

Eighteen Months of Income Elasticity of the Government Lottery After the Introduction of the Eighty-Baht Lottery Policy: A Preliminary Analysis

สิบแปดเดือนของความยืดหยุ่นของอุปสงค์ต่อรายได้ ของสลากกินแบ่งรัฐบาล ภายหลังการประกาศนโยบาย ควบคุมราคาสลากไม่เกินแปดสิบบาท: การวิเคราะห์เบื้องต้น

Pichit Eamsopana ¹

Abstract

This research was designed to be a pilot study to primarily evaluate income elasticity of the government lottery and analyze its movement after the introduction of the 80 Baht Lottery Policy by The National Council for Peace and Order (NCPO). The survey started from June 2014 to December 2015 and took place in Phasicharoen District of Bangkok. The results indicated that the government lottery had regressive aspect. All income elasticities calculated were less than 1. However, in the period of June 2015 up to December 2015, the values of the income elasticities continually improved. This might reflect the NCPO's candidness and its quality of administration.

Keywords: *Income Elasticity, Government Lottery, Price Control Lottery Policy*

บทคัดย่อ

งานวิจัยนี้ถูกออกแบบมาเพื่อใช้ในการศึกษาเบื้องต้นเกี่ยวกับความยืดหยุ่นของอุปสงค์ต่อรายได้ของสลากกินแบ่งรัฐบาล และทิศทางการเปลี่ยนแปลงของมัน ภายหลังจากที่ คณะรักษาความสงบแห่งชาติ (คสช.) ประกาศใช้นโยบายควบคุมราคาสลากให้มีราคาไม่เกินคู่ละ 80 บาท การเก็บรวบรวม

¹ Lecturer, Faculty of Business Administration, Siam University, Petkasem Road, Phasicharoen, Bangkok 10160, Thailand.

ข้อมูลเริ่มขึ้นเมื่อ มิถุนายน พ.ศ. 2557 และสิ้นสุดเมื่อธันวาคม พ.ศ. 2558 ในท้องที่เขตภาษีเจริญ กรุงเทพมหานคร ผลการวิจัยพบว่า สลากกินแบ่งรัฐบาลมีคุณสมบัติถดถอย ความยืดหยุ่นของอุปสงค์ต่อรายได้ที่คำนวณได้ในทุกเดือนมีค่าน้อยกว่า 1 แต่อย่างไรก็ตาม ความยืดหยุ่นของอุปสงค์ต่อรายได้ในช่วง มิถุนายน พ.ศ. 2558 ถึงธันวาคม พ.ศ. 2558 มีแนวโน้มปรับตัวดีขึ้นอย่างต่อเนื่อง ซึ่งน่าจะสะท้อนถึงความตั้งใจจริง และความสามารถในการบริหารงานของ คสช.

คำสำคัญ: ความยืดหยุ่นของอุปสงค์ต่อรายได้, สลากกินแบ่งรัฐบาล, นโยบายควบคุมราคาสลากกินแบ่งรัฐบาล

Introduction

One of the opening policies announced by The National Council for Peace and Order (NCPO) after taking power of Thailand in May 2014 was the 80-baht lottery policy. Under the campaign called “Bringing Back Happiness”, the NCPO intended to keep the lottery ticket price at 80 baht per pair (40 baht per ticket) effectively. Sellers who sell the tickets at price higher than this will face criminal charge. Above all, the NCPO attempted to correct ways the Government Lottery Office (GLO) distributed its lottery tickets and to subjugate mafia groups and official misconduct to control the lottery ticket price at its face price of 80 baht per pair (Thongnoi, 2014). During the policy implementation that began on July 2, 2014, the NCPO faced many difficulties and received people’s complaints that lottery tickets were still sold more than 80 Baht. The NCPO, therefore, issued several measures to reinforce the policy, mainly law amendment and surveillance improvement, aiming at controlling the price effectively. After the reinforcement, the NCPO announced the policy again that from June 2, 2015 onward the lottery tickets must be sold to consumers not more than 80 Baht per pair. Sale of the overpriced ticket would be prosecuted severely (Kamnuansilpa, 2014; Thai PBS, 2015).

