

## **Online Appendix: For Online Publication**

- Section A      **Lottery Games in Taiwan**
- Section B      **Construction of Individual Wealth Data**
- Section C      **Additional Tables and Figures**
- Section D      **Alternative Approach to Estimate Wealth  
Elasticity of Fertility**
- Section E      **Estimates based on Golosov et al. (2021)'s  
Approach**

## A Lottery Games in Taiwan

### A.1 Public Welfare Lottery

The Taiwanese government initiated the Public Welfare Lottery in 1999. The purpose of the lottery was to improve social welfare by creating job opportunities for the disabled, native aborigines, and single-parent families to sell tickets. The government uses revenue from selling lottery tickets to support its social welfare program. There were three main types of Public Welfare Lottery in our sample period: (1) Computer-drawn games, (2) scratchcard games, and (3) Keno games.

In this section, we present demos of these lottery tickets or cards. For a computer-drawn game, players need to select a set of numbers. The lottery agency regularly announces the prize numbers drawn by the computer (e.g., twice a week). For example, Lotto 6/49 is one of the most popular computer-drawn games in Taiwan, a ticket for which is presented in Figure A1. Players choose six numbers (1-49) at a cost of 50 NT\$ per bet. The prize amount depends on how many numbers match, and the jackpot is hit if all six numbers are matched. The jackpot keeps growing until someone wins.

Scratchcard games usually require a player to scratch away numbers or symbols to reveal specific prizes. Figure A2 shows a typical type of scratchcard game. In Keno games, players need to select a set of numbers and game types. Figure A3 shows a ticket for a Keno game. The common rule of Keno games is that a player chooses one of ten gameplays and then selects 20 numbers, ranging from 1 to 80. Payouts are different depending on the gameplay and the numbers a player chooses.

### A.2 Taiwan Receipt Lottery

The Taiwan Receipt Lottery started in 1950. Its purpose is to ensure that consumers ask for receipts from sellers and therefore prevent tax evasion. Having purchased any goods or services, including paying electricity or telephone bills, the consumer receives an invoice with an eight-digit number printed along the top. Figure A4 shows a sample of an invoice. The government then

draws and announces the winning numbers bi-monthly. No matter the amount paid for an item, each receipt invoice has an even chance of winning the lottery by matching the drawn number. Table [A1](#) presents the game rules and prize amounts, ranging from 200 NT\$ (about 6.7 US\$) to 2 million NT\$ (about 67 thousand US\$) before 2011. The largest prize rose to 10 million NT\$ (about 333 thousand US\$) in 2011.

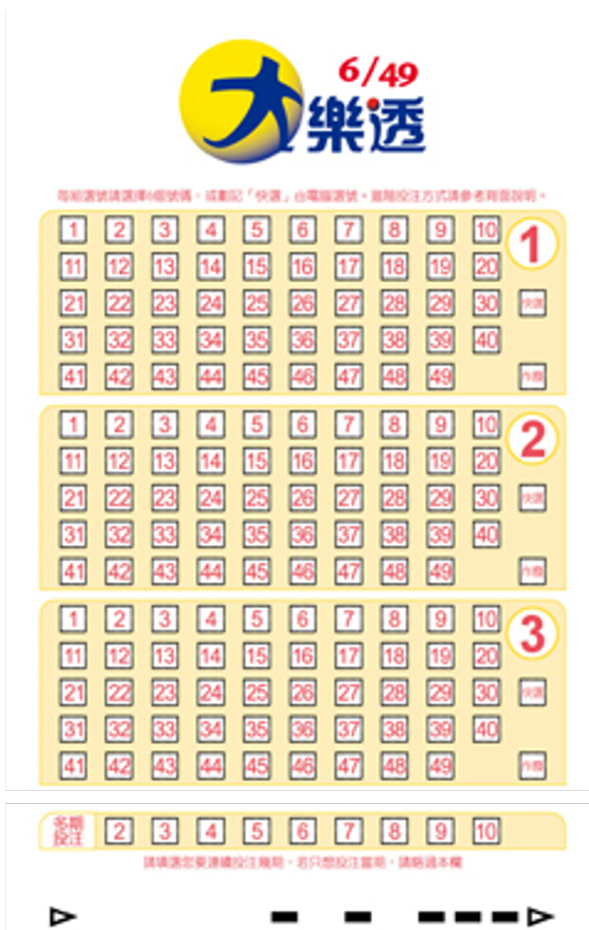
Table A1: Rules for the Taiwan Receipt Lottery

Prizes (in TWD)		Matching Winning Numbers
Special Prize	10 million	all 8 digits from the special prize number
Grand Prize	2 million	all 8 digits from the grand prize number
First Prize	200,000	all 8 digits from any of the First Prize numbers
Second Prize	40,000	the last 7 digits from any of the First Prize numbers
Third Prize	10,000	the last 6 digits from any of the First Prize numbers
Fourth Prize	4,000	the last 5 digits from any of the First Prize numbers
Fifth Prize	1,000	the last 4 digits from any of the First Prize numbers
Sixth Prize	200	the last 3 digits from any of the First Prize numbers
Additional Sixth Prize	200	the last 3 digits from the Additional Sixth Prize number(s)

Note: This table displays the rules for the Taiwan Receipt Lottery. People receive an entry, which contains 8 numbers (see Figure A4), when they purchase goods. They match these numbers on the receipt to the numbers randomly drawn by the Ministry of Finance every two months.

Figure A1: Computer-Drawn Game - Lott 6/49

(a) Purchase Sheet



(b) Purchase Receipt



Notes: Figure A1a displays the Lott 6/49 purchase sheet. Each sheet has multiple sections. Players choose six numbers from section one for one bet. If players want to have more than one bet, they can repeat the same process in other sections. Players also can choose the right column below the section number to let the betting machine choose six numbers randomly. After submitting the purchase sheet to the betting shop, the player receives a receipt, as displayed in Figure A1b, which can be used to redeem the prize.

Figure source: Taiwan Lottery Website. <https://www.taiwanlottery.com.tw/Lotto649/index.asp>.

Figure A2: Scratched Game

(a) Unscratched

(b) Scratched



Notes: This figure displays one of the famous scratchcard games. Figure A2a displays the unscratched card, which has eight sets of games. Players need to scratch the card and match the numbers in each set to win specific prizes. As shown in Figure A2b, the numbers inside the blue shape matched each other. Hence, the player won the prize as shown in the shape.

Figure source: Taiwan Lottery Website.

[https://www.taiwanlottery.com.tw/instant/instant\\_games\\_details\\_4573.asp](https://www.taiwanlottery.com.tw/instant/instant_games_details_4573.asp).



Figure A3: Keno Game

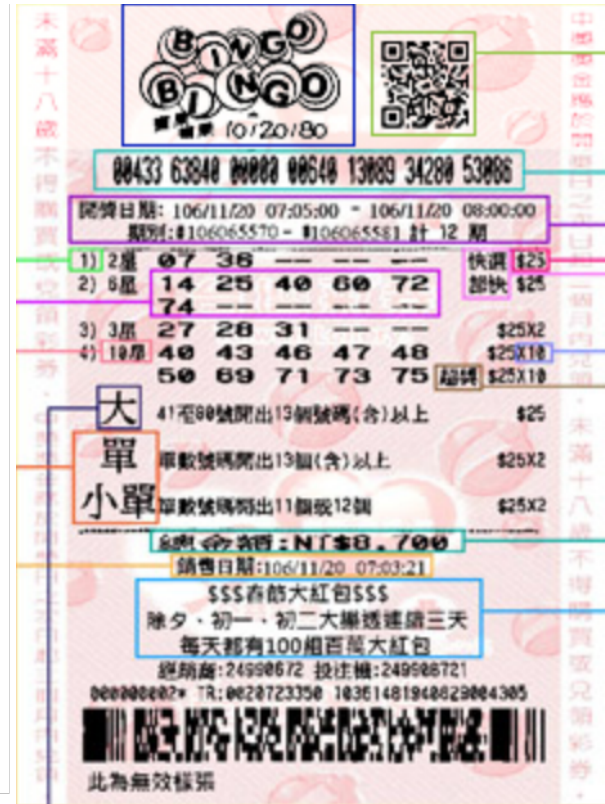
(a) Purchase Sheet



The purchase sheet features a 'BINGO' logo at the top left. Below it, there are instructions in Chinese: '買票實業為快開彩券，開獎結果都為正確。切勿隨意投注。' and '開獎時請務必使用果色或藍色票子。' and '未滿十八歲不得購買或兌換彩券。' A red box indicates '正確的劃記：畫圈'.

