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Lottery tax windfalls, state-level fiscal policy, and consumption☆

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HIGHLIGHTS

- We study lottery tax windfalls received by state governments.
- Windfalls finance higher expenditures on low income households in recessions.
- Insignificant impact of lottery tax windfalls in good economic conditions.
- Wealth transfers from high to low income households through lottery tax channel.

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ABSTRACT

We find that lottery tax windfalls finance higher state-government expenditures on supplemental security income that increase consumption, but only during bust periods. Wealth transfers from lottery winners to low income households enable fiscal policy to stabilize consumption during bust periods.

Measuring the impact of government fiscal policy on consumption is a challenge since fiscal policy is endogenous with respect to economic conditions. We utilize 147 multi-state PowerBall and MegaMillions lottery prices between 1998 to 2009 to circumvent this endogeneity.[1]

Our study of lottery tax windfalls examines the possibility that the relation between fiscal policy and consumption depends on the state of the economy (Parker, 2011) by exploiting heterogeneity in consumption, economic conditions, and fiscal policy across states. We find evidence of a supplemental security income (SSI) channel in which lottery tax windfalls enable state governments to increase SSI payments during bust periods that increase consumption. SSI payments are discretionary expenditures that target low income households. Although minimum payments are required by the federal government, the amount of these supplemental payments and their eligibility requirements are decided by individual states.

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[1] Approximately 25% of lottery revenue is collected by state governments as a sales tax. In contrast to this stable source of revenue, 60% of lottery revenue becomes prize money that is the basis of a lottery tax windfall. Operating expenses account for the remaining 15% of lottery revenue.

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Table 1
State characteristics. This table reports each state's effective tax rate on lottery winnings and average consumption growth based on retail sales. Supplemental security income (SSI) expenditures as a percentage of total expenditures are also reported. ACIR is a variable between zero and ten that increases with the stringency of a state's balanced budget amendment, while the deposit (DEP.) and withdrawal (WITH.) rules of state-level budget stabilization funds are ranked between one and five. A state is fiscally constrained unless its ACIR index is strictly below two and the sum of these rule rankings is strictly below three.