Nevertheless, economists may look into other aspects of lottery rather than politics and security. By means of fiscal policy, necessity and equity are primarily concerned. For necessity, economists consider the need of allowing the lottery as a tool of public finance comparing to other alternatives and social acceptance. Since Thailand has operated the lottery for more than a century, talking about its necessity might be too late and in vain although the NCPO has absolute power to close the GLO down if found unnecessary, unfit, or harmful to Thai morality

and social discipline. For equity, it is important to know who pay for the lottery tickets. The lottery is the game with very poor odds against players. This characteristic provides the players a negative return that in the long run the players will certainly lose (Oster, 2004). When used as a tool of public finance, the lottery in this respect is a form of taxation, i.e., one who buys the lottery ticket is the one who pays the tax. In principle, a desirable tax should stand on the ability to pay basis, a tax rate increases as the income increases. The rich pay a higher tax rate than the poor. A tax that has such characteristic is known as a progressive tax. Conversely, a tax collected in a way that a tax rate decreases as the income increases is called a regressive tax, the tax type that is undesirable and tends to worsen social equity such as widening the income gap or blocking someone resource access. To know who pay for the lottery tickets, hence, is crucial. If people in the high income group are major patrons of the lottery, the lottery, then, is progressive and its operation can help and promote social equity. In opposition, if the lottery is found to be regressive, the society walks away from equity. The low income group takes the burden of the lottery tax. Solutions and measures must be created in order to improve such regressivity.

One way to measure progressivity or regressivity of the lottery is to use the concept of income elasticity of demand and this is the main attention of this study. The plan is to find series of changes in income elasticity of lottery play from the time the price control enforcement is announced until the time this research proposal is written (18 months from July 2014 to December 2015). The result of this study can shed some light on the GLO operation and the eighty-baht lottery policy whether they can create equity and efficiency to the society. If progressivity is found, the society is moving toward equity and efficiency. However, if regressivity is found, the burden of the tax does not follow the principle of people's ability to pay. Social equity is challenged. To handle such regressivity, solutions and alternative measures need to be formulated and the current methods need to be discussed.

Literature Reviews

Concept of income elasticity of demand uses analysis of a ratio between two percentage changes, quantity demand and income (Baumol and Blinder, 2011). Hence, for our lottery we have:

$$\text{Income Elasticity of Lottery Play} = \frac{\text{PercentageChangeinLotteryDemand}}{\text{PercentageChangeinIncome}} \dots\dots (1)$$

If the income elasticity has a positive sign, percentage change of lottery demand and income move the same direction. However, as a good tax, we would like to have the value of the income elasticity to be more than 1, meaning that percentage change in lottery demand or tax rate moves faster pace than income does. This follows the ability to pay basis. Hence, the progressive tax is resulted. The positive value of income elasticity less than 1 indicates undesirable occurrence, a regressive tax or in other words, the richer pay lower tax rate than the poorer do. Lastly, the most unwelcome resulted is a negative income elasticity. In this situation, lottery demand and income move in the opposite direction. Having such inverse relationship, economists may call the lottery an inferior good but the happening is worse than inferiority, tax burden decreases as income increases or we can roughly say that the rich do not pay for this tax.

There are several literatures regarding progressivity, regressivity, or income elasticity of lottery play. For example, Clotfelter (1979) used lottery data from the Maryland State Lottery Agency and found that the state-operated lottery had regressive aspect. The degree of regressivity was even higher than the conventional weekly lottery play. Clotfelter and Cook (1987) used data on lottery expenditures and incomes from several places to determine the implicit tax imposed by the lottery agencies. With the conventional tool of public finance, they found the implicit tax regressivity in nearly all cases. Furthermore, they found that tax rate from the lottery was too high comparing to the rates of excise tax, alcohol, and tobacco. Mikesell (1989) explored two Illinois lottery games, Instant Lottery and Online, from 1985 to 1987. He found that the income elasticity for the Instant Lottery was likely to be smaller than that of the Online. He also found that there was no evidence that all income elasticities studied were different than one. Hence, regressivity was not confirmed. More interestingly, when total lottery sales were investigated, the income elasticity for total lottery sales were always more than one and kept raising from 1985 to 1987. Hansen (1995) evaluated tax incidence for lottery instant