The main section is titled '選擇玩法' (Choose Gameplay) and includes a '選號' (Choose Numbers) grid from 1 to 80. Below this, there are sections for '超級類號' (Super Class Numbers), '快選' (Quick Selection), '作廢' (Void), '選擇投注倍數' (Choose Betting Multiplier), '猜大小' (Guess High/Low), '猜單雙' (Guess Odd/Even), and '快選' (Quick Selection) for these categories.

(b) Purchase Receipt



The receipt features a 'BINGO' logo at the top left and a QR code at the top right. Below the logo, there are lottery numbers: '00433 63840 00000 00640 13089 34280 53006'. The receipt includes the following information:

- 開獎日期: 106/11/20 07:05:00 - 106/11/20 08:00:00
- 票別: #106065570 - #106065581 計 12 期
- 1) 2星 07 36 --- --- --- 快選 \$25
- 2) 0星 14 25 40 60 72 74 --- --- --- 超快 \$25
- 3) 3星 27 28 31 --- --- --- \$25X2
- 4) 10星 40 43 46 47 48 50 69 71 73 75 超快 \$25X10

The receipt also includes a section for '大單小單' (Big Single/Small Single) with the following conditions:

- 大單: 41至80號開出13個號碼(含)以上 \$25
- 單數號碼開出13個(含)以上 \$25X2
- 小單: 單數號碼開出11個或12個 \$25X2

Additional information includes: '金額: 1000.00', '銷售日期: 106/11/20 07:03:21', '\$\$\$春節大紅包\$\$\$' (New Year's Eve, 1st day, 2nd day lucky draw for 3 consecutive days), '每天都有100組百萬大紅包', '經銷商: 24990672 投注機: 24990672', and '00000002\* TR: 0020723350 10361481940029004305'. A barcode is at the bottom, and the text '此為無效紙張' (This is an invalid paper) is printed below it.

Notes: Figure A3a displays a Keno game purchase sheet. Players first choose one of ten gameplays in the first row, then choose 20 numbers from 1 to 80. They can also bet whether the numbers will be high or low, even or odds in the bottom panel. After submitting the purchase sheet to the betting shop, the player receives a receipt as shown in Figure A3b, which can be used to redeem a prize. The prizes are different according to the gameplay and how many numbers a player matches.

Figure source: Taiwan Lottery Website. <https://www.taiwanlottery.com.tw/BINGOBINGO/index.asp>.

Figure A4: Taiwan Receipt Lottery



*Notes:* This figure displays an example from the Receipt Lottery, which contains 8 numbers (04841548).



## B Construction of Individual Wealth Data

We construct individual wealth data using the following administrative records: (1) wealth registry; (2) income statement file; and (3) records on mortgage interest costs. The wealth register contains the third-party reported variables of financial and non-financial assets for all individuals in Taiwan. Financial assets include detailed information on end-of-year listed and unlisted stocks. The price of stocks is measured by the trading price at the ex-dividend date on the Taiwan Stock Exchange (TWSE) and the Taipei Exchange.<sup>25</sup> The stocks of unlisted companies are also included and priced by the net asset value share.<sup>26</sup>

Non-financial assets include real estate (lands and houses). The information includes areas, locations, and unique identification numbers. The value of land and houses in wealth registers is measured by their assessed values, which are announced by the local government in Taiwan for tax purposes once per year, and it are considered much lower than trading prices in the market.<sup>27</sup> To bring the value of land and houses closer to the trading price in the market, following the procedures in [Leth-Petersen \(2010\)](#) and [Boserup et al. \(2016\)](#), we multiply the assessed values of houses or land by the ratio of average trading prices to average assessed values at the township level.

However, the wealth register does have two limitations. First, bank deposits, bonds, and other assets in the money markets, such as short-term bills, are not included in the data.<sup>28</sup> Therefore, we estimate the value of these assets by using information on interest income from the income statement and a simple capitalization method ([Saez & Zucman, 2016](#)). To start, we separately aggregate the interest income of deposits, bonds, and short-term bills. Then, in order to construct the capitalization rate, we divide each aggregate interest income by the aggregate amount of assets

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<sup>25</sup>The Taipei Exchange is the stock exchange for listed companies in the Over-the-Counter (OTC) market and the emerging stock market. For those stocks with no information on ex-dividend date trading price, we use the closing price at the end of July instead; for those stocks that do not have a closing price at the end of July, we use the net asset value share instead.

<sup>26</sup>The net asset value of a company is defined as the total assets (including cash, saving, merchandise inventory, equipment, investments, etc.) and liabilities (including loan, accounts payable, pension reserves, etc.) as listed on the income return file of the company.

<sup>27</sup>For example, the assessed value of a house is based on construction costs, depreciation, and location ranking adjustment.

<sup>28</sup>Individual interest income of bonds and short-term bills is taxed separately with uniformly 10%. They are common tools used to save individual income tax in Taiwan.

(i.e., bank deposits, bonds, and short-term bills) reported in the Financial Statistics published by the Central Bank. Thus,  $r_{jt}$  is the capitalization rate for asset  $j$  in year  $t$ , defined as follows:

$$r_{jt} = \frac{\sum_i d_{ijt}}{W_{jt}}, \quad (\text{B.1})$$

where  $d_{ijt}$  is the interest income for asset  $j$  held by individual  $i$  in year  $t$ , and  $W_{jt}$  is the corresponding aggregate amount of the asset  $j$  in year  $t$ . Finally, we can calculate each individual  $i$ 's capitalized assets  $w_{ijt}$  by dividing interest income  $d_{ijt}$  of asset  $j$  by the corresponding capitalization rate  $r_{jt}$ .