State	Lottery	Lottery tax	Effective tax rate	Consumption growth	SSI spending	ACIR index	DEP. rules	WITH. rules	Fiscally constrained
					All expenditures				
AK	No	No	0.00%	0.658%	0.611%	6	1	1	No
AL	No	No	5.00%	1.235%	3.856%	10	4	1	Yes
AR	Yes	Yes	7.00%	1.219%	3.199%	9	5	5	Yes
AZ	Yes	Yes	4.94%	0.437%	2.038%	10	4	4	Yes
CA	Yes	No	0.00%	1.125%	3.823%	6	2	2	Yes
CO	Yes	Yes	1.65%	0.106%	1.435%	10	3	2	Yes
CT	Yes	Yes	4.75%	0.998%	1.270%	5	2	3	Yes
DE	Yes	No	0.00%	0.309%	1.155%	10	2	3	Yes
FL	Yes	No	0.00%	0.415%	3.235%	10	2	2	Yes
GA	Yes	Yes	6.00%	−0.241%	2.793%	10	2	1	Yes
HI	No	No	8.69%	0.473%	1.445%	10	1	3	Yes
IA	Yes	Yes	8.98%	1.748%	1.380%	10	1	1	No
ID	Yes	Yes	7.93%	1.105%	1.706%	10	1	1	No
IL	Yes	Yes	1.54%	0.848%	2.498%	4	2	1	Yes
IN	Yes	Yes	1.74%	0.486%	1.919%	10	4	4	Yes
KS	Yes	Yes	6.45%	0.804%	1.576%	10	3	1	Yes
KY	Yes	Yes	6.00%	0.629%	4.217%	10	2	1	Yes
LA	Yes	Yes	6.00%	2.444%	3.609%	4	2	1	Yes
MA	Yes	Yes	5.56%	0.847%	2.471%	3	2	1	Yes
MD	Yes	Yes	5.00%	0.469%	1.814%	6	3	1	Yes
ME	Yes	Yes	8.50%	1.677%	2.060%	9	2	1	Yes
MI	Yes	Yes	2.42%	0.605%	2.265%	6	4	4	Yes
MN	Yes	Yes	7.89%	0.819%	1.212%	8	1	1	No
MO	Yes	Yes	6.00%	0.793%	2.524%	10	1	1	No
MS	No	No	5.00%	1.294%	3.910%	9	1	1	No
MT	Yes	Yes	9.63%	1.687%	1.447%	10	5	5	Yes
NC	Yes	Yes	8.02%	0.328%	2.372%	10	2	1	Yes
ND	Yes	Yes	7.10%	2.293%	0.993%	8	2	4	Yes
NE	Yes	Yes	6.76%	1.029%	1.445%	10	2	2	Yes
NH	Yes	Yes	5.00%	1.693%	1.190%	2	2	2	Yes
NJ	Yes	Yes	7.82%	1.717%	1.616%	10	2	2	Yes
NM	Yes	Yes	7.08%	0.720%	2.036%	10	2	1	Yes
NV	No	No	0.00%	0.545%	1.779%	4	4	2	Yes
NY	Yes	Yes	7.24%	2.147%	2.756%	3	4	2	Yes
OH	Yes	Yes	7.10%	0.612%	2.237%	10	2	1	Yes
OK	Yes	Yes	6.51%	1.690%	2.414%	10	2	3	Yes
OR	Yes	Yes	9.17%	−0.433%	1.542%	8	1	1	No
PA	Yes	No	0.00%	0.998%	2.759%	6	2	3	Yes
RI	Yes	Yes	10.01%	1.039%	2.522%	10	1	2	Yes
SC	Yes	Yes	7.00%	0.486%	2.231%	10	3	2	Yes
SD	Yes	No	0.00%	1.119%	1.776%	10	2	2	Yes
TN	Yes	Yes	6.00%	0.444%	3.451%	10	3	2	Yes
TX	Yes	No	0.00%	0.791%	2.683%	8	2	2	Yes
UT	No	No	6.67%	0.466%	0.977%	10	2	2	Yes
VA	Yes	Yes	5.75%	0.930%	1.975%	8	4	4	Yes
VT	Yes	Yes	9.49%	2.528%	1.505%	0	2	2	No
WA	Yes	No	0.00%	1.382%	1.842%	8	2	3	Yes
WI	Yes	Yes	6.84%	0.936%	1.535%	6	3	2	Yes
WV	Yes	Yes	6.50%	2.050%	3.930%	10	2	2	Yes
WY	No	No	0.00%	3.268%	0.734%	8	1	1	No
Average			5.13%	1.035%	2.155%	8.08	2.32	2.04	

Consequently, the SSI channel links exogenous shocks to government fiscal policy in different economic conditions with consumption. In the absence of a lottery tax windfall, expenditures on supplemental security income and consumption both decline during bust periods. Furthermore, the negligible impact of lottery tax windfalls on consumption during boom periods is consistent with weaker household borrowing constraints during these periods.

1. Data

Lottery data are from the website www.portalseven.com that contains the location of Power Ball and Mega Million lottery winners starting in 1998. As reported in Table 1, 43 states participate in these multi-state lotteries. A state's highest marginal income tax rate represents its effective tax rate on lottery winnings, while dollar-denominated lottery tax windfalls are computed as the product of this effective tax rate times the prize money received by their resident lottery winner. These windfalls ignore sales taxes and state income taxes collected on future income generated by the lottery prize.

Our proxy for state-level consumption is retail sales defined by the total annual sales of the retail industry (NAICS 44–45) in each state (Ostergaard et al., 2002; Korniotis, 2008). Gross State Product (GSP) is an annual measure of each state's economic output. State-level revenue and expenditure data as well as GSP are obtained from the US Census Bureau's Compendia database.

