.K, and Jamaica.

Ishi(1981) points out the issue of 'kuroyon' in Japan, which refers to the fact that the capture rates of taxable income recorded for salaried workers, farmers and the self-employed are about 90, 60, and 40 percent, respectively. This issue is often a point of contention in Japan and it has been studied for many years. Horioka and Sekita (2006) claim that the 'kuroyon issue' has been hotly debated in Japan and discuss whether a corporate enterprise tax system based on sales, salary, etc., and a taxpayer numbering system should be introduced; but this argument is yet to progress.

1.4 Lottery Receipt Experiment as an Innovation

For many years the mainland China has also been wrestling with the issue of how to capture a fair tax base. The government first issued a guideline requiring "an official receipt printed with public lottery number" (You Jiang Fa Piao, in Chinese, hereafter we call it "lottery receipt") as a means of organizing tax collection. According to "The China Taxation Act," a receipt is cleaved to be a certificate of the existence of monetary transaction; and

hence is the primary proof of the financial accounting and tax audit, and is managed and printed, issued, and storaged by the taxation bureau. The government incorporates a lottery ticket into an official receipt, hence the lottery receipt is not only an official receipt but also a public lottery ticket simultaneously (information on the tranction and lottery number are printed on the lottery receipt). Fig. 2 shows the framework of the delivery of lottery receipts among the government, firm, and consumer.

The lottery receipt system appeared and used by Taiwan in the 1960s to improve tax collection efficiency; it is still operative. The Republic of Korea also "imported" this system from Taiwan in the 1990s, and the revised new system seems to work well.[7]

The mainland China central government first mentioned on March 4, 1989, that the experiments with lottery receipt would be held in some areas so as to strengthen the tax collection.[8] Discussion and preparation took ten years prior to the launch of the experiment. On January 1, 1998, the new receipt system came into effect in Haikou City, Hainan Province, which is one of the most open cities in China. The central government evaluated the system's performance and has since increased the trial area incrementally across the nation. According to the author's May 2003 research, using

[7]The lottery receipt system has been revised to be a so called 'the Korea Credit Card Tax Deduction System.' If the consumer declares the total spending statement, for examle, by credit card receipts, the government will give the consumer a income tax deduction based on the transaction volume stated in the receipts. Kim (2005) mentioned this system in the "tax reform issues in Korea."

[8]See Note of Mainland China Government by State Commission for Restructuring the Economic System (1989) for details. The original sentence is written in Chinese, "State Council's notice on the main points of economic reform presented by State Commission for Restructuring the Economic System in 1989." In this notice, it is suggested that "to strengthen the private firms' tax collection, the lottery receipt system can be tried out in some cities."

Google.com, by the end of 2002 there were over 80 big-city-level local tax bureaus countrywide (out of approximately 662) where the experiment was underway. In other words, 12 percent of local tax bureaus were conducting the lottery receipt experiment (LRE hereafter, also see Appendix A).[9]

Accompanying the LRE, the "China Taxation Act" was revised, and since May 1, 2001, the "New China Taxation Act" has been enacted. The detailed enforcement rules for the new act came into effect on October 15, 2002. A new 23rd article has since been added to the new act, which provides that "the equipment which prevents tax evasion should be actively installed." Specifically, this "equipment which prevents tax evasion" is a patented machine that issues an official receipt printed with a public lottery number.[10]

The experiments were conducted in depth in three of China's largest cities: Beijing, Shanghai, and Tianjin. In Beijing, one district (out of 18) has been conducting the experiment since January 1, 2001; seven districts since August 1, 2002; and the remaining 10 districts have been issuing lottery receipts since October 1, 2002. At first, mainly service industries, such as food service businesses, issued lottery receipts. However, in Shanghai, the

[9]By the end of 2002, only Beijing and Shanghai had been experimental areas at the provincial or state level, according to data from the China Taxation Bureau. Information regarding the experiments in other areas has not yet been reported as formal statistical data. The figures in Appendix A were obtained from the news media. Because these are not government statistics, caution is required when interpreting the information. This table only approximates the state of the experiments throughout country.

[10]The inventor of the lottery receipt machine is Haiping DAI. He applied for a patent on April 28, 1998, and the China Patent Bureau authenticated the patent on February 21, 2001. This machine can issue the receipt with a special number that is used for a random drawing. The value written on the receipt is reported to the consumer, the firm, and the tax bureau simultaneously. The consumer can use the lottery receipt and the special number to investigate the status of the prize by telephone or via the Internet.

experiment began in October 1, 2002, and since January 1, 2003, it has grown to include other service industries such as beauty salons and real estate agencies. In Tianjin, Tanggu (one district of Tianjin) began the experiment on January 1, 2003, and the other districts have started since January 2004. Today, the scope of areas conducting the LRE has expanded to many areas.

Until now the researches on tax evasion has been focused on the effects of governmental monitoring, punishment and consumer's attributes on the tax evaders. It is the first time that the LRE in China has been tried to give the taxpayers' incentive to declare voluntarily the tax base by not inflicting punishment but giving a subsidy (public lottery) simultaneously. LRE may works as an incentive mechanism that can mitigate the information asymmetry between the government and the taxpayer. There still have been neither theoretical nor empirical research on this new system.

1.5 Contribution and Structure of this Paper

The paper begins with a theoretical analysis on how well China's new taxation system is run, then empirically examines the effect of this system on tax collection, using the "natural experiment" method based on panel data consisting of experimental and non-experimental areas, and the individual data in the Chinese Household Survey 2006.

We found that the new system works well and make the economy both Pareto improving and Pareto efficient. We also found that the lottery receipt experiment has caused not only business tax revenues but also the growths of business tax and total tax revenues to increase significantly. Evidence

based on individual data also supports that lottery receipt has promoted consumer to declare tax.

Section 2 contains a theoretical consideration. Section 3 describes the data, the model, econometric estimation, and results. Section 4 discusses the policy implications and concludes.