$$w_{ijt} = \frac{d_{ijt}}{r_{jt}}, \quad (\text{B.2})$$

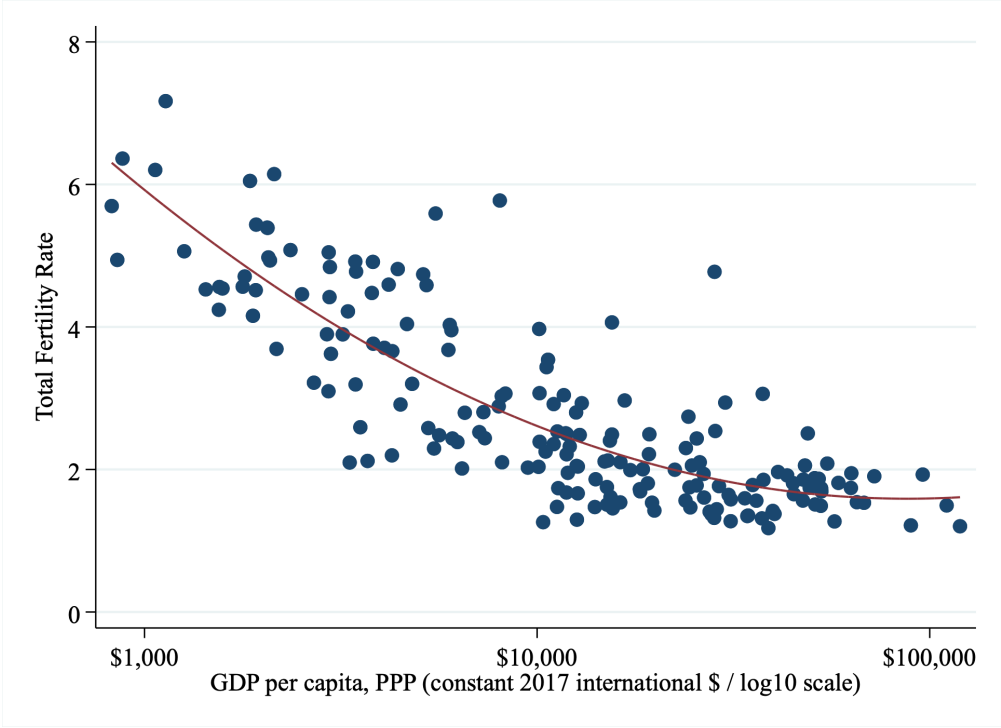
Second, the wealth registry data lack information on debt. We use records on mortgage interest costs reported by third-party (i.e., banks) and the same capitalization method to impute the value of debt for each individual. According to Lien et al. (2021), mortgages reported to the tax agency account for around 53% of total debt in Taiwan. Therefore, we think our wealth data should cover most debts held by the Taiwanese. Finally, one important reminder is that pensions and insurance are not included in our wealth data, which is a common drawback of administrative wealth data in Nordic countries. According to the National Wealth Report, pensions and insurances account for 17% of individuals' total net wealth in 2014.<sup>29</sup>

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<sup>29</sup>Retrieved from: <https://www.stat.gov.tw/public/Data/861393520GEYI9Z14.pdf>. Date of access: July 31, 2022.

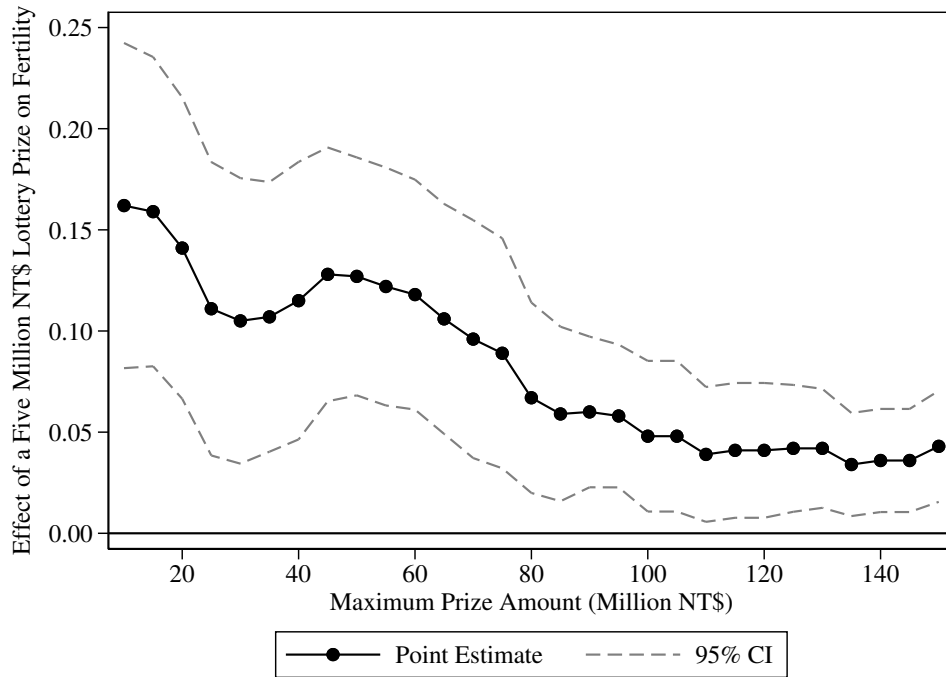
# C Additional Tables and Figures

Figure C1: The Relationship Between GDP Per Capita and the Total Fertility Rate



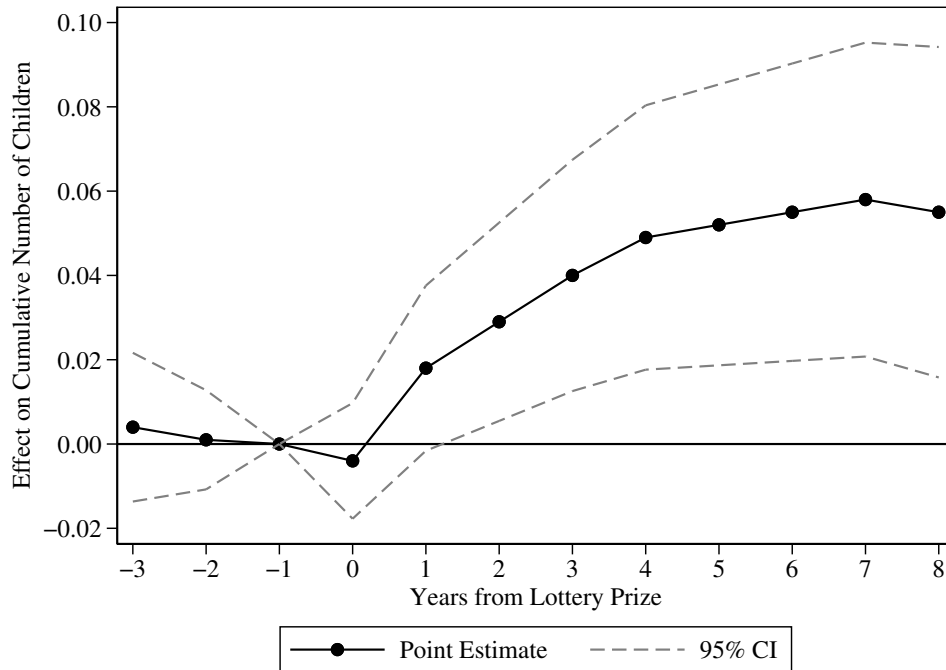
Notes: Each symbol stands for one country. The total fertility rate is defined as the number of children per 1,000 women. The data year is 2020. Data source: Our World in Data (Roser, 2014, 2020).

Figure C2: Robustness Check: Alternative Maximum Prize Amount Cutoff



Notes: This figure displays the estimated coefficients of  $Current_i \times Prize_i \times \mathbf{I}[t = L_i + 6]$  from Equation (1), with alternative settings on the maximum prize amount (ranges from 10 Million NT\$ to 150 Million NT\$) included in the sample. The outcome of interest is the cumulative number of children. The solid symbol denotes the point estimates. The dashed line denotes the 95% confidence interval. The horizontal axis refers to the maximum prize amount.