games in Colorado and found that portion of income spent on the games was negatively related to per capita income. The Suit's Index indicated the existence of the regressive tax. Miyazaki, Hansen, and Sprott (1998) analyzed longitudinal sales data from six lottery states and found that in most cases the lottery was regressive. However, evidences on proportionality and progressivity were also found. Ghent and Grant (2010) found three lottery games in South Carolina, Instant Scratch-Off, Fixed-Odds Online, and Lotto, were regressive. However, in some levels of income ranges, characteristics of progressivity were observed. They did not conclude that progressivity was found but suggested that if lottery expenditures were flat in income ranges considered, the lottery was less regressive than it would be.

Method

Data

Primary data were collected from field surveys asking lottery buyers' information on lottery expenditure, income, and other personal characteristics. Since this project was designed to be a preliminary study, expediency was one of the project's main drivers. However, academic principle and research standard were aware of and well maintained. The survey area, hence, was assigned to be in Phasicharoen District of Bangkok where Siam University is located for easy access of data. In Phasicharoen District, there are eight well known places where people can find lottery tickets offered for sale, in front of a Chinese shrine called San Chao Pho Suea Bang Wa, surrounding area of Bang Khae Market (surveying area only in Phasicharoen District), surrounding area of a Buddhist Temple called Wat Paknam Phasicharoen, on pathway of Petkasem Road between Petkasem 46/3 and Petkasem 48, on pathway of Petkasem Road between Petkasem 60/3 and Petkasem 62, on pathway of Thoet Thai Road between Thoet Thai 41/1 and Thoet Thai 49, Wat Chai Chimplee Market, and Wiset Ni Yom Alley. The data, therefore, were collected from these places. The research assistants interviewed lottery buyers after they made a purchase to acquire information needed. In sample size determination, expediency came to play again. Number of target population was estimated from the fact that in Thailand, there were about 19 million people have bought the lottery tickets (Treerat, 2013). This figure was potential customers of the GLO. We also knew that Thailand's population was about 65 million (Mahidol Population Gazette, 2014). Hence, we could say that approximately 29

percent of Thailand's population were the potential customers of the GLO. Using similar method, we could roughly estimate the number of our target population (potential customers of the GLO in Phasicharoen District) by multiplying Phasicharoen District's population of 129,559 people (Phasi Charoen District Office, 2014) by 29 percent. The figure of 37,573 came out as the target population. From Krejcie and Morgan's table (Krejcie and Morgan, 1970), number of samples required for population of 40,000 were 380. Hence, the goal of each period survey was to gather at least 380 interviewees. The eighteen months started from July, 2014 to December, 2015 (the period of enforcement of the price control). However, this study also included June 2014 to capture the income elasticity before implementation of the price control. Hence, pragmatically, we surveyed 19 months rather than 18 months. In each month, the period of survey was set to be around at the end of the month before the lottery day and the survey took about two days, e.g., for June 2014, the survey was conducted during June 29 – 30, 2014 at the aforementioned places before the lottery day of July 1, 2014 and received 386 interviewees.

Data Analysis

This study applies lottery demand functions as indicated in Oster (2004), Papachristou (2006), Geronikolaou and Papachristou (2007), Yuan (2011), and Forrest, Gulley, and Simmons (2000). However, those complex forms are shaped to be a simple one that lottery demand is a function of income and other factors:

$$Q_i = f(\text{Income}, D) \dots\dots\dots (2)$$

where:

Q is lottery expenditure (Baht) that the interviewee spends in the survey month

Income is the interviewee's income per month (Baht)

D is the matrix that includes economic factors and personal characteristics of the interviewee

or in logarithmic form:

$$\ln(Q_i) = a_i + (b)\ln(Income_i) + \ln(D_i) \dots\dots\dots (3)$$

From (3), assume that variables in D remain unchanged then take derivative both sides with respect to $Income$ and arrange to have only b on the left hand side. We have:

$$b = (\partial Q \div Q) \div (\partial Income \div Income) \dots\dots\dots (4)$$

(4), in fact, is the same as (1) that is the traditional form of income elasticity of demand, i.e., b is the income elasticity. If we run regression on (3) and find that b is statistically significant, our b , hence, is different from zero and has meaning to interpret.