The Advisory Commission on Intergovernmental Relations (1987) summarizes the stringency of each state's balanced budget amendment by assigning states an ACIR score between zero and ten. A higher ACIR score corresponds to a more stringent balanced

Table 2
Lottery tax windfalls, SSI expenditures, and consumption. This table reports the impact of lottery tax windfalls on supplemental security income (SSI) expenditures and consumption using the panel regressions in Eqs. (1) and (2). SSI and consumption represent percentage growth rates. Boom and bust periods are defined at the state-level as years in which GSP growth is in the top quintile and bottom quintile, respectively. The lottery dummy variable $DLW_{j,t}$ is one if at least one resident in state j wins the lottery in year t, and the state taxes lottery winnings. Dollar-denominated lottery tax windfalls are computed based on the state's highest marginal income tax rate. Fraction replaces $DLW_{j,t}$ with the fraction of lottery wins in state j in year t relative to all lottery wins within the US that year.

	Tax on lottery winnings (33 states)					No tax on lottery winnings (8 states)		
	SSI	Consumption	Consumption	Consumption	Consumption	SSI	Consumption	Consumption
Bust	−0.0067***	−0.0121***	−0.0097**	−0.0149**	−0.0107**	−0.0022	−0.0089	−0.0181
	−2.63	*−2.62*	*−2.45*	*−2.53*	*−2.29*	*−0.59*	*−1.34*	*−1.60*
Boom	−0.0035	0.0175***	0.0159***	0.0022	0.0160***	−0.0065	0.0148*	0.0379*
	−1.59	*6.15*	*5.15*	*0.22*	*5.16*	*−1.01*	*1.89*	*1.97*
DLW	−0.0001	0.0008						
	−0.05	*0.20*						
Bust ∗ DLW	0.0067***	0.0119**						
	3.35	*2.14*						
Boom ∗ DLW	−0.0060	−0.0073						
	−1.14	*−0.88*						
Lottery tax			−3.0926**					
			−2.26					
Bust ∗ Lotterytax			9.3316***					
			4.40					
Boom ∗ Lotterytax			−7.5711					
			−0.63					
Fraction					−0.0209			
					−0.59			
Bust ∗ Fraction					0.1275**			
					2.50			
Boom ∗ Fraction					−0.0261			
					−0.42			
SSI				−0.1161				−0.0062
				−0.73				*−0.03*
Bust ∗ SSI				0.3362**				0.2102
				2.32				*1.02*
Boom ∗ SSI				0.2838				−0.6421
				1.23				*−1.22*
Constant	0.0368***	−0.0883***	−0.0892***	0.0416***	−0.0890***	0.0837***	−0.0806***	−0.0826***
	24.50	*−32.97*	*−28.53*	*7.21*	*−27.21*	*51.81*	*−26.61*	*−7.30*
Observations	297	396	396	297	396	72	96	72
R-squared	0.791	0.821	0.820	0.801	0.819	0.554	0.897	0.880

*** Denote significance at the 1 percent level.
** Denote significance at the 5 percent level.
* Denote significance at the 10 percent level.

budget amendment. States have also adopted budget stabilization funds to institutionalize savings. The deposit and withdrawal rules associated with these stabilization funds range from one to five, with higher values denoting more stringent rules (Wagner and Elder, 2005). The balanced budget amendment and stabilization fund thresholds identify 41 fiscally constrained states, all of which participate in multi-state lotteries, based on the smallest possible nonempty subset of states. The nine states in Table 1 that are not fiscally constrained have the least stringent balanced budget amendments and the least stringent budget stabilization fund rules.

2. Empirical results

State–year panel regressions with state and year fixed effects are estimated. The first panel regression

$$\begin{aligned} SSI_{j,t} &= \beta_1 \, Bust_{j,t} + \beta_2 \, Boom_{j,t} + \beta_3 \, DLW_{j,t} \\ &\quad + \beta_4 \, (Bust \times DLW)_{j,t} + \beta_5 \, (Boom \times DLW)_{j,t} \\ &\quad + \gamma_1 \, State_j + \gamma_2 \, Year_t + \epsilon_{j,t}. \end{aligned} \tag{1}$$

Besides SSI, the state–year dependent variable also assumes the value for consumption. Standard errors are double-clustered by state and year. State-level boom and bust periods are defined as years in which GSP growth is in the top quintile and bottom quintile, respectively. We divide the subset of fiscally constrained states that participate in lotteries into two groups; 33 states with and 8 states without a tax imposed on lottery winnings. The influence of lottery tax windfalls on fiscal policy is limited to the former.

$DLW_{j,t}$ equals one if there is a lottery winner in state j in year t, provided this state taxes lottery winnings. This dummy variable ensures the tax implications of receiving a lump sum payment versus an annuity is immaterial. Another specification replaces DLW with the dollar-denominated amount of the lottery tax windfall, normalized by its total tax revenue in the same year.

Table 2 indicates that state governments use lottery tax windfalls to increase SSI expenditures, but only in bust periods, as the interaction between Bust and DLW has a positive β_4 coefficient of 0.0067 (t-statistic of 3.35) when SSI is the independent variable. This 0.67% increase implies that more than half of lottery tax windfalls are used to finance higher SSI expenditures during bust periods. In the absence of a lottery tax windfall, SSI payments decline during bust periods, as indicated by the negative β_1 coefficient. With consumption as the dependent variable, the interaction between Bust and DLW has a positive β_4 coefficient of 0.0119 (t-statistic of 2.14), while the negative β_1 coefficients signify that consumption is unconditionally lower during bust periods. Consequently, lower consumption during bust periods is partially offset by lottery windfalls.

A separate specification replaces DLW with a fractional count variable that normalizes the total number of lottery wins in state j by the total number of wins across the US during year t. This count variable is not influenced by the counter-cyclical nature of lotteries, but its interaction with Bust continues to exert a positive influence on consumption. Therefore, the counter-cyclical lottery

Table 3
Impact of lottery tax windfalls on fiscal policy. This table records the impact of lottery tax windfalls on percentage growth in government revenue, total government expenditures, highway expenditures, and cumulative debt. State-level boom and bust periods are defined as years in which GSP growth is in the top quintile and bottom quintile, respectively. The lottery dummy variable $DLW_{j,t}$ is one if at least one resident in state j wins the lottery in year t, and the state taxes lottery winnings. Both state and year fixed effects are included. Standard errors are double-clustered according to state and year.

	Total revenue	Total expenditures	Highway expenditures	Cumulative debt
Bust	−0.0171	−0.0054	0.0031	0.0163
	−0.89	*−1.36*	*0.19*	*0.71*
Boom	−0.0121	0.0090*	0.0039	0.0036
	−0.68	*1.96*	*0.27*	*0.24*
DLW	−0.0178	0.0109**	0.0179	−0.0110
	−1.09	*2.45*	*0.64*	*−1.12*
Bust × DLW	−0.0095	−0.0098	−0.0607	0.0115
	−0.30	*−1.58*	*−1.14*	*0.66*
Boom × DLW	0.0477	−0.0210*	−0.0300	0.0053
	1.39	*−1.78*	*−0.87*	*0.22*
Observations	451	451	451	451
R-squared	0.626	0.177	0.068	0.156

*** Denote significance at the 1 percent level.
** Denote significance at the 5 percent level.
* Denote significance at the 10 percent level.

participation is not driving the importance of lottery tax windfalls to consumption.

A second panel regression investigates a specific SSI channel through which consumption is influenced by SSI expenditures, hence fiscal policy

$$\begin{aligned} \text{CON}_{j,t} &= \beta_1 \,\text{Bust}_{j,t} + \beta_2 \,\text{Boom}_{j,t} + \beta_3 \,\text{SSI}_{j,t} \\ &\quad + \beta_4 \,(\text{Bust} \times \text{SSI})_{j,t} + \beta_5 \,(\text{Boom} \times \text{SSI})_{j,t} \\ &\quad + \gamma_1 \,\text{State}_j + \gamma_2 \,\text{Year}_t + \epsilon_{j,t}. \end{aligned} \tag{2}$$

Table 2 reports that higher SSI expenditures by state governments do not unconditionally increase state-level consumption as the β_3 coefficient is insignificant. However, the β_4 coefficient for the Bust × SSI interaction variable equals 0.3362 (t-statistic of 2.32). Thus, higher SSI expenditures in bust periods increase consumption. This increase contrasts with lower consumption during bust periods in the absence of a lottery tax windfall. Finally, the insignificant β_5 coefficient indicates that higher SSI expenditures in boom periods do not impact consumption. This finding is consistent with weak household borrowing constraints in boom periods.

The average lottery tax windfall normalized by the relevant state's average tax revenue is 0.07%. The coefficient in Table 2 corresponding to the interaction between this ratio and Bust equals 9.3316 (t-statistic of 4.40). Therefore, the impact of a lottery tax windfall on consumption during a bust period equals $0.0007 \times 9.3316 = 0.65\%$. This impact includes consumption by the lottery winner as well as the "secondary" consumption derived from the increased income of individuals that profit from the lottery winner's consumption.

Through the SSI channel, the impact of a lottery tax windfall on consumption equals $0.3362 \times 0.0067 = 0.23\%$, which accounts for one third of the 0.65% increase in consumption. For comparison, consumption is not sensitive to SSI expenditures during bust periods in states that do not tax lottery winnings.

During bust periods, the average lottery prize is $122.5 million, which generates an average lottery tax windfall of $7.8 million. Consumption increases by $111.1 million, of which $15.3 million can be attributed to the SSI channel. As SSI payments equal 5.4% of consumption during bust periods, the corresponding consumption-SSI multiplier equals 0.3362 divided by 0.054, which exceeds 6. This high multiplier can result from the secondary consumption defined above as well as the positive correlation between SSI expenditures and other government assistance programs such as food stamps issued by the federal governments. Clemens and Miran (2012) conclude that larger multipliers also arise from government spending that is financed by windfalls rather than deficits.

Within the subset of 41 fiscally constrained states, the results in Table 3 indicate that lottery tax windfalls exert a significant unconditional impact on government expenditures, with the DLW coefficient equaling 0.0109 (t-statistic of 2.45). However, as government expenditures decline during bust periods, the conditional impact of a lottery tax windfall on government expenditures is not positive (t-statistic for Bust × DLW is −1.58). Thus, the increase in SSI expenditures during bust periods attributable to a lottery tax windfall is relatively unique. Indeed, government expenditures on highway construction, which is a popular "shovel-ready" stimulus expenditure, is insensitive to lottery tax windfalls, as are total government revenue and debt.

As an additional robustness test, we randomly assign the 147 non-zero DLW variables to 600 different state–year pairs in order to examine their contemporaneous economic impacts. For 1000 random shuffles, we re-estimate Eq. (1) with consumption and SSI as the dependent variable. The percentage of these shuffles that produce a significantly positive β_4 coefficient for the Bust × DLW interaction variable is then recorded.

Significance of Bust × DLW	Consumption	Percentage	SSI	Percentage
Positive at 10%	39	3.9%	47	4.7%
Positive at 5%	17	1.7%	21	2.1%
Positive at 1%	1	0.1%	2	0.2%

The above percentages are consistent with the Type I error of the respective tests, and therefore confirm the importance of lottery tax windfalls, in a specific state during a specific year, to consumption and SSI expenditures.

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