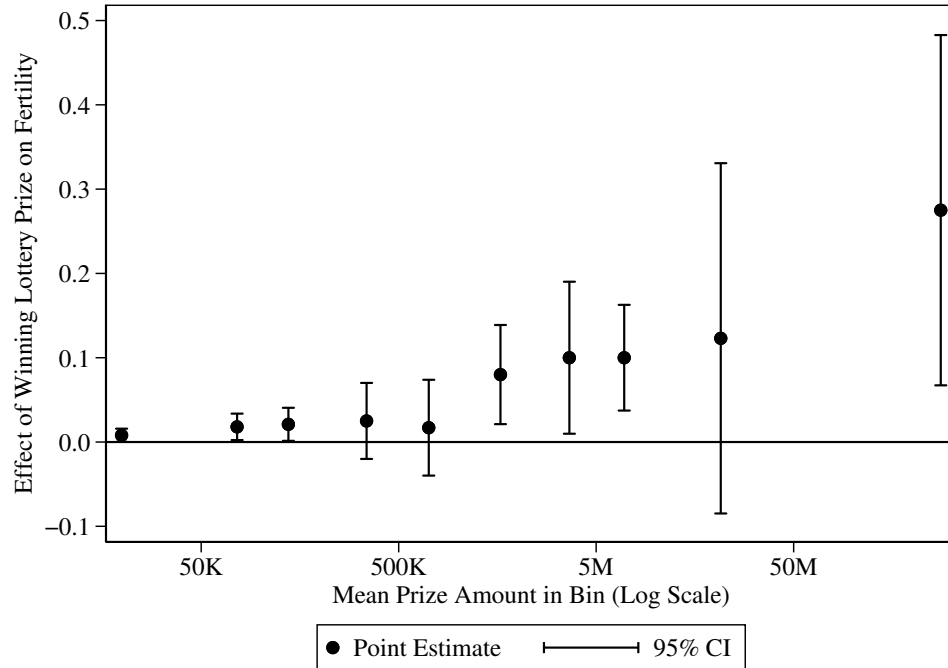
Figure C3: Effect of a Five Million NT\$ Lottery Prize on Fertility (Tracking 8 Years)



Notes: This figure displays the estimated coefficients of  $Current_i \times Prize_i \times \mathbf{I}[t = L_i + s]$  from Equation (1), but set  $s = -3, -2, \dots, 8$ . The sample only consists of winners whose (placebo) winning years are from 2007 to 2010 (four cohorts). The outcome of interest is the cumulative number of children. The solid line denotes the point estimates. The dashed line denotes the 95% confidence interval. The horizontal axis refers to the number of years from the (placebo) lottery-winning year.



Figure C4: Effect of a Lottery Prize on Fertility (Prize Group Bin Design)



Notes: This figure reports estimated coefficients of  $Current_i \times Prize_i \times \mathbf{I}[t = L_i + 6]$  in Equation (1), but replacing the continuous measure of lottery wins ( $Prize$ ) with a series of binary indicators  $\mathbf{I}[Size = k]$  representing different prize ranges: 1) 10 to 50 thousand NT\$; 2) 50 to 100 thousand NT\$; 3) 100 to 250 thousand NT\$; 4) 250 to 500 thousand NT\$; 5) 500 thousand to 1 million NT\$; 6) 1 to 2.5 million NT\$; 7) 2.5 to 5 million NT\$; 8) 5 to 10 million NT\$; 9) 10 to 50 million NT\$ and 10) 50 million NT\$ or more. We use winners of 5 to 10 thousand NT\$ as the reference group. The outcome of interest is the cumulative number of children. The circle symbol denotes the point estimates. The dashed line denotes the 95% confidence interval. The horizontal axis refers to the log average prize amount within the bin.

Table C1: Descriptive Statistics for Lottery Winners (by Minimum Prize) and Population

Minimum Prize	Lottery Winner					Population
	2K	5K	10K	30K	50K	
<i>Individual characteristics</i>						
Age	31.30 (6.83)	31.90 (6.74)	32.57 (6.61)	32.73 (6.68)	32.80 (6.68)	31.36 (7.90)
Living in urban area	0.69 (0.46)	0.69 (0.46)	0.69 (0.46)	0.70 (0.46)	0.70 (0.46)	0.69 (0.46)
Female	0.59 (0.49)	0.52 (0.50)	0.46 (0.50)	0.45 (0.50)	0.44 (0.50)	0.50 (0.50)
Married	0.45 (0.50)	0.46 (0.50)	0.48 (0.50)	0.47 (0.50)	0.47 (0.50)	0.41 (0.49)
Winner's Employment	0.74 (0.44)	0.75 (0.43)	0.75 (0.43)	0.74 (0.44)	0.74 (0.44)	0.69 (0.46)
Winner's Earnings (NT\$1,000)	283 (404)	290 (394)	297 (398)	288 (400)	290 (412)	286 (546)
Winner's Income (NT\$1,000)	302 (451)	308 (445)	317 (464)	309 (464)	312 (484)	308 (657)
Winner's Assets (NT\$1,000)	1,941 (10,424)	2,041 (8,702)	2,152 (9,173)	2,256 (9,208)	2,360 (9,740)	2,320 (13,292)
Winner's Liquid Assets (NT\$1,000)	612 (7,775)	612 (4,791)	619 (4,911)	635 (3,654)	658 (3,870)	709 (7,939)
Winner's Savings (NT\$1,000)	270 (1,196)	248 (1,155)	235 (1,103)	233 (1,113)	233 (1,139)	292 (1,391)
Household Earnings (NT\$1,000)	495 (708)	490 (656)	489 (628)	474 (646)	474 (659)	458 (870)
Household Income (NT\$1,000)	530 (790)	524 (732)	523 (723)	509 (737)	510 (748)	497 (1,344)
Household Assets (NT\$1,000)	3,895 (15,670)	3,847 (13,986)	3,831 (13,003)	3,941 (12,743)	4,027 (13,395)	4,166 (41,405)
Household Liquid Assets (NT\$1,000)	1,098 (9,663)	1,065 (6,840)	1,046 (6,565)	1,074 (5,914)	1,104 (6,358)	1,209 (38,198)
Household Savings (NT\$1,000)	462 (1,844)	421 (1,689)	395 (1,562)	394 (1,551)	389 (1,553)	478 (2,440)
<i>Fertility variables</i>						
Cumulative Number of Children	0.85 (1.09)	0.88 (1.10)	0.91 (1.11)	0.92 (1.12)	0.92 (1.11)	0.82 (1.11)
Gave Birth in $s - 1$	0.04 (0.20)	0.04 (0.21)	0.04 (0.21)	0.04 (0.20)	0.04 (0.20)	0.03 (0.18)
Gave Birth in $s - 2$	0.04 (0.20)	0.05 (0.21)	0.04 (0.21)	0.04 (0.20)	0.04 (0.20)	0.03 (0.18)
Gave Birth in $s - 3$	0.05 (0.21)	0.05 (0.21)	0.05 (0.21)	0.05 (0.21)	0.05 (0.21)	0.04 (0.19)
# of Observations	1,268,579	406,922	250,462	96,777	65,453	11,205,868

Note: We utilize the all individuals aged 20-44 from 2007-2012 to construct population data. For each individual, we randomly assign one year between 2007-2012 as a placebo "winning year." We then use their individual characteristics from the year prior to this randomly assigned placebo winning year in our analysis. We use the post-stratification weighting technique and match the marital status, age, earnings, and asset stratifications for our lottery sample and the population. Urban areas refer to the 6 largest cities in Taiwan with special municipality status: Taipei City, New Taipei City, Taoyuan City, Taichung City, Tainan City, and Kaohsiung City. These cities have the largest populations in Taiwan. Employment is defined as having positive annual labor earnings. Annual earnings are defined as the sum of annual wage income, business income, and professional income. Annual income is defined as the sum of annual labor earnings plus other annual income sources like interest, rents, farming, pensions etc, excluding lottery winnings. Assets are defined as the sum of real estate value, financial assets, and stocks, minus mortgage debt. Liquid assets are defined as the sum of financial assets and stocks. All monetary values like earnings, income, assets and liquid assets are measured in thousand New Taiwan Dollars (NT\$) and adjusted to 2016 NT\$ levels (1 NT\$  $\approx$  0.033 US\$ in 2016). More details on the construction of asset data can be found in Appendix B. Standard deviations are in parentheses, and standard errors are in brackets.