2 The Model

2.1 Benchmark Model

An economic transaction (without lottery receipt), is assumed to involve three types of agent: the firm, consumer, and government. The government wants to know the volume of transaction between the firm and the consumer in order to collect the business tax. We assume that an infinite number of homogeneous firms, each seeking profit maximization within a competitive market. Also, that there are N homogeneous consumers; where $1 < N < \infty$.[11] When a consumer buys a product from a firm, the information on the purchased quantity is shared with the company. The government cannot know about this sale unless it incurs a sufficiently large monitoring cost. Although social public welfare will increase if all consumers pay their taxes voluntarily to produce optimal public goods, the consumer has an incentive not to pay taxes (free rider incentive) due to the government's inability to perfectly supervise the trading volume between the consumer and firm.

Here we use the setting in Cremer and Gahvari (1993), but we consider

[11] If N=1, the free rider problem will not arise. If $N \to \infty$, the net government revenue per capita or tax rate will become very low ($\to 0$ when no tax evasion).

only one good for simplification without loss of essence. The firms' production technologies are linear and c is the constant average and marginal cost. The output is subject to a per unit tax (or sales tax or business tax) of t and is sold at a consumer price of p. According to Cremer and Gahvari (1993, pp. 263-265):

The firm maximizes expected profits, π^e,

$$\pi^e = [p - c - g(1-\alpha) - (\alpha + (1-\alpha)\beta\tau)t]x, \tag{1}$$

where x denotes the firm's output. α is the proportion reported by the evaded firm. The firm's taxes depend on its reported sales. The tax administration makes a examination of α without cost. $\beta(0 \leq \beta \leq 1)$ is the probability that a evaded firm caught by the tax administration. τ with upper bound is the penalty rate. $g(1-\alpha)$ is the firm's cheating cost, and is an increasing and convex function of the propportion $(1-\alpha)$ of sales not reported.

If $x > 0$, eq. (1) implies that the firm chooses α such that

$$q \equiv g(1-\alpha) + (\alpha + (1-\alpha)\beta\tau)t] \tag{2}$$

is minimized. The first- and second-order conditions for this problem are

$$g'(1-\alpha) = (1-\beta\tau)t, \tag{3}$$

$$g''(1-\alpha) > 0. \tag{4}$$

From (3) it follows that a necessary condition to have an interior solution

for α is

$$\beta\tau < 1. \tag{5}$$

We assume that (5) is satified, and $g'(0) = 0,\ g'(1) = \infty$ to ensure that the solution will be in the interior. We make

$$t^e \equiv (\alpha + (1-\alpha)\beta\tau)t \tag{6}$$

denote the firm's expected tax payment per unit of output. The market equilibrium occurs at

$$p = c + g + t^e. \tag{7}$$

Lemma 1. If $g + t^e < t$, the tax evasion problem arises.[12]

Proof. Suppose that a firm reports sales honestly, then the price of output will be $p^h = c + t$. $g + t^e < t$ makes $p < p^h$, then the honest firm will be dispeared by market selection, and there are only tax evading firms in the equilibrium. Q.E.D.

The audit cost is given by $d(\beta)$ which increases with β. The government's problem is to maximize the utility, Λ, of a representative consumer with

[12]This condition is not stated explicitly in Cremer and Gahvari (1993).

endoment k.

$$max_{\{t,\beta,\tau\}}\Lambda = v_i(x_i) + h_i(R), \tag{8}$$

where $(c + g + t^e)x_i = k_i$. $R = t^e x_i - d(\beta)$, is the net government revenue per capita. h_i is the utility from the public good, $h' > 0,\ h'' < 0$. $v_i(x_i)$ is the utility from private consumption of x_i, $v' > 0,\ v'' < 0$.

Suppose that the government chooses the "social optimal" $t^*(> 0),\ \beta^*(> 0), \tau^*(> 0)$, given that the firm optimally chooses $\alpha^*(1 > \alpha^* > 0),\ (g(\alpha^*) > 0,\ g(\alpha^*) + t^{e*} < t^*)$. This is an equilibrium among the government, firms and consumers. Consequently, the honest firms are excluded by the cheating firms because of information asymmetry, and consumers' seeking of cheaper goods.

2.2 LRE as a Pareto Improving Mechanism

Like money or currency, the lottery receipt cannot be forged. When a consumer obtains a lottery receipt printed with the purchased amount "$w(= px),$" this receipt with "w" is copied into the government (to get receipt means that the consumer declares the volume "w" and the tax "tx"), thus the government receives the verifiable fact of "w" and can collect the tax "$tx.$" Consumers have the probability of getting the lottery prize from the government only if they are in possession of the lottery receipt. The lottery receipt is essentially a public lottery, even though it is printed on an offical receipt and its "price" is related to the sales tax "$tx.$"

2.2.1 Give the Consumer an Incentive to Declare Tax

In the benchmark model, the positive $d(\beta^*)$ and $g(\alpha^*)$ are pure waste of social resources, so that the first best taxation ($\alpha^* = 1,\ g(\alpha^*) = 0,\ \beta^* = 0,\ d(\beta^*) = 0$) cannot be realized.

Here we can transform the consumers' problem of a lottery receipt into a governmental subsidy problem. Assume that the government gives the consumer a subsidy s (e.g. lottery, the expected value of the lottery for the consumer is assumed be s) to make the consumer declare the tax (e.g. ask for an official receipt), while keeping the auditing ($\beta^*(> 0),\ d(\beta^*) > 0$).[13]

Proposition 1. If $t^* - t^{e*} \geq s \geq t^* - t^{e*} - g(\alpha^*) > 0$*, this economy will be Pareto-improving.*

Proof. To make the consumer buy the honest firm's goods (voluntarily and fully declare tax to the government), the consumer's incentive constraint is $p^s = c + t^* - s \leq p(= c + t^{e*} + g(\alpha^*))$*. And from Lemma 1, we obtain* $s \geq t^* - t^{e*} - g(\alpha^*) > 0$*. The government's incentive constraint is* $s \leq t^* - t^{e*}$*. If we assume that* $s = t^* - t^{e*} - g(\alpha^*) + \epsilon,\ \epsilon \to 0^+$*, the net increase of government revenue per unit output will be* $g(\alpha^*)(= (t^* - t^{e*}) - (t^* - t^{e*} - g(\alpha^*) + \epsilon) > 0)$. Q.E.D.