Results

(3) is estimated by each month survey data to find the coefficient b as the income elasticity. The results are shown in Table 1 below:

Table 1 Estimated Income Elasticity for Each Month

Month	Samples (n)	Income Elas. (b)	t-stat.
Jun. 2014 [♦]	386	0.374*	1.971
Jul. 2014	382	0.544**	2.553
Aug. 2014	387	0.612**	2.351
Sep. 2014	385	0.606***	2.988
Oct. 2014	400	0.588	1.538
Nov. 2014	387	0.428	1.107
Dec. 2014	380	0.355*	1.925
Jan. 2015	380	0.343*	2.023
Feb. 2015	402	0.341	1.256
Mar. 2015	385	0.347	1.317
Apr. 2015	390	0.340**	2.740
May 2015	381	0.294	1.313
Jun. 2015	392	0.497**	2.224
Jul. 2015	387	0.557**	2.747
Aug. 2015	380	0.620	1.057
Sep. 2015	380	0.623	1.692
Oct. 2015	398	0.628*	1.794
Nov. 2015	381	0.643**	2.289
Dec. 2015	405	0.646**	2.585

[♦] period before the price control, * significance level of 0.1 or better, ** significance level of 0.05 or better, *** significance level of 0.01 or better

The results show that most income elasticities estimated are statistically significant. 12 from 19 of the elasticities are significant at 0.1 level or better. For the 12 statistically significant elasticities, all of them have values less than 1 with the highest value of 0.646 in December 2015 and the lowest is 0.343 in January 2015. The values of the income elasticities

less than 1 indicate the evidence of regressivity of the lottery in Phasicharoen District. By looking at only the income elasticity values, b , a random trend is found. However, after May 2015 the value of the income elasticity seems to be consistently improving from 0.294 in May 2015 to 0.646 in December 2015.

Conclusion and Discussion

The results of this study show evidence that the lottery in Phasicharoen District is regressive. The income elasticity of each month surveyed is less than 1. This indicates disproportionate burden between tax rate and taxpayers' ability to pay if we treat the lottery as a type of tax. Hence, in principle, this source of the government's revenue by the GLO, is inappropriate because the burden falls on the poor who usually have no saving and low ability to pay. However, this attempt of the NCPO to control the price of the lottery (although they may not realize the matter of the income elasticity) should be admired. In any case, this attempt aims at eliminating sale of more than the legal ticket face price that takes much advantage of consumers and violates the law. In economic view, by looking at one month before the price control (June 2014) and the first month after enforcing the price control (July 2014), we can see that the income elasticity increases from 0.374 to 0.544 or an increase of approximately 45 percent. This figure implies that people positively respond and are ready to follow the NCPO's policy. This is a good sign of success. However, shortly thereafter, the income elasticity begins to decline along with people's complaints about frivolous policy enforcement of the government officials and that they cannot buy the 80 Baht lottery. The situation seems to return back to the time before the price control, i.e., the selling price of a lottery ticket is about 100 to 120 Baht per pair or even more for popular numbers or in some areas. The high price comes with the low income elasticity figure. The income elasticity begins to fall from 0.612 in August 2014 to its minimum at 0.294 in May 2015 implying that the situation of preying on the poor comes back and seems to be worse than before. This fact tells us that in the period before the policy reinforcement, the attempt of the NCPO to have the 80 Baht lottery is almost in vain. Lottery tickets are sold over the face price extensively without dissuasion or arrest from the government officials. This shows ineffectiveness of the policy enforcement, management incompetence, and problems in distribution of lottery tickets. It is not surprising why the policy reinforcement is

developed. The policy reinforcement seems to alleviate difficulties the NCPO facing earlier. The income elasticity responds positively. The results of the study show that the value of the income elasticity climbs up time after time from 0.294 in May 2015 to 0.646 in December 2015 indicating that the regressivity is declining. From the results of this study, we cannot certainly say that the price control policy is successful. However, the methods used in the reinforcement measure show impressive results; increasing of the income elasticity. The series of the income elasticities after June 2015 indicate a good sign for the attempt to control the price of lottery, creating a more appropriate tax tool and helping to have better social equity. If the values of income elasticities after the period of this study still render the same pattern as that of July 2015 to December 2015, and keep increasing to demonstrate the income elasticity of more than 1, we as economists will gladly say the policy is successful.