Table C2: Distribution of a Lottery Prize

Prize Amount	Number of Winners	Mean Win (Thousand NT\$)	Median Win (Thousand NT\$)
<b>All Prizes</b>			
5K–10K	180,120	8	8
10K–50K	178,265	20	17
50K–500K	42,134	118	92
500K–5M	4,965	1,334	812
5M–100M	1,479	10,059	6,827
>100M <sup>†</sup>	109	377,099	281,663
<b>Public Welfare Lottery</b>			
5K–10K	96,275	7	7
10K–50K	166,113	19	17
50K–500K	41,173	117	90
500K–5M	4,490	1,322	811
5M–100M	1,275	10,379	6,726
>100M <sup>†</sup>	109	377,099	281,663
<b>Taiwan Receipt Lottery</b>			
5K–10K	95,862	8	8
10K–50K	10,771	28	32
50K–500K	918	164	162
500K–5M	475	1,452	1,622
5M–100M	204	8,061	8,000

Note: All prizes are after-tax amounts and adjusted with CPI, displayed in 2016 NT\$ (1 NT\$  $\approx$  0.033 US\$). An individual can win both the Public Welfare Lottery and the Taiwan Receipt Lottery in a given year. Therefore, the sum of the head counts of two subcategories might exceed the total head counts.

<sup>†</sup> Not included in the main sample.

Table C3: Balance Test

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Winner's Income & Asset (10M)										
Dependant Variable:	Urban	Female	Married	Employed	Earnings	Income	Assets	Liquid Assets	Savings	Number of Children	Total Prize (1K)
<b>Panel A: Current Winners</b>											
$Prize_i$	0.015*	-0.053***	-0.001	0.006	0.001	0.001	0.014	-0.002	-0.001	-0.019	0.000
	(0.008)	(0.010)	(0.009)	(0.008)	(0.001)	(0.001)	(0.011)	(0.004)	(0.002)	(0.019)	(0.007)
Observations	222,937										
<b>Panel B: Future Winners</b>											
$Prize_i$	0.024***	-0.093***	-0.017**	0.002	0.001	0.001	0.003	-0.000	-0.004*	-0.039**	0.000
	(0.009)	(0.010)	(0.008)	(0.008)	(0.001)	(0.001)	(0.012)	(0.004)	(0.002)	(0.018)	(0.002)
Observations	183,985										
<b>Panel C: Difference-in-differences</b>											
$Current_i \times Prize_i$	-0.009	0.038***	0.016	0.004	0.000	0.000	0.011	-0.001	0.002	0.019	0.000
	(0.012)	(0.014)	(0.012)	(0.011)	(0.001)	(0.001)	(0.016)	(0.006)	(0.003)	(0.026)	(0.007)
Observations	406,922										
Baseline Mean	0.682	0.545	0.424	0.743	0.027	0.029	0.190	0.060	0.025	0.791	0.382

Note: Panels A and B report estimated coefficients of  $\beta$  from the equation  $X_i = \beta \cdot Prize_i + a_i + r_i + \varepsilon_i$ .  $a_i$  is the age fixed effect.  $r_i$  is the pre-treatment lottery redemption records control. Panel A only includes current winners, and Panel B only includes future winners. Panel C reports estimated coefficients of  $\beta_3$  from Equation  $X_i = \beta_1 Current_i + \beta_2 Prize_i + \beta_3 Current_i \times Prize_i + a_i + r_i + \varepsilon_i$ . The outcomes of interest are winners' characteristics in the one year previous to the lottery win. The coefficient  $\beta_3$  stands for the difference-in-differences estimate for the baseline variable between current and future winners of the different prize amounts. Standard errors reported in parentheses.

\*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, and \* significant at the 10 percent level.

Table C4: Descriptive Statistics for Current and Future Lottery Winners

	Current Winners	Future Winners	Future Winners (Re-weighted)
<i>Individual characteristics</i>			
Age	32.76 (6.47)	30.86 (6.91)	32.76 (6.47)
Living in urban area	0.69 (0.46)	0.68 (0.47)	0.69 (0.46)
Female	0.49 (0.50)	0.55 (0.50)	0.55 (0.50)
Married	0.49 (0.50)	0.42 (0.49)	0.49 (0.50)
Winner's Employment	0.75 (0.43)	0.74 (0.44)	0.75 (0.43)
Winner's Earnings (NT\$1,000)	306 (403)	270 (383)	297 (406)
Winner's Income (NT\$1,000)	326 (447)	287 (443)	317 (462)
Winner's Assets (NT\$1,000)	2,160 (9,010)	1,897 (8,312)	2,227 (8,797)
Winner's Liquid Assets (NT\$1,000)	625 (4,762)	597 (4,827)	689 (4,783)
Winner's Savings (NT\$1,000)	249 (1,193)	248 (1,107)	291 (1,228)
Household Earnings (NT\$1,000)	502 (680)	477 (624)	529 (659)
Household Income (NT\$1,000)	538 (752)	507 (706)	567 (744)
Household Assets (NT\$1,000)	3,971 (14,155)	3,697 (13,776)	4,357 (15,479)
Household Liquid Assets (NT\$1,000)	1,075 (7,551)	1,053 (5,864)	1,225 (6,056)
Household Savings (NT\$1,000)	416 (1,727)	427 (1,641)	501 (1,794)
<i>Fertility variables</i>			
Cumulative Number of Children	0.96 (1.12)	0.79 (1.07)	0.94 (1.12)
Gave Birth in $s - 1$	0.05 (0.21)	0.04 (0.20)	0.04 (0.20)
Gave Birth in $s - 2$	0.05 (0.21)	0.04 (0.20)	0.04 (0.21)
Gave Birth in $s - 3$	0.05 (0.22)	0.04 (0.20)	0.05 (0.21)
# of Observations	222,937	183,985	222,937

Note: We utilize the all individuals aged 20-44 from 2007-2012 to construct population data. For each individual, we randomly assign one year between 2007-2012 as a placebo "winning year." We then use their individual characteristics from the year prior to this randomly assigned placebo winning year in our analysis. We use the post-stratification weighting technique and match the marital status, age, earnings, and asset stratifications for our lottery sample and the population. Urban areas refer to the 6 largest cities in Taiwan with special municipality status: Taipei City, New Taipei City, Taoyuan City, Taichung City, Tainan City, and Kaohsiung City. These cities have the largest populations in Taiwan. Employment is defined as having positive annual labor earnings. Annual earnings are defined as the sum of annual wage income, business income, and professional income. Annual income is defined as the sum of annual labor earnings plus other annual income sources like interest, rents, farming, pensions etc, excluding lottery winnings. Assets are defined as the sum of real estate value, financial assets, and stocks, minus mortgage debt. Liquid assets are defined as the sum of financial assets and stocks. All monetary values like earnings, income, assets and liquid assets are measured in thousand New Taiwan Dollars (NT\$) and adjusted to 2016 NT\$ levels (1 NT\$  $\approx$  0.033 US\$ in 2016). More details on the construction of asset data can be found in Appendix B. Standard deviations are in parentheses, and standard errors are in brackets.