Lemma 2. In the new equilibrium, $\beta\ (> 0)$ *and* $s\ (> 0)$ *are necessary, and* $s\ (> 0)$ *is a nonlinear function of* α*.*

Proof. If $\beta = 0$ *which means no auditing, the cheating firm's price will*

[13] In reality, the goverment mornitors the tax evaders at the same time, while issuing lottery receipt. If the government do not audit ($\beta(= 0),\ d(\beta^{)} = 0$), t^e will become zero.

be c, then the consumer will buy from this firm, the tax evasion problem arise again. From Proposition 1, $s \geq t - t^e - g(\alpha) > 0$. *We assume that* $t - t^e - g(\alpha) = \eta$, *where* η *is constant and* ≥ 0. *We substitute (3) and (6) for* $(1 - \beta\tau)t$ *and* t^e, *respectively, then we obtain a differencial equation of* α, $(1-\alpha)g'(1-\alpha) - g(1-\alpha) = \eta$. *The solution for* $g(1-\alpha)$ *is that* $g(1-\alpha)$ *must be a linear function of* $1-\alpha$. *It contradicts with the convex* $g(1-\alpha)$ *by assumption. Hence,* $t - t^e - g(\alpha)$ *must be positive and a nonlinear function of* α, *and* $s > 0$. Q.E.D.

For example, we assume $g(1-\alpha) = tan[(1-\alpha)^2(\pi/2)]$ *which satifies* $g' > 0$, $g'' > 0$, $g'(0) = 0$, *and* $g'(1) = \infty$, *then* $(1-\alpha)g'(1-\alpha) - g(1-\alpha)$ *will be a nonlinear function of* α *and be positive.*

$d(\beta)(> 0)$ is a threat to the cheating firms and makes $\alpha > 0$ and $t^e > 0$. Clearly, it is the pure waste of social resource caused by both the information asymmetry and the taxpayer's incentive to free rider (or by the government's inability of committing all taxpayers to pay tax). We may call this type of cost "social cost of the unconscious" or "social cost of moral hazard." Just because of this cost, the first-best taxation ($\beta^* = 0,\ d(\beta^*) = 0$) cannot be realized.

Proposition 2. The government can find a s^{**} *to enable the practice of the Pareto efficient taxation* (t^{**}) *without no evasion.*

Proof. After the consumer declares the tax to the government, the economy will shift to a new equilibrimu by s. *If* t^* *is unchanged, the net increase in government revenue will be* $g(\alpha^*) > 0$. *The government can decrease*

t^* to find a new social optimal t^{**} while keeping the auditing. In the new equilibrium, $\alpha^{**} = 1$ and $p^{s**} = c + t^{**}$ for all firms, $\beta^* > \beta^{**} > 0$,[14] *$d(\beta^*) > d(\beta^{**}) > 0$, $s^{**} = t^{**} - t^{e**} - g(\alpha^{**}) + \epsilon$, $t^{**} < t^*$ and $R^{**} > R$ for the government, $p^{s**} = c + t^{**}(< c + t^{e*} + g(\alpha^*))$ is the price for the consumer. The cheating firms are excluded by the consumer's seeking of honest firms and the market selection, then the firm's cheating cost is totally saved. The government also save partial auditting cost.* Q.E.D.

2.2.2 The Costs of Consumer's Reporting

Next, we assume that the per unit cost of consumer's reporting is ζ (> 0).

Proposition 3. If $g(\alpha^*) - \zeta > 0$ and $t^* - t^{e*} \geq s \geq t^* - t^{e*} - g(\alpha^*) + \zeta > 0$, the government can Pareto improve the economy by giving the cosumer a positive subsidy s. In the new equilibrium, s makes the optimal t^{***} be practicable given that ζ. To decrease the ζ also Pareto improves the economy.

Proof. The consumer's incentive constraint is $p^s = c + t^* + \zeta - s \leq p(= c + t^{e*} + g(\alpha^*))$. And from Lemma 1, we obtain $s \geq t^* - t^{e*} - g(\alpha^*) + \zeta > 0$. The government's incentive constraint is $s \leq t^* - t^{e*}$. If we assume that $s = t^* - t^{e*} - g(\alpha^*) + \zeta + \epsilon$, $\epsilon \to 0^+$, the net increase of government revenue per unit output will be $g(\alpha^*) - \zeta$ $(=(t^* - t^{e*}) - (t^* - t^{e*} - g(\alpha^*) + \zeta + \epsilon) > 0)$. Q.E.D.

[14] From (3) and (4), smaller t makes α larger, while smaller β makes α larger. We can keep α constant by keeping $(1 - \beta\tau)t$ constant while decreasing both t and β. We can also decrease all of t, β, and α.

As shown in the model, the LRE can be considered as a governmental subsidy to the consumer, and the governmental net revenue will be increased. We can consider that $s = 0$ in areas where the LRE is not being conducted; the increase of net tax revenue can express the difference in tax revenues between areas where the experiment being conducted and those where not.

3 Empirical Examination

3.1 By Macro Panel Data

3.1.1 Probability of Winning a Prize, Amount of Prize

To announce the amount of the prize beforehand can be considered a government strategy. For example, according to the pre-draw prize announcement by the Beijing Local Tax Bureau on July 17, 2002,[15] the total prize money amounted to three million Yuan in August and September, and 10 million Yuan between August and December in 2002. However, ex post facto, the total prize money paid out to the 67,129 winners in the whole city during 2002 was 1.67 million Yuan. The total actual prize was therefore only 16.7 percent of the announced prize.[16] Moreover, the pre-drawing prize announcement of the probability of winning the prize (namely, the ratio between the prize and the tax revenue) may be a government strategy.

According to a China Taxation Bureau report on July 30, 2002,[17] the total prize amount paid out in all China's experimental areas was 30 million Yuan, and the increase in tax revenues brought about by the lottery receipts

[15] See "Beijing Evening on July 17, 2002" for details.
[16] This may also be because the planned sale of lottery was not realized.
[17] See 'People's Daily', July 31, 2002 for details.

was 900 million Yuan between January 1 and June 30, 2002. The ratio of the prize to tax revenues (which can be seen as a kind of input output ratio) was about 1:30. In the experiment in the Huairou District of Beijing in 2001, 0.14 million Yuan was paid out in prizes and the tax revenue of six million Yuan was increased owing to providing lottery receipts. The prize tax revenue ratio was about 1:40. Many Chinese mass media outlets announce information regarding the prizes. We cannot obtain detailed information on prizes at the provincial or state level for the entire country, thus we cannot perform an econometric analysis at the provincial level.