Nonetheless, one thing that we can notice from the figures of the income elasticities is that if the NCPO has good intention, earnestness, proactive approach, and follows up the officials' works continuously, the goal can be achieved with no or minimal difficulties. This can be seen from the fine movement of the income elasticity after the announcement of the policy reinforcement. But if the NCPO only wants to create propaganda, act frivolously, is reluctant, or neglects to follow up the officials' performance, the outcome will, of course, be disappointing as it happened in the beginning phase of the policy promulgation.

References

- Baumol, W.J. and Blinder, A.S. (2011). *Economics: Principles and Policy* (12th ed.). Boston: Cengage learning.
- Clotfelter, C.T. (1979). On the Regressivity of State-Operated Numbers Games. *National Tax Journal*, 32(4), 543-548.
- Clotfelter, C. and Cook, P. (1987). Implicit Taxation in Lottery Finance. *National Tax Journal*, 40(4), 533-546.
- Forrest, D., Gulley, D., and Simmons, R. (2000). Elasticity of Demand for UK National Lottery Tickets. *National Tax Journal*, 53(4), 853-864.

- Geronikolaou, G. and Papachristou, G.A. (2007). On the Demand for Lotteries in Greece. *International Journal of Business and Economics*, 6(3), 255-259.
- Ghent, L.S. and Grant, A.P. (2010). The Demand for Lottery Products and Their Distributional Consequences. *National Tax Journal*, 63(2), 253-268.
- Hansen, A. (1995). The Tax Incidence of the Colorado State Lottery Instant Game. *Public Finance Quarterly*, 23(3), 385-398.
- Kamnuansilpa, P. (2014). *Regime Lotto Price Cut Failure Hits Low-Income Earners*. Retrieved January 15, 2016, from <http://www.bangkokpost.com/print/444723/>
- Krejcie, R.V. and Morgan, D.W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, 30(3), 607-610.
- Mahidol Population Gazette. (2014). *Population Estimate at mid Year*. Retrieved January 18, 2016, from <http://www.ipsr.mahidol.ac.th/ipsr/Contents/Documents/Gazette/Gazette2014TH.pdf>. (in Thai).
- Mikesell, J.L. (1989). A Note on the Changing Incidence of State Lottery Finance. *Social Science Quarterly*, 70(2), 513-521.
- Miyazaki, A.D., Hansen, A., and Sprott, D.E. (1998). A Longitudinal Analysis of Income-Based Tax Regressivity of State-Sponsored Lotteries. *Journal of Public Policy and Marketing*, 17(2), 161-172.
- Oster, E.F. (2004). Are All Lotteries Regressive? Evidence from the Powerball. *National Tax Journal*, 57(2), 179-187.
- Papachristou, G.A. (2006). Is Lottery Demand Elasticity a Reliable Marketing Tool? Evidence from a Game Innovation in Greece. *International Review of Economics (formerly RISEC)*, 53(4), 627-640.
- Phasicharoen District Office. (2014). *Phasicharoen District Office's Data Base for the Fiscal Year of 2014*. Bangkok: Phasicharoen District Office. (in Thai).
- Thai PBS. (2015). *Last Day for Vendors to Sell Lottery Over 80 Baht*. Retrieved January 15, 2016, from <http://englishnews.thaipbs.or.th/last-day-for-vendors-to-sell-lottery-over-80-baht/>

- Thongnoi, J. (2014). *In a Numbers Game, the House Always Wins*. Retrieved January 14, 2016, from <http://www.bangkokpost.com/print/419087/>
- Treerat, N. (2013). *One Count ... Lottery Reform for Thai Society*. Lecture in a seminar arranged by the Select Committee of the Senate for a Study of Problems and Reform Guideline of Lottery Administrative System in Thailand on July 5, 2013 at Parliament Building 2. (in Thai).
- Yuan, J. (2011). Are Lotteries Substitutes to Each Other?. *Journal of Gambling Business and Economics*, 5(3), 1-14.