Table C5: Descriptive Statistics for Lottery Winners (Re-weighted) and Population

	Lottery Winners	Lottery Winners (Re-weighted)	Population
<i>Individual characteristics</i>			
Age	31.90 (6.74)	31.36 (7.90)	31.36 (7.90)
Living in urban area	0.69 (0.46)	0.69 (0.47)	0.69 (0.46)
Female	0.52 (0.50)	0.50 (0.50)	0.50 (0.50)
Married	0.46 (0.50)	0.41 (0.49)	0.41 (0.49)
Winner's Employment	0.75 (0.43)	0.69 (0.46)	0.69 (0.46)
Winner's Earnings (NT\$1,000)	290 (394)	281 (452)	286 (546)
Winner's Income (NT\$1,000)	308 (445)	302 (513)	308 (657)
Winner's Assets (NT\$1,000)	2,041 (8,702)	2,258 (9,771)	2,320 (13,292)
Winner's Liquid Assets (NT\$1,000)	612 (4,791)	676 (5,517)	709 (7,939)
Winner's Savings (NT\$1,000)	248 (1,155)	262 (1,235)	292 (1,391)
Household Earnings (NT\$1,000)	490 (656)	465 (720)	458 (870)
Household Income (NT\$1,000)	524 (732)	500 (803)	497 (1,344)
Household Assets (NT\$1,000)	3,847 (13,986)	3,973 (14,998)	4,166 (41,405)
Household Liquid Assets (NT\$1,000)	1,065 (6,840)	1,123 (7,457)	1,209 (38,198)
Household Savings (NT\$1,000)	421 (1,689)	436 (1,794)	478 (2,440)
<i>Fertility variables</i>			
Cumulative Number of Children	0.88 (1.10)	0.83 (1.10)	0.82 (1.11)
Gave Birth in $s - 1$	0.04 (0.21)	0.04 (0.18)	0.03 (0.18)
Gave Birth in $s - 2$	0.05 (0.21)	0.04 (0.19)	0.03 (0.18)
Gave Birth in $s - 3$	0.05 (0.21)	0.04 (0.19)	0.04 (0.19)
# of Observations	406,922	406,922	11,205,868

Note: We utilize the all individuals aged 20-44 from 2007-2012 to construct population data. For each individual, we randomly assign one year between 2007-2012 as a placebo "winning year." We then use their individual characteristics from the year prior to this randomly assigned placebo winning year in our analysis. We use the post-stratification weighting technique and match the marital status, age, earnings, and asset stratifications for our lottery sample and the population. Urban areas refer to the 6 largest cities in Taiwan with special municipality status: Taipei City, New Taipei City, Taoyuan City, Taichung City, Tainan City, and Kaohsiung City. These cities have the largest populations in Taiwan. Employment is defined as having positive annual labor earnings. Annual earnings are defined as the sum of annual wage income, business income, and professional income. Annual income is defined as the sum of annual labor earnings plus other annual income sources like interest, rents, farming, pensions etc, excluding lottery winnings. Assets are defined as the sum of real estate value, financial assets, and stocks, minus mortgage debt. Liquid assets are defined as the sum of financial assets and stocks. All monetary values like earnings, income, assets and liquid assets are measured in thousand New Taiwan Dollars (NT\$) and adjusted to 2016 NT\$ levels (1 NT\$  $\approx$  0.033 US\$ in 2016). More details on the construction of asset data can be found in Appendix B. Standard deviations are in parentheses, and standard errors are in brackets.

Table C6: Subgroup Analysis—By Parenthood Status

Dependent Variable:	Number of Cumulative Children	
	(1)	(2)
	Parenthood Status	
	w/o Child	w/ Child
$Current_i \times \mathbf{I}[Size_i = 10K - 50K] \times \mathbf{I}[t = L_i + 6]$	0.018*** (0.006)	0.004 (0.004)
$Current_i \times \mathbf{I}[Size_i = 50K - 500K] \times \mathbf{I}[t = L_i + 6]$	0.041*** (0.010)	0.005 (0.007)
$Current_i \times \mathbf{I}[Size_i = 500K - 5M] \times \mathbf{I}[t = L_i + 6]$	0.078** (0.031)	-0.002 (0.019)
$Current_i \times \mathbf{I}[Size_i = 5M - 50M] \times \mathbf{I}[t = L_i + 6]$	0.148*** (0.053)	0.078** (0.030)
$Current_i \times \mathbf{I}[Size_i \geq 50M] \times \mathbf{I}[t = L_i + 6]$	0.483*** (0.182)	0.138 (0.112)
Baseline Trend	0.405	0.203
Observations	2,194,390	1,874,830

Note: This table reports estimated coefficients of  $Current_i \times Prize_i \times \mathbf{I}[t = L_i + 6]$  in Equation (1), but replacing the continuous measure of lottery wins (*Prize*) with a series of binary indicators  $\mathbf{I}[Size = k]$  representing different prize ranges: 1) 10 to 50 thousand NT\$; 2) 50 to 500 thousand NT\$; 3) 500 thousand to 5 million NT\$; 4) 5 to 50 million NT\$ and 5) 50 million NT\$ or more. We use winners of 5 to 10 thousand NT\$ as the reference group. The outcome of interest is the cumulative number of children that winner  $i$  has by the end of the sixth year after a lottery win. The baseline trend is the change in the cumulative number of children for the future winner between one year before and six years after the placebo lottery-winning year. All regressions include the same set of covariates shown in Column (6) of Table 2. Column (1) includes winners with no child before winning the lottery. Column (2) includes winners with at least one child before winning the lottery. Standard errors are clustered at the winner level and reported in parentheses. \*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, and \* significant at the 10 percent level.

Table C7: Public Family Benefits Spending in US, Sweden, and Taiwan

	US	Sweden	Taiwan
<b>Public Family Benefits Spending</b>			
Total Spending, National Currency (Millions)	130,903	172,746	147,948
Spending per-person, National Currency	399	16,804	6,268
Spending per person, PPP converted (in 2015\$)	373.6	1,743.2	383.24
Percentage of GDP (%)	0.6	3.4	0.8

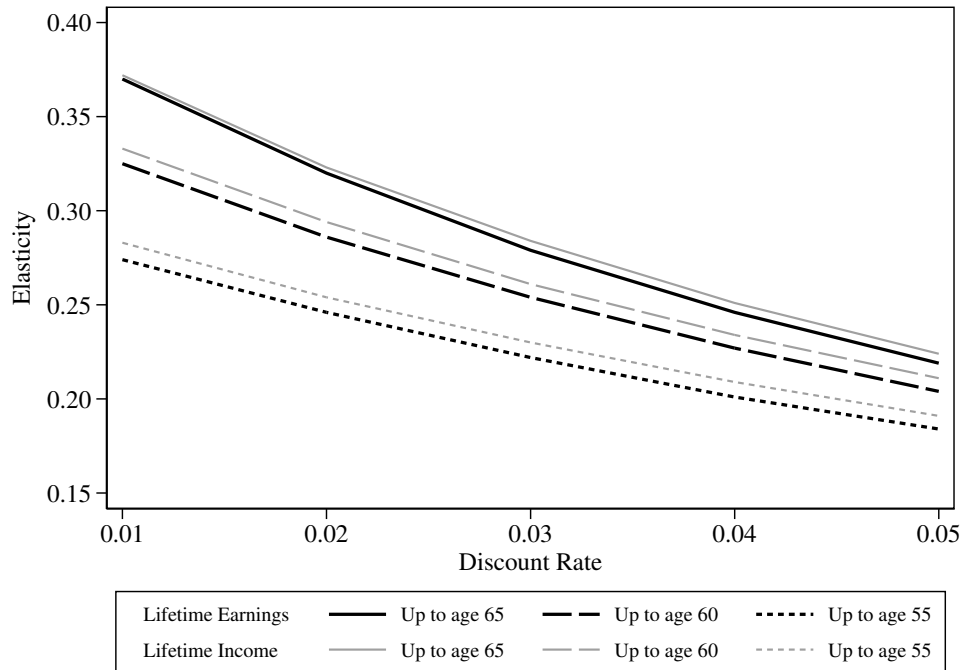
Note: Public family benefits spending includes financial support that is exclusively for families and children. Such as child-related cash transfers, income support payments during parental leave, income support for sole parents' families, financing and subsidizing of childcare and early education providers, and child-related tax spending. The data is as of 2019. Data source: OECD Family Database, Ministry of Interior (MOI) Taiwan, Ministry of Health and Welfare (MOHW) Taiwan, and Directorate General of Budget, Accounting and Statistics (DGBAS) Taiwan.