There are 18 districts in Beijing. Huairou, Chaoyang, Shunyi, Fengtai, Fangshan, Pinggu, Shijingshan, and Miyun have been issuing lottery receipts since August 1, 2002. The other ten districts began issuing receipts on October 1, 2002. Therefore, the effect of the experiment on tax revenues can be estimated by district-level panel data (18 districts, 6 years, before and after the experiments).

One district of Tianjin, Tanggu, has issued the lottery receipt since January 1, 2003; the other districts of Tianjin have issued them only since 2004. Tianjin is adjacent to Beijing both geographically and culturally. They are both cities under the direct control of the central government. According to Table 1, the populations, city scale, and income of these two cities are very similar. Therefore, we used Tianjin as a control area for a comparative analysis of before and after the experiments in Beijing.

3.1.2 The Data Set

We obtained detailed information on the experiments, such as prize amounts and tax revenues, from the Tianjin Statistics Bureau, Tianjin Tax Bureau, Beijing Statistics Bureau, and Beijing Tax Bureau. Beijing Statistics Yearbook 1999-2004, Tianjin Statistics Yearbook 1999-2004, Beijing Public Finance Yearbook 2002-2004 and China Statistics Yearbook 1991-2005 are used. Therefore, we used the 6-year (1998-2003, data of the former year inclued in 1999-2004) district-level data (18 districts in Beijing and 21 districts in Tianjin) to empirically examine the effect of the experiments.

The information on prize reported by mass media or estimated by the author,[18] is shown in Appendix B. In Tanggu of Tianjin, the prize was 75,800 Yuan in 2003.

The definitions of variables are described in Appendix C. Summary statistics of the data are reported in Table 2. The main information before and after the experiments is summarized by district in Table 3. These two tables provide some indications of the effects of the experiment.

3.1.3 Empirical Specification and Estimation Method

Following Heckman and Hotz (1989), Papke (1994) and Wooldridge (2002), we used the following empirical models to capture the effect of the experiments, and first obtained a random trend model,

$$y_{it} = c_i + \beta LRE_{it} + \gamma Z_{it} + \theta_i t + u_{it}, \tag{9}$$

[18]The author has used the prize reported by mass media to estimate the prize in the period without reporting by weighted average. The detailed information is available upon request.

where y_{it} is the level value of per capita real sales (or business) tax revenue in district i, LRE_{it} is the information on experiment, Z_{it} are the controlled variables with level values, θ_i is the specific trend in the district, c_i is the specific time-invariant factor, u_{it} is the white noise. c_i, θ_i and u_{it} are all unobserved. When y_{it} and Z_{it} are log values, Equation (10) becomes a random growth model.

The first difference of Equation (10) becomes

$$\Delta y_{it} = \beta \Delta LRE_{it} + \gamma \Delta Z_{it} + \theta_i + \Delta u_{it}. \tag{10}$$

For a consistent estimator of β, the important condition is that the LRE_{it} is exogenous. As pointed out in Heckman and Hotz (1989) and Papke (1994), if there is a problem of self-selection regarding program participation, it is very hard to obtain a consistent estimator of β. Here, there are three reasons to bring LRE close to being exogenous. Firstly, there are many preparations that must be made before the LRE starts: the timing of LRE is mainly determined by the degree of the preparation. Secondly, as is well known, China is a centralized country, where policy changes cannot occur in a state or a city unless the central government grants permission, and no state or city has the freedom to accept or reject central government policy. Thirdly, because all of the samples used in the econometric analysis are areas that participated in the experiment, by using experiment information for different periods we can avoid the problem of serious self-selection, hence tend to obtain a consistent estimator. Therefore, it can reasonably be said that to a large degree LRE_{it} is exogenous.

Because error term Δu_{it} is the first difference of u_{it}, it becomes a series correlation.[19] The fixed effect of panel estimation considering this characteristic of the error term is used to estimate Equation (11). This method is the fixed effect within regression with AR(1) disturbances explained in detail in Papke (1994) and Wooldridge (2002).

3.1.4 Construction of the Variables

The methods of constructing the variables for estimation are summarized in Appendix C. Δy_{it} is the one difference of y_{it} which is the level or log value of per capita real business tax revenue in district i and is the dependent variable. ΔLRE_{it} is the dummy variable for an experiment district (1 for an experiment district, 0 for others) multiplied by the dummy variable for the experiment time (1 for experiment time, 0 for other time).[20]

To obtain a difference in difference estimator for β, Huairou in Beijing and Tanggu in Tianjin are dropped from the sample, because they have different timing for LRE.[21] Thus, we finally use a data set of 37 districts for 6 years.

3.1.5 Estimated Results

Table 4 provides the results of panel estimation based on the information for 17 districts in Beijing (excluding Huairo) and 20 districts in Tianjin (ex-

[19] $Corr(\Delta u_{it}, \Delta u_{it-1}) = -0.5$. See page 283 of Wooldridge (2002) for details.

[20] ΔLRE_{it} is the independent variable. $\Delta Prize_{it}$ is the one difference of per capita real lottery prize; it is considered a proxy for capturing the experiment effect (ΔLRE_{it}) and is an independent variable.

[21] The estimation results are almost unchanged when Huairou and Tanggu are included in the sample; these results are also available upon request.

cluding Tanggu). The dependent variables are the first differences of the level and the logarithm of business tax and total tax revenues, and the independent variables are the first differences of LRE, GDP, GDP of the 2nd sector and GDP of the 3rd sector; thus the value of the estimated ΔLRE coefficient serves as the difference in the level between the experiment and non-experiment areas. For business tax revenue, the ΔLRE coeffiects are significant, ranging from 84.355 to 105.676, and the elasticities of experiment from 0.171 to 0.213. In the case of total tax revenue, the effect of the experiment is not significant, although the coefficient is positive. These results imply that the experiment has significantly raised business tax revenue by over 17.1 percent but has no significant effect on total tax revenue.[22]

Table 5 shows the results of panel estimation based on the random growth model. Variables here are made from the first differences of logarithm of those in Table 4, and from the first differences of LRE; thus the coefficient of ΔLRE serves as the difference in the growth rates. For business tax revenues, there was about a significant 21.5-24.2 percent increase in the growth rates of the experiment areas. In the case of total tax revenue, there was a 10.4-11.6 percent increase.[23]

[22]The author also has used the first difference of prize as a proxy for ΔLRE, but he has not obtained significant effect from prize. There may be two reasons. First, the amount of prize is determined by the sales simultaneously thus it is endogenous. Second, the data on prize is not statistical data but estimated by the author, thus there would be large measurement error on the prize data. These estimation results are also avalaible upon request.

[23]The author has also used the first difference of prize as a proxy for ΔLRE , but was unable to obtain significant prize effect. The same reasons as in Footnote 22 are relevant here. These results are also avalaible upon request.

3.2 Evidence from Individual 'Panel' Data

In Feburay 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 on lottery receipt are included in the questionare. See Appendix D for the questions and the respondents's answers in details.

For the 1,021 respondents who did not ask for and receive official receipts before LRE, 384 respondents (384/1,021=37.6%) asked for and received lottery receipts per 2.039 times shopping or eating out after 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 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 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

LRE (p-value = 0.000 by difference test).

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 business (sales) tax. For a consumer, LRE is given, thus the results are realibale because we controlled for the "self-selection problem" well. The evidence from the micro "panel" data strongly supports that LRE significantly promotes the consumer to declare tax.

4 Findings, Implications, and Conclusion

The literature on tax evasion has focused on the effects of governmental monitoring, punishment and consumer's attributes on the tax evaders. It is the first time that the LRE in China has been tried out to give the taxpayers' incentives to voluntarily declare the tax base by not inflicting punishment but giving a prize (public lottery) simultaneously. This paper examined, theoretically and empirically, the effect of LRE on tax revenues (implicitly on tax evasion) in China.

The paper shows that if the government gives the consumer a subsidy (e.g. issue a lottery receipt), the consumer will voluntarily and fully declare tax so that the seller cannot cheat, and that the cheating cost can be totally saved while the auditting cost can be partially saved (Pareto improving and effeciency), the optimal taxation becomes practicable. By issuing lottery receipts, the Chinese government can prevent the tax evasion caused by collusion between consumers and firms and can collect business taxes effectively.

Our empirical examination of 6-year data from 37 districts in Beijing and Tianjin indicated that the business tax revenue was significantly (over 17.1 percent) higher, and the real growth rates of business tax and total tax revenues were significantly (over 21.5 and over 10.4 percent, respectively) higher in the experiment areas. Moreover, because the data sets used were from all of areas that participated in the experiments, and because the estimations were based on different periods of participation, self-selection problems were avoided to a large degree. Thus, our analysis is similar to a kind of (quasi-) natural experiment.

We controlled for the self-selection problem well by using "panel" individual data. Evidence based on Chinese Household Survey 2006 strongly supports that LRE has promoted many consumer to declare tax.

Through the theoretical and empirical analyses, LRE can be judged as successful insofar. LRE not only increases tax revenues but also mitigate the information asymmetry between the government and taxpayers. Hence, it may also largely contribute to mitigate the issue of underground economy in the world, especially in China.[24] We would believe that LRE will have a significant influence on future tax collection policies in China, and perhaps in other countries as well.

For future research, we must clarify theoretically and more specifically

[24]The good economic performance during the transition period 1978-2008 has been called 'The China Miracle.' There are many studies on the reasons. For example, the "development strategy and economic reform" is emphasized in Lin et al. (1996). Based on the fact that there are high saving-inverstment rates and high growth rates, Horioka and Wan (2006, 2007, 2008) explain why China saves so much. We would like to bilieve, just like LRE, that there may also be many Pareto improving institutional innovations contributed to the economic growth, thus we should carefully analyze those effects of the seemingly 'special' systems on the economy in all fields in China.

the consumer preference for the purchases of lottery tickets and empirically apply these data to the information from the experiment and non-experiment areas after 2004. 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.[25]

[25]However, tax evasion is penalized in every country when it is dectected by government, thus tax evasion is also a form of gambling.

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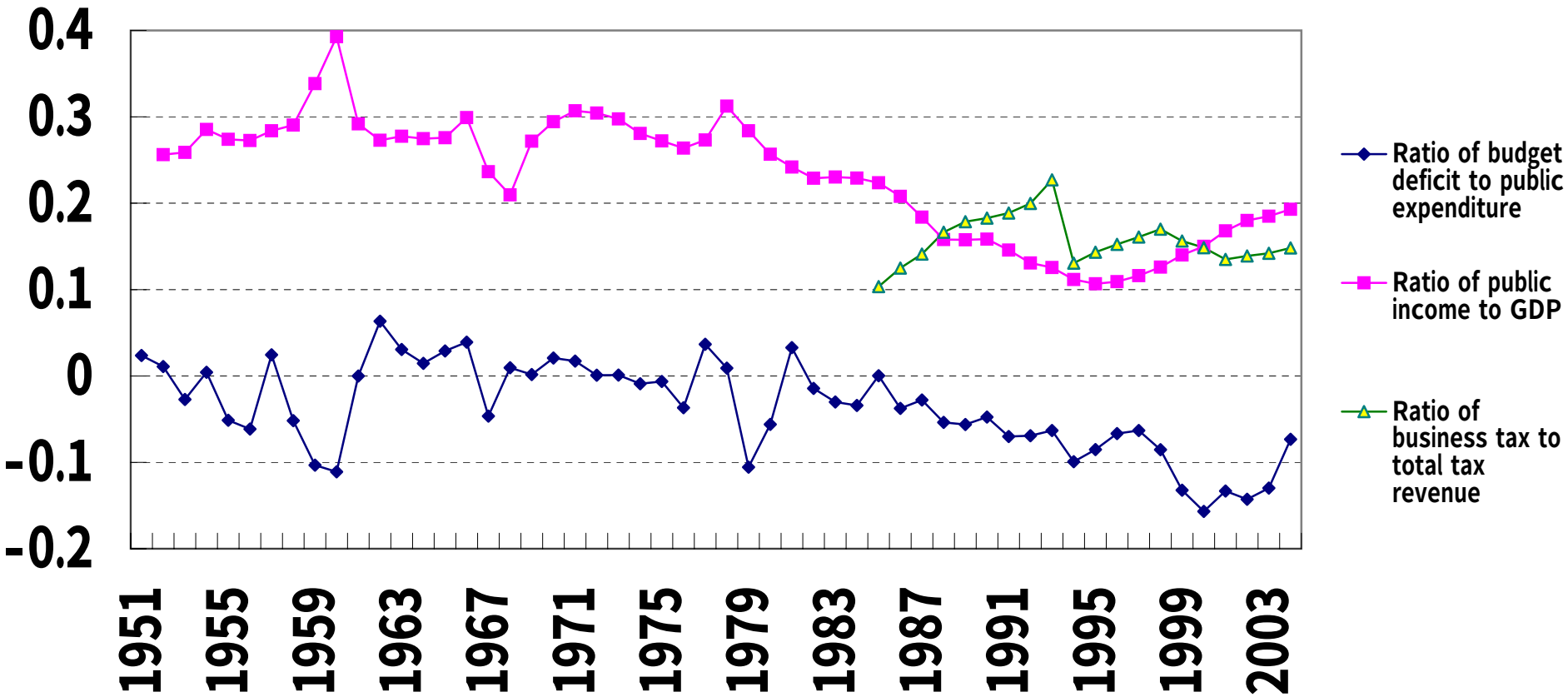
Figure 1: Budget Deficit, Public Income and Tax Revenues in China, 1951-2004



Source: China Statistics Yearbook, 1991-2005

Figure 2: The Delivery of Lottery Receipt in China

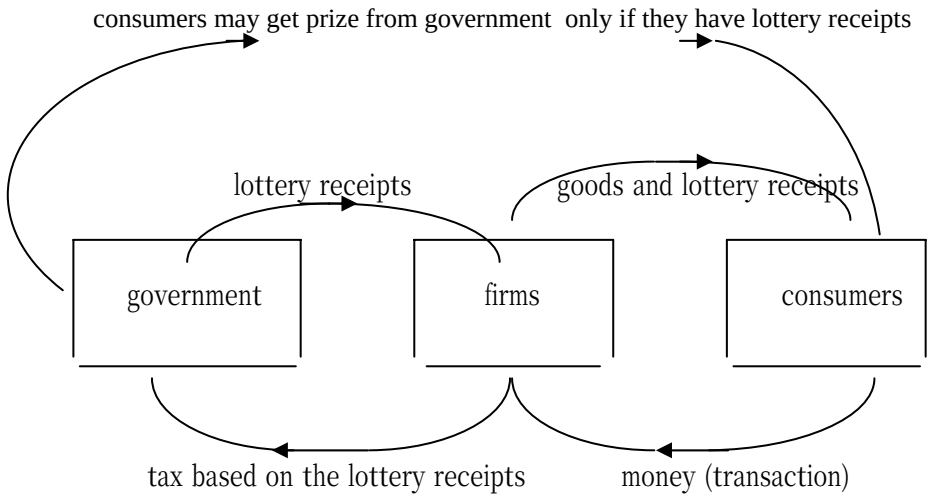


Table 1: Main Indicators in Beijing and Tianjin in 2002

2002	Beijing	Tianjin
Population	14.253 million	9.191 million
GDP	321270 million Yuan	205120 million Yuan
Per capita GDP	22541 Yuan	22380 Yuan
Growth rate of per capita GDP	0.08	0.11
Total tax revenues	53400 million Yuan	37590 million Yuan

Source: Beijing Statistics Yearbook 2003, Tianjin Statistics Yearbook 2003

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
tax_revenue	222	70325	97262	8227	560802
business_tax	222	27715	43139	1617	245595
gdp	222	1137669	1363700	109560	8928950
second_sector_gdp	216	409171	528148	10879	3548992
third_sector_gdp	215	612835	939894	44177	6930939
population	222	54	33	5	178
cpi	222	102	3	99	107
prize	222	53790	255712	0	2459359
real_revenue	222	1488	2322	191	16869
real_business_tax	222	495	547	38	3023
real_gdp	222	28483	52473	1810	446171
real_secondary_gdp	216	9243	19429	249	151937
real_third_gdp	215	11060	14153	1507	113645
real_prize	222	0.066	0.235	0	1.5
experiment	222	0.2	0.361	0	1
log_revenue	222	6.797	0.903	5.253	9.733
log_business_tax	222	5.736	0.962	3.634	8.014
log_gdp	222	9.652	0.965	7.501	13.008
log_second_gdp	216	8.418	1.179	5.519	11.931
log_third_gdp	215	8.874	0.853	7.318	11.641
after	222	0.333	0.472	0	1
LRE	222	0.153	0.361	0	1
Δ LRE	185	0.092	0.290	0	1
Δ Total tax revenue	185	198	490	-2300	3884
Δ Business tax revenue	185	72	136	-332	853
Δ GDP	185	4593	11585	-1569	100726
Δ GDP of 2nd sector	180	1120	2944	-5249	20468
Δ GDP of 3rd sector	178	1690	2723	-561	20976
Δ real_prize	185	0.067	0.215	0.000	1.232
Δ log(Total tax revenue)	185	0.153	0.194	-0.274	0.827
Δ log(Business tax revenu	185	0.136	0.269	-0.774	1.604
Δ log(GDP)	185	0.150	0.065	-0.134	0.481
Δ log(GDP of 2nd sector)	180	0.114	0.206	-0.692	1.276
Δ log(GDP of 3rd sector)	178	0.155	0.069	-0.103	0.388

Source: Author's calculations based on Beijing Statistics Yearbook, 1999-2004, Tianjin Statistics Yearbook, 1999-2004, and Beijing Public Finance Statistics Yearbook, 2002-2004.

Table 3: The Growth Rate of Per Capita Tax Revenue in Beijing and Tianjin Before and After the Experiment

District	Time	Variable	Obs	Mean	Std. Dev.	Min	Max
Beijing (excluding Huairou)	before 2002	Δlog(Business tax revenue)	51	0.134	0.280	-0.491	0.712
		Δlog(Total tax revenue)	51	0.229	0.181	-0.124	0.688
	2002, 2003	Δlog(Business tax revenue)	34	0.263	0.273	0.006	1.604
		Δlog(Total tax revenue)	34	0.170	0.190	-0.246	0.794
Tianjin (excluding Tanggu)	before 2002	Δlog(Business tax revenue)	60	0.142	0.167	-0.163	0.757
		Δlog(Total tax revenue)	60	0.152	0.134	-0.274	0.540
	2002, 2003	Δlog(Business tax revenue)	40	0.020	0.328	-0.774	0.505
		Δlog(Total tax revenue)	40	0.043	0.240	-0.232	0.827

Source: Author's calculation based on the processed data.

Table 4: The Effect of Lottery Receipt Experiment (LRE) on Tax Revenues (Random Trend Model, 37 Districts in Beijing and Tianjin, 1998-2003)

	Dependent variable = Δ Business tax revenue						Dependent variable = Δ Total tax revenue		
	Fixed Effect	Elasticity	Fixed Effect	Elasticity	Fixed Effect	Elasticity	Fixed Effect	Fixed Effect	Fixed Effect
Δ LTE	105.676	0.213	102.416	0.207	84.355	0.171	118.031	115.324	94.548
	(36.758)***		(36.289)***		(36.915)**		(133.737)	(134.142)	(139.782)
Δ GDP			0.004					0.006	
			(0.002)**					(0.007)	
Δ GDP of 2nd Sector					0.013				0.039
					(0.006)**				(0.023)
Δ GDP of 3rd Sector					0.025				-0.010
					(0.010)**				(0.041)
Constant	44.496		30.786		-2.808		178.03	148.455	140.912
	(11.970)***		(13.901)**		(19.476)		(46.812)***	(52.278)***	(72.504)*
Observations	148		148		142		148	148	142
Number of groups	37		37		36		37	37	36
R-sq: within	0.070		0.101		0.165		0.070	0.013	0.032
between	0.166		0.117		0.257		0.105	0.294	0.073
overall	0.098		0.121		0.194		0.010	0.044	0.037
rho_ar	-0.147		-0.164		-0.176		0.352	0.349	0.347

Note: Standard errors are in parentheses; *, **, *** denote significant at the 10%, 5% and 1% levels, respectively.

Table 5: The Effect of Lottery Receipt Experiment (LRE) on Growth Rates of Tax Revenues (Random Growth Model, 37 Districts in Beijing and Tianjin, 1998-2003)

	Dependent variable = Δlog(Business tax revenue)			Dependent variable = Δlog(Total tax revenue)		
	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect
ΔLTE	0.234	0.242	0.215	0.109	0.116	0.104
	(0.083)***	(0.085)***	(0.095)**	(0.055)*	(0.056)**	(0.062)*
Δlog(GDP)		-0.255			-0.206	
		(0.470)			(0.312)	
Δlog(GDP of 2nd Sector)			0.041			-0.031
			(0.151)			(0.099)
Δlog(GDP of 3rd Sector)			0.113			0.112
			(0.514)			(0.334)
Constant	0.080	0.112	0.058	0.130	0.160	0.109
	(0.027)***	(0.070)	(0.083)	(0.018)***	(0.046)***	(0.052)**
Observations	148	148	142	148	148	142
Number of groups	37	37	36	37	37	36
R-sq: within	0.067	0.076	0.061	0.034	0.038	0.035
between	0.114	0.072	0.101	0.149	0.024	0.140
overall	0.080	0.076	0.071	0.044	0.030	0.042
rho_ar	-0.068	-0.070	-0.070	0.085	0.092	0.101

Note: Standard errors are in parentheses; *, **, *** denote significant at the 10%, 5% and 1% levels, respectively.

Appendix A: The Areas with Lottery Receipt Experiment (LRE) in China in 2002

(author's search using the search engine Google.com in May 2003)

	number of districts or cities	number of districts (cities) with lottery receipt experiment	the rate of lottery receipt experiment (percent)
Nationalwide	2858	228	7.98
Beijing	18	18	100
Tianjin	18	0	0
Hebei	172	16	9.3
Shanxi	119	0	0
Neimenggu	101	0	0
Liaoning	100	28	28
Jiling	60	5	8.33
Heilongjiang	130	11	8.46
Shanghai	20	20	100
Jiangshu	108	0	0
Zhejiang	88	0	0
Anhui	106	4	3.77
Fujian	84	13	15.48
Jiangxi	99	18	18.18
Shandong	139	25	17.99
Henan	158	7	4.43
Huben	101	13	12.87
Hunan	122	9	7.38
Guangdong	122	26	21.31
Guangxi	110	0	0
Hainan	20	3	15
Congqing	40	1	2.5
Sichuan	180	0	0
Guizho	86	5	5.81
Yunan	128	4	3.13
Xizhuang	73	0	0
Sanxi	107	0	0
Ganshu	86	5	5.81
Qinghai	43	0	0
Ningxia	24	0	0
Xinjiang	96	0	0

Note: It is from author's search using the search engine Google.com in May 2003.

It is not statistical data, some notes are needed.

Appendix B: Reported and Estimated Prize by District in 2002, 2003, 2004

District	Prize (by period) reported by media (homeapge, newspaper)	Prize in Yuan in 2002 (the italic is estimated value)	Prize in Yuan in 2003 (the italic is estimated value)
Dongcheng	2002/10/1-2002/12/31: 212500; 2003/4/11-2003/4/18: 62500	212500	*850000*
Xicheng	2002/10/1-2002/12/10: 100000; 2002/10/1-2003/1/31: 295000; 2003/1/1-2003/2/28: 193600; 2003/1/1-2003/12/31: 1237000	*198200*	1237000
Congwen	2002/10/1-2002/12/31: 88400; 2003/1/1-2003/12/31: 586800	88400	586800
Xuanwu	2002/10/1-2003/12/31: 122650	*24530*	*98120*
Chaoyang	2002/8/1-2002/8/29: 47000; 2003/1/1-2003/1/31: 157300; 2004/1/1-2004/6/10: 1929010	*455388*	*2459359*
Fengtai	2003/1/1-2003/6/30: 332960; 2004/1/1-2004/12/31: 1780000	*86708*	*665920*
Shijingshan	2003/1/1-2003/10/31: 320150; 2003/1/1-2003/12/31: 385950	*36548*	385950
Haidian	2002/10/1-2002/12/31: 297800; 2003/1/1-2003/12/31: 2256300; 2005/1/1-2005/1/31: 1230000	297800	2256300
Mentougou	2002/10/1-2002/12/31: 11700; 2003/1/1-2003/5/31: 55000	11700	*132000*
Fangshan	2002/8/1-2002/9/9: 8400; 2003/1/1-2003/9/30: 78860; 2002/8/1-2004/7/19: 238000	*31795*	*139113*
Changping	2002/10/8-2003/1/31: 89740; 2002/10/8-2003/10/30: 300190; 2002/10/8-2004/8/3: 1046870	*65703*	*283858*
Shunyi	2002/8/1-2002/12/26: 100900; 2002/8/1-2003/4/22: 170000; 2003/1/1-2003/7/14: 122430	*104379*	*230345*
Tongzhou	2002/10/1-2002/11/6: 7700; 2002/10/1-2003/9/29: 162400	*31792*	*162400*
Daxing	2002/10/1-2002/12/25: 33000; 2002/10/1-2003/11/21: 261950	*35357*	*229285*
Pinggu	2002/8/1-2002/10/22: 7000; 2002/10/1-2003/1/31: 34800; 2002/8/1-2003/11/14: 114700	*26557*	*89265*
Huairou	2001/1/1-2001/12/31: 140000; 2002/8/1-2002/8/31: 8000; 2004/1/1-2004/7/22: 344270	*40000*	*358133*
Miyun	2004/1/1-2004/5/31: 153000	*19575*	*210058*
Yanqing	2002/10/1-2003/1/16: 11000; 2005/1/1-2005/3/31: 93400	*9340*	*189394*
Reported total prize (all districts)	2002/8/1-2002/12/31: 1669700; 2003/1/1-2003/12/31: 1117000; 2004/1/1-2004/12/31: 41769600	1669700	1117000
Estimated total prize (all districts)		*1776273*	*10563301*

Note: The values in italics are estimated by the author with the reported data in mass media.

Appendix C: Construction of the Variables

Variable	Definition (construction of the variables)
tax_revenue	nominal total tax revenues by district, (10,000 Yuan)
business_tax	nominal business tax revenues by district, (10,000 Yuan)
gdp	nominal GDP by district, (10,000 Yuan)
second_sector_gdp	nominal GDP of the second sector by district, (10,000 Yuan)
third_sector_gdp	nominal GDP of the third sector by district, (10,000 Yuan)
population	population by district, (10,000 persons)
cpi	consumer price index, (1998=100)
prize	prize by district, (Yuan, per district)
real_revenue	=tax_revenue/population/cpi*100, (Yuan, per capita)
real_business_tax	=business_tax/population/cpi*100, (Yuan, per capita)
real_gdp	=gdp/population/cpi*100, (Yuan, per capita)
real_secondary_gdp	=second_sector_gdp/population/cpi*100, (Yuan, per capita)
real_third_gdp	=third_sector_gdp/population/cpi*100, (Yuan, per capita)
real_prize	=prize/population/cpi*100, (Yuan, per capita)
experiment	dummy, 1 for the experiment district, 0 for the non-experiment district
after	dummy, 1 for the experiment period, 0 for the non-experiment period
LRE	=experiment*after
Δ LRE	=LRE(t)-LRE(t-1)
Δ Total tax revenue	=real_revenue(t)-real_revenue(t-1)
Δ Business tax revenue	=real_business_tax(t)-real_business_tax(t-1)
Δ GDP	=real_gdp(t)-real_gdp(t-1)
Δ GDP of 2nd sector	=real_secondary_gdp(t)-real_secondary_gdp(t-1)
Δ GDP of 3rd sector	=real_third_gdp(t)-real_third_gdp(t-1)
Δ real_prize	=real_prize(t)-real_prize(t-1)
log(Total tax revenue)	=log(real_revenue)
log(Business tax revenue)	=log(real_business_tax)
log(GDP)	=log(real_gdp)
log(GDP of 2nd sector)	=log(real_secondary_gdp)
log(GDP of 3rd sector)	=log(real_third_gdp)
Δ log(Total tax revenue)	=log(Total tax revenue)(t)-log(Total tax revenue)(t-1)
Δ log(Business tax revenue)	=log(Business tax revenue)(t)-log(Business tax revenue)(t-1)
Δ log(GDP)	=log(GDP)(t)-log(GDP)(t-1)
Δ log(GDP of 2nd sector)	=log(GDP of 2nd sector)(t)-log(GDP of 2nd sector)(t-1)
Δ log(GDP of 3rd sector)	=log(GDP of 3rd sector)(t)-log(GDP of 3rd sector)(t-1)

Note: t, t-1, means t period and t-1 period, respectively.

Appendix D:

Questions and Answers in the Survey

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; 3.2) Because additional payment was not required when I asked for the official receipt; 3.3) Because tax revenue gives both the country and myself benefits; 3.4) Others.

3.1) 174 respondents answered 'Yes.'

3.2) 74 respondents answered 'Yes.'

3.3) 316 respondents answered 'Yes.'

3.4) 11 respondents answered 'Yes.'

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; 4.2) Because it was very troublesome to ask and receive the official receipt; 4.3) Because the lottery was not printed on the official receipt; 4.4) Others.

4.1) 63 respondents answered 'Yes.'

4.2) 763 respondents answered 'Yes.'

4.3) 193 respondents answered 'Yes.'

4.4) 137 respondents answered 'Yes.'

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; 7.2) Because additional payment was not required when I asked for the receipt; 7.3) Because tax revenue gives both the country and myself benefits; 7.4) Because the lottery was printed on the receipt; 7.5) Others.

7.1) 153 respondents answered 'Yes.'

7.2) 57 respondents answered 'Yes.'

7.3) 373 respondents answered 'Yes.'

7.4) 663 respondents answered 'Yes.'

7.5) 9 respondents answered 'Yes.'

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; 8.2) Because it was very troublesome to ask for and receive the lottery receipt; 8.3) Because I thought that it was very difficult to get the lottery prize even if I had the lottery receipt; 8.4) Others.

8.1) 26 respondents answered 'Yes.'

8.2) 420 respondents answered 'Yes.'

8.3) 247 respondents answered ‘Yes.’

8.4) 89 respondents answered ‘Yes.’