## **D Alternative Approach to Estimate Wealth Elasticity of Fertility**

In the main analysis, we use the change in accumulated wealth in the comparison group to measure the magnitude of the income shock from the lottery wins. An alternative approach is to use the accumulated income flow during one's lifetime. To estimate the lifetime income, we first take the population data and estimate the year-to-year income (earnings) growth rate for each individual. And then, we take the median growth rate by gender and age and apply it to our sample. We then calculate the counterfactual of the potential income (earnings) for lottery winners as if they had not received the lottery gain. We compute the annual income (earnings) up to their retirement age (which is defined as 55, 60, or 65). We also apply various discount rates (from 0.01 to 0.05) to compute future lifetime income (earnings) to current values. Using this information, we re-compute the wealth elasticity driven by the lottery on fertility.

Figure **D1** displays the results. Using different assumptions, the estimated elasticity falls from 0.18 to 0.37. The elasticity is lower when we assume a higher discount rate and an earlier retirement age. The estimations using labor market earnings and total income are quite consistent.

Figure D1: Estimated Elasticity with Lifetime Income/Earnings



*Notes:* This figure denotes the estimated wealth elasticity on fertility using lifetime income/earnings as the base of wealth change. The horizontal axis denotes the discount rate. The vertical axis demonstrates the estimated elasticity. The back lines denote estimations using lifetime earnings, and the gray lines denote estimations using lifetime income. The solid, dashed, and dotted lines are based on the estimation that calculates lifetime income/earnings up to 65, 60, and 55, respectively.



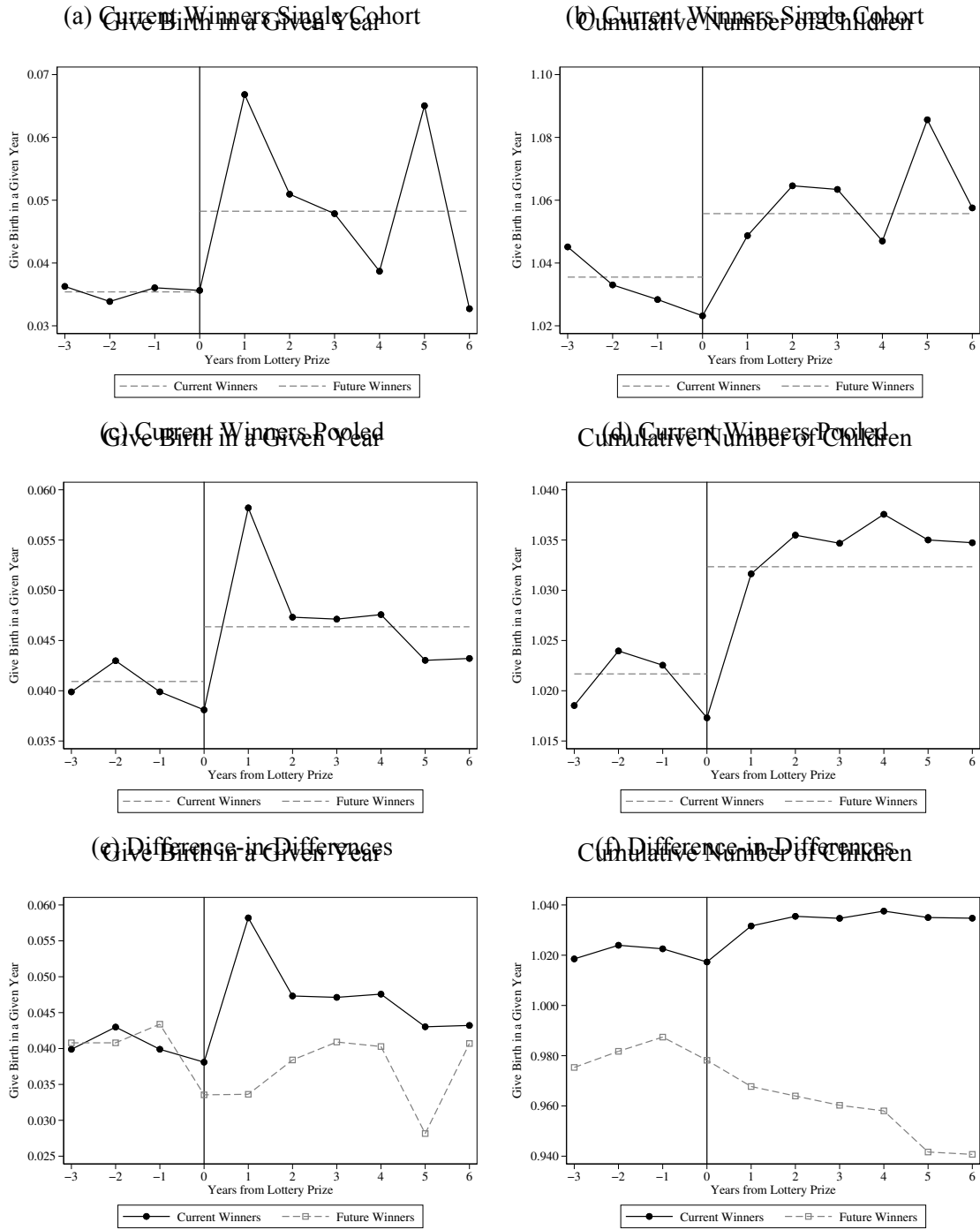
## E Estimates based on Golosov et al. (2021)'s Approach

In our primary analysis, we adopt a triple-difference approach, relying on three variations: 1) the amount of prizes, 2) observation times (pre- and post-winning), and 3) the timing of the lottery win. In this appendix, we follow the difference-in-differences (DID) and instrumental variables approach in [Golosov et al. \(2023\)](#), relying only on variations from observation times (pre- and post-winning) and the timing of the lottery win. Our sample consists of lottery winners who won more than NT\$ 1 million ( $\approx$  30 thousand US\$), resulting in a total of 3,445 lottery winners.

The basic empirical design compares changes in fertility trends before and after (pseudo) winning among current and future winners. Figure [E1b](#) shows the trend in the cumulative number of children for the cohort who won lottery prizes in 2011. This trend is adjusted for age and calendar fixed effects, isolating the outcomes of interest from life-cycle and temporary effects. In the pre-winning period, the average number of children was 1.04, which increased to 1.06 in the post-winning period. Figure [E1d](#) shows a similar trend when pooling all lottery cohorts. The average number of children rose from 1.02 in the pre-winning period to 1.035 in the post-winning period.

Figure [E1f](#) further introduces future winners as the control group, serving as the counterfactual in the absence of a lottery win. This control group consists of individuals who would win a lottery prize above NT\$ 1 million beyond our observation period (i.e., more than six years after their pseudo-winning year). The figure shows that while the control group experienced a slight downward trend in fertility, the treatment group (current winners) showed an increase. Overall, the evidence is consistent with our main results: receiving a cash transfer from the lottery increases fertility.

Figure E1: Fertility Trend across Event Time for Current and Future Winners



Notes:

To formally test the impact of winning the lottery, we perform a regression based on the DID design. Specifically, we estimate the following regression:

$$\begin{aligned}
B_{it} = & \alpha_0 + \alpha_1 \cdot Current_i + \beta_s \cdot \mathbf{I}[t = L_i + s] \\
& + \gamma_s \cdot Current_i \times \mathbf{I}[t = L_i + s] + a_{it} + \theta_t + \mathbf{X}_i\psi + \varepsilon_{it}
\end{aligned} \tag{E1}$$

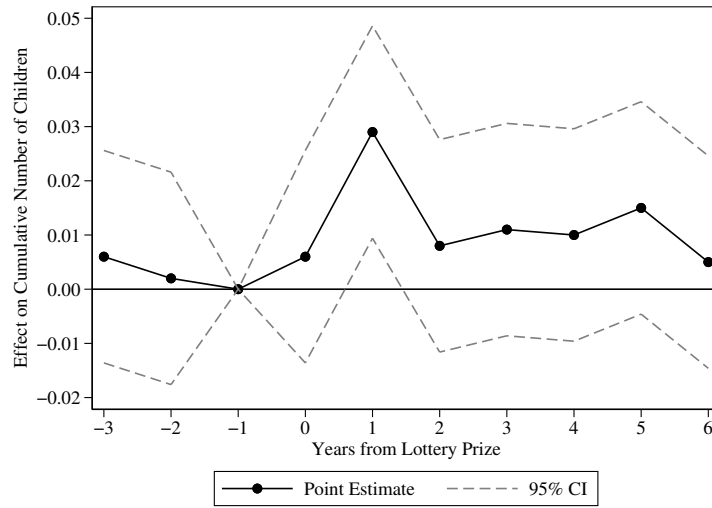
The outcome of interest, represented by  $B_{it}$ , is the cumulative number of children that an individual  $i$  ever has at time  $t$ .  $Current_i$  is a dummy variable indicating that an individual  $i$  is either a current winner who first won lottery prizes in year  $L_i$  ( $Current_i = 1$ ) or a future winner whose first lottery winning year is after  $L_i + 6$  ( $Current_i = 0$ ). Event time dummies  $I[t = L_i + s]$  indicate observations before or after lottery wins, where  $L_i$  is the year of individual  $i$ 's first lottery win. Thus,  $I[t = L_i + s]$  represents an indicator for being  $s$  years away from the win, with  $s = -3, -2, 0, 1, 2, 3, 4, 5, 6$ . For instance,  $I[t = L_i + 1]$  is a dummy for the first year after the lottery-winning year. Our sample comprises a balanced panel of individuals observed annually from 3 years ( $s = -3$ ) pre-winning to 6 years ( $s = 6$ ) post-winning. We normalize the event time dummy coefficients at the baseline year  $s = -1$  to zero. For future winners,  $L_i$  is a ‘‘placebo’’ winning year determined by subtracting 6 from their actual first winning year.  $a_{it}$  is the age fixed effect.  $\theta_t$  denotes year fixed effect.  $\mathbf{X}_i$  is a vector of pre-determined covariates.

Following [Goloso et al. \(2023\)](#), the regression is estimated for each cohort and event time separately. The final estimate is based on the cohort-size weighted average. This approach also addresses concerns regarding staggered DID as noted by [De Chaisemartin & d’Haultfoeuille \(2020\)](#), [Callaway & Sant’Anna \(2021\)](#), and [Sun & Abraham \(2021\)](#). The standard errors were computed based on the bootstrapping method with 1,000 times re-sampling with replacement within the cohort-by-group cluster.

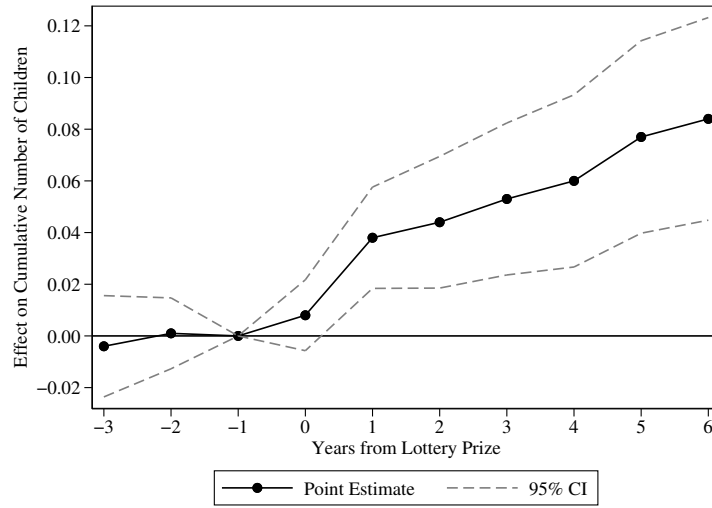
Figure [E3b](#) demonstrates that winning a lottery prize above NT\$ 1 Million leads to an increase in total fertility by 0.08 by the end of the sixth year after the lottery win.

Figure E2: Effect of Winning Lottery on Fertility

(a) Give Birth in a Given Year



(b) Cumulative Number of Children



Notes:

To estimate the impact of each dollar of the lottery prize, we further combine the DID design with an instrumental variable approach. Specifically, we use the  $Current_i \times \mathbf{I}[t = L_i + s]$  from Equation (E1) as instruments and the prize amount received as the endogenous variable. Formally, we estimate the following equations:

$$Prize_{it} = \nu_0 + \nu_1 \cdot Current_i + \mu_s \cdot \mathbf{I}[t = L_i + s] + \eta_s \cdot Current_i \times \mathbf{I}[t = L_i + s] + a_{it} + \delta_t + \mathbf{X}_i \phi + \epsilon_{it} \quad (\text{E2})$$

$$B_{it} = \zeta_0 + \zeta_1 \cdot Current_i + \kappa_s \cdot \mathbf{I}[t = L_i + s] + \lambda_s \cdot \widehat{Prize}_{it} + a_{it} + \xi t + \mathbf{X}_i \omega + v_{it} \quad (\text{E3})$$

Equation (E2) is similar to Equation (E1) but substitutes the dependent variable with  $Prize_{it}$ , which denotes the amount of the lottery prize received. The value is zero for current winners prior to their lottery win and for future winners throughout the observation period. For current winners after their lottery win, the value is the actual prize amount, after tax and denoted in real dollars. Equation (E3) estimates the impact of  $Prize_{it}$  on fertility. To better compare with our main estimate, we scale the effect to represent a five million NT\$ lottery prize win.

Figure E3b demonstrates the estimated result. The findings reveal that a five million NT\$ lottery prize win increases total fertility by 0.085 by the end of the sixth year after the lottery win. This estimate is quite close to our main estimate from the triple-difference approach.

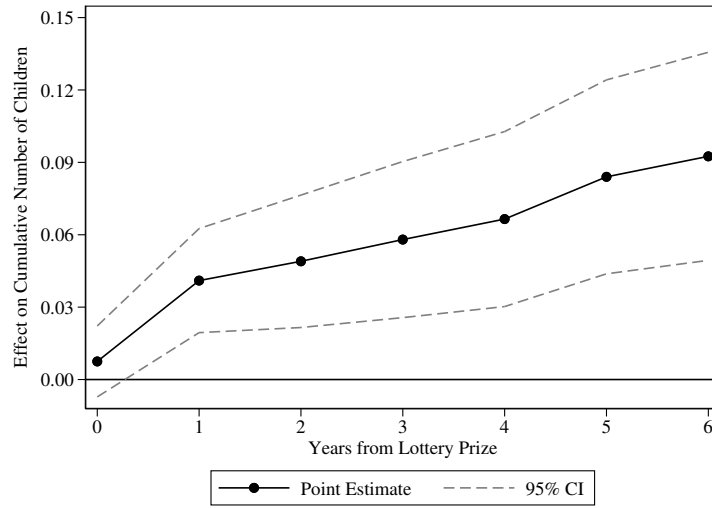


Figure E3: Effect of a Five Million NT\$ Lottery Prize on Fertility (IV Results)

(a) Give Birth in a Given Year



(b) Cumulative Number of Children



Notes: