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Running the Numbers on Lotteries and the Poor: An Empirical Analysis of Transfer Payment Distribution and Subsequent Lottery Sales

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Abstract State lottery revenues are shown to increase during the week transfer payments are distributed. The timing of the increase in lottery purchases suggests a portion of the transfer payments is used to purchase lottery tickets. In addition to providing information on the timing of lottery purchases, this study finds sales of Pick 3 and Pick 4 tickets increase during the period, while sales of Pick 5 and Pick 6 games do not, suggesting a general preference for the relatively higher probability, smaller jackpot games for the group.

Keywords Lottery · Transfer payments · Liquidity constraints · Permanent income hypothesis

JEL D00 · D12 · D91 · H50 · H53 · I00 · I38

This paper uses weekly lottery sales data to demonstrate a link between the distribution of government transfer payments, such as Aid to Families with Dependent Children[1] (welfare), social security, disability, etc. and lottery ticket purchases across the United States. Most prior studies that have analyzed gambling activities of the poor have relied on survey data or used cumulative sales figures by county or state to infer the extent to which the poor participate in lottery games. This

[1]In 1996, Temporary Aid for Needy Families (TANF) replaced AFDC, Emergency Assistance for Needy Families, and Job Opportunity and Basic Skills Training (JOBS) programs.

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paper analyzes weekly lottery sales, taking into account weeks in which government transfer payments are distributed. Increased activity during "check week" suggests participation by transfer payment recipients. While much has been written about suggested regressivity of lottery "taxes", it is not the goal of this paper to measure regressivity, but rather to promote further understanding of the gambling activity of the transfer recipients, presumably poor and elderly, including the timing of lottery purchases and the relative preferences for various payout structures of the group.

Weekly lottery data were gathered from the lottery annual produced by LaFleur (1993, 1994, 1995, 1996). We estimate the change in expenditure during the week of "check day," the day when Aid to Families with Dependent Children (AFDC-welfare), social security, and disability payments are received by these transfer recipients. A significant increase in gambling activities during these weeks suggests that transfer recipients spend a portion of the transfers on lottery games.

Increases in consumption of any type, including gambling, during check week is consistent with the findings of the consumption behavior of the liquidity-constrained. According to the Permanent Income Hypothesis (Friedman 1957) and Life-Cycle Theory (Modigliani 1970), current consumption is a function of permanent income or wealth, not current income, and is assumed to be constant over the course of the life of an individual. Anticipated income, in this case the transfer payments, are therefore not expected to affect short-term consumption patterns. However, the smoothing out of consumption predicted by the Permanent Income Hypothesis and Life-Cycle Theory does not hold when consumers face binding liquidity constraints. When borrowing to smooth out consumption is very costly, the marginal propensity to consume out of current income may be much higher than the theories would predict. A significant portion of the recipients of transfer payments in the United States economy is likely to be liquidity-constrained due to relatively low current earnings, possibly poor credit history because of past financial hardships, or lack of ready access to traditional credit markets. The regular spikes in lottery ticket sales are consistent with prior findings indicating that many transfer recipients face binding liquidity constraints and will increase spending on both durable and immediate consumption goods in response to even regularly distributed income.

Estimation of the effects of check distribution on lottery purchases is performed on a state-by-state basis. The transfer payment, as estimated through the check week variable, is shown to increase consumption of lottery tickets in Pick 3 and Pick 4 games, but not in Pick 5 or Pick 6 games.[2] The results are significant and the non-uniformity of increases in consumption across games provides some insight into apparent preferences of this liquidity-constrained group.

This paper will proceed as follows. Section two outlines a brief history of lotteries in the United States. Section three notes the motivation behind the empirical model, outlines the time-series regression techniques that are used and presents the regression results. Section four summarizes the findings of the study and concludes the paper.

[2] The Pick 5 games studied were those without progressive jackpots.

A Brief History of the Lottery in the United States

The existence and popularity of lottery games is not a new phenomenon limited to the United States. The concept of a lottery as a mechanism to offer a small chance that one may win a large, consumption-altering, payoff appears to have an appeal across cultures. In a 1993 ranking by sales of the hundred largest lotteries in the world, there were at least two entries from each continent, excluding Antarctica (LaFleur 1994).

In America, since the eighteenth century, colonies and states have periodically used lotteries and other forms of wagering as a method of generating tax revenues (Weinstein and Deitch 1974). In the early nineteenth century, lotteries were commonly used in the United States to generate revenue for state and local government infrastructure projects including schools, roads, and canals (Clotfelter and Cook 1991, pp. 35–36). Thomas Jefferson, an ardent supporter of lotteries, wrote "Thoughts on Lotteries," in 1826, in which he explained that "revenue generated by lotteries are preferable to that generated by taxes, because lotteries, unlike taxes, involve only willing participants whose money is given without coercion"[3] (Clotfelter and Cook 1991, p. 215).

Lottery activity increased greatly during the early 1800s. In 1832, U.S. lottery expenditures, according to one estimate, reached as high as 3% of GNP (Clotfelter and Cook 1991, p. 36). During this time, growing complaints of fraud and suggestions of lotteries as a harmful vice began to arise. Gradually, legal lotteries began to disappear as state and local governments enacted bans on the practice. By 1894, there were no longer any state-sanctioned lotteries in the United States.

The ban on lotteries continued until 1964, when New Hampshire introduced the New Hampshire Sweepstakes. Other states soon followed. By 1985, survey results suggested that 74% of Americans favored legalization of lotteries as a means to generate tax revenue (Clotfelter and Cook 1991, pp. 43–45). By 2005, forty states and the District of Columbia offered some form of lottery or instant-win games.

Supporters of lotteries generally echo the argument of Thomas Jefferson that lotteries are a preferred mechanism in generating tax revenue, due to the voluntary nature of the activity. Lottery opponents charge that despite the voluntary nature of lottery participation, social costs may still outweigh social benefits. Anti-lottery proponents base their belief on the assumption that lotteries and other forms of gambling unfairly victimize the poor, and much has been written on the subject of the "regressivity" of lotteries in the United States. Price and Novak (1999) examine lottery sales data by county in Texas, and Hansen et al. (2000) analyze survey data on the sales of lottery products in Pennsylvania, Connecticut, Massachusetts, California, and Illinois. Evidence of the regressive nature of lotteries was also found in the United Kingdom (Farrell and Walker 1999), where survey data from National Opinion Polls were used to estimate a low income-elasticity of demand for lottery tickets, which implied that the lottery levy is regressive.

Related studies have also indicated that lottery purchases vary across ethnic groups. In Illinois, a positive relationship was found between the percentage of black

[3] At the time of writing his "Thoughts on Lotteries," Jefferson was attempting to gain an exemption to a recent law that banned personal property auctions, which would allow him to hold a lottery for his home.

population and the purchases of instant games at a county level (Mikesell 1989). In the study, counties that had a ratio of workers to residents of greater than 1.1 were excluded in an attempt to avoid the possibility that sales of lottery tickets within the inner city may not be generated by the residents, but from the (higher income) individuals who work there. A significant relationship was also found between the size of the black population and purchases of numbers (Pick 3) games in Texas, while no such relationship was found between the size of the black population and lotto purchases (Price and Novak 2000). Price and Novak (2000) also found a direct negative relationship between average education levels and instant games, but a positive relationship between average education levels and lotto purchases.

The aforementioned studies use primarily survey data or locally grouped sales data to infer consumer behavior in an effort to test for regressivity. The purpose of this paper is not to debate whether the lottery is "regressive" or to what extent, but rather to further the research on the topic by demonstrating a link between transfer payment distribution and lottery activity, and to analyze lottery sales data in a new way to gain insight into the lottery purchase patterns and payout preferences of the transfer payment recipients.

Liquidity Constraints, Transfer Payment Recipients, and the Lottery

This paper tests whether increases in lottery sales coincide with the distribution of government transfer payments to gain insight into the timing of lottery purchases and the payout preferences by transfer payment recipients. Under the assumption that most transfer recipients are liquidity-constrained, we illustrate that the existence of lumpiness in lottery expenditures, an apparent violation of the permanent income hypothesis and life-cycle theory, can be linked to transfer payment distribution during check week.

The Permanent Income Hypothesis (Friedman 1957) and Life-cycle Theory (Modigliani 1970) suggest that consumers will keep a constant level of consumption over the course of their lifetime, provided that they can accurately forecast their permanent income or wealth over the course of their lifespan. Given these assumptions, only unexpected shocks to current income or wealth should affect current consumption. Empirically, it has been shown that current income has little significance in current consumption (Hall 1978).

One notable exception to the Permanent Income Hypothesis and Life-Cycle Theory is the existence of liquidity-constrained consumers. Both theories hinge upon the ability of agents to borrow when they are young in order to smooth out consumption over time. When people do not have access to traditional credit markets for borrowing against future earnings, they are likely to exhibit lumpy consumption patterns, since consumption is directly tied to current income (Zeldes 1989).

Studies of household savings using micro data find significant groups in the population control virtually no wealth (Hubbard et al. 1995). Liquidity-constrained families are estimated to constitute 19.4% of the United States population (Mariger 1987). Jappelli and Pagano (1994), Schmidt-Hebbel et al. (1992), and McKinnon (1973) have all used variations of real credit balances and real money balances to demonstrate the role liquidity constraints play in the determination of savings rates.

Similarly, recipients of the Earned Income Tax Credit (EITC) appear to increase consumption at the time of their income tax refunds (Barrow and McGranahan, 2000). According to research based on the Consumer Expenditure Survey from 1980 to 1991, recipients of income tax refunds increased their purchases of both durable and non-durable goods at the time the refund checks were received. The study concluded that liquidity constraints play an important role in this apparent violation of the life-cycle theory. It appears that liquidity constraints are binding among a portion of U.S. citizens and as a result, income shocks have a significant effect on their consumption patterns.

Analysis of the daily diary portion of the Consumer Expenditures Survey for the period 1986–1996 indicates increases in instantaneous consumption spending immediately following Social Security check distribution (Stephens 2003). According to the CES, Spending on food-away-from-home and instantaneous consumption items, such as entertainment expenditures, is found to increase on the day of check arrival. This spike in consumption is most prevalent among households for whom the primary source of income is Social Security payments.

If the portion of the population that receives transfer payments is liquidity-constrained, the transfer payments are expected to increase consumption in that period. With weekly lottery data, it is possible to test for increases in lottery purchases during the weeks in which checks are distributed. Significant increases in lottery expenditures that coincide with transfer payment distribution suggest that the liquidity-constrained group is spending a portion of this money on lottery tickets, where expected payoffs are only 50 cents per dollar spent. Consequently, this must reduce spending on other goods, which may include food, shelter, and medication, for which the transfer payments may have been intended.

This study uses lottery sales data for the period 1992 to 1995. During this time checks to recipients of AFDC (Aid to Families with Dependent Children), Social Security, and Disability payments were distributed on the third of the month[4] (Tomkiel 1996). The lottery revenues are reported weekly (LaFleur 1993, 1994, 1995, 1996). A dummy variable for check week is constructed to identify weeks during which transfer payments were distributed. If this check week variable is significant, it demonstrates that consumption of the non-progressive[5] payout lotteries is not constant over the course of the month. Since the check week variable corresponds to the period in which transfer payments are made by the government, significant spending during these periods suggests that the recipients of these payments, most likely poor and liquidity-constrained, spend a portion of the transfer payments on lottery tickets.

This study focuses on the timing of lottery expenditures and the revealed payout preferences linked to those expenditures. Significant increases in lottery expenditures were found for weeks that included the third of the month. Inclusion of a dummy variable for the week including the 15th of the month, a common pay date

[4] The checks are distributed on the third of each month if the third falls on a business day. If the third falls on a weekend or holiday, the checks are distributed on the last business day before the third. The check week variable used in this study was constructed based on these rules.

[5] Progressive lottery games include any lottery game with a jackpot that increases after each drawing for which there are no jackpot winners. The payouts for these progressive jackpot games are not constant from drawing-to-drawing and week-to-week. Payouts for non-progressive games are time independent as the prizes for winning tickets are set when the games are introduced and do not fluctuate over time.

for twice monthly pay schedules, did not produce significant results for the dummy for the 15th of the month. It did, however, produce similar results to the shown regressions for the third of the month dummy variable. This supports the explanation that the significant increases in lottery expenditures found at the first of the month is likely due to transfer payments.

While we suggest that these expenditures can be linked to government transfer payment distribution, it is possible that some of the effect from the week of the third comes from people who only get paid once a month on the first. However, even if this is the case, we still find the timing of lottery expenditures, and the associated payouts of the games played, to be of interest. Although currently, daily lottery sales data is not available, analysis of the Consumer Expenditure Survey by Stephens (2003) indicates that instantaneous consumption and entertainment expenditures increase on the day of transfer payment check distribution.

Regression Results

Data were gathered for all states that had information for Pick 3, Pick 4, and Pick 5 games from *LaFleur's world lottery almanac* (LaFleur 1993, 1994, 1995, 1996) for the period 1992 to 1995 (Tables 1, 2, and 3). The Pick 3 game is typically a daily, televised drawing of three ping-pong balls, one each from three sets of ten balls, labeled zero through nine. For the standard Pick 3 ticket, a one-dollar wager, with odds of 1:1,000, offers a $500 prize if the ticket matches the three digit number

Table 1 Pick 3 results—effects of check week

State	Coefficient on Check Week	Probability Value	ARMA Form of Regression	Percentage Increase
California	24,130	0.0007	AR(1,4)	2.15
Connecticut	80,114	0.0002	AR(1)	3.14
DC	45,371	0.0123	AR(1,4)	2.79
Florida	345,861	0.0000	AR(2)	5.13
Georgia	345,829	0.0001	AR(1)	3.13
Illinois	246,740	0.0000	AR(1,4)	4.80
Indiana	16,291	0.0067	None	3.25
Iowa	6,609	0.1298	AR(1)	2.80
Kentucky	32,588	0.0007	ARMA(2,1)	2.53
Maryland	317,026	0.0000	AR(1)	4.63
Massachusetts	115,487	0.0140	None	1.46
Michigan	231,958	0.0000	AR(1,4)	3.17
Mississippi	54,873	0.0000	AR(3)	7.66
New York	237,270	0.0003	AR(1)	1.85
Ohio	324,054	0.0000	AR(1,2,4)	3.91
Pennsylvania	384,170	0.0000	AR(1)	3.23
Texas	43,121	0.0030	AR(1)	1.60
Virginia	120,571	0.0149	AR(1)	2.60

Presented in the table are the coefficients on the check week variable, the probability values associated with the *t*-statistic on the check week variable, the ARMA form of the regression, and the percentage increase in Pick 3 revenues on check week over the mean for each state that has Pick 3 games. Full regression results available from authors upon request

Table 2 Pick 4 results—effects of check week

State	Coefficient on Check Week	Probability Value	ARMA Form of Regression	Percentage Increase
Connecticut	29,244	0.0005	AR(1,3)	2.35
DC	17,872	0.0674	AR(1,4)	1.97
Illinois	23,833	0.1031	AR(1,2,4)	1.05
Indiana	16,320	0.0027	AR(2)	3.42
Michigan	217,237	0.0000	AR(4)	5.33
New York	111,171	0.0063	AR(1)	1.50
Ohio	69,329	0.0000	AR(1,4)	3.78
Pennsylvania	106,364	0.0000	AR(1,4)	2.28
Virginia	72,720	0.0001	AR(3)	4.47

Presented are the coefficients on the check week variable, the probability values associated with the *t*-statistic on the check week variable, the ARMA form of the regression, and the percentage increase in Pick 4 revenues on check week over the mean for each state that has Pick 4 games. Full regression results available from authors upon request

drawn.[6] Pick 4 games work in the same manner, with odds of 1:10,000 and a prize of $5,000. Meanwhile, the specific rules for Pick 5 games vary by state, but grand prizes generally fall within the range of $50,000 to $100,000, with expected payouts roughly equal to 50% of money wagered. The Pick 6 lotto games are included in this study for comparative purposes to the other games, but are expected to be less reliable due to the varying nature of the payoff and lack of information in the data set on the size of the jackpot (Table 4).[7]

States that had at least one full year of data for any of these games were included, except for states that exhibited little variation due to relatively low weekly revenues and subsequent rounding by *LaFleur's world lottery almanac*. The states for which adequate data are available for Pick 3 games were California, Connecticut, the District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, New York, Ohio, Pennsylvania, Texas, and Virginia. States that had Pick 4, Pick 5, or Pick 6 games were also analyzed for check week effects in those games.

The basic regression model takes the form:

$$\begin{aligned}(Weekly\,Game\,Revenue)_t = {} & \alpha_1 + \alpha_2(Check\ Week) + \alpha_3(Progressive) \\ & + \alpha_4(1995) + \alpha_5(1994) + \alpha_6(1993) + \alpha_7(Feb) \\ & + \alpha_8(Mar) + \alpha_9(Apr) + \alpha_{10}(May) + \alpha_{11}(Jun) \\ & + \alpha_{12}(Jul) + \alpha_{13}(Aug) + \alpha_{14}(Sep) + \alpha_{15}(Oct) \\ & + \alpha_{16}(Nov) + \alpha_{17}(Dec) + \varepsilon_t. \qquad (1)\end{aligned}$$

[6] For pick 3 games, most states offer an option of betting on other propositions, such as boxing the numbers. In general these propositions offer higher probabilities of winning lower payouts with expected returns that are identical to or lower than the standard Pick 3 games.

[7] Because lottery sales are connected to a centralized computer, accurate sales data is maintained. While instant game sales were reported in LaFleur's world lottery almanacs, because their sales are not connected to centralized systems, the weekly sales figures reported for instant game sales may not accurately reflect actual sales of instant game tickets to consumers.

Table 3 Pick 5 results—effects of check week

State	Coefficient on Check Week	Probability Value	ARMA Form of Regression	Percentage Increase
Connecticut	−13,549	0.1284	AR(1)	−1.67
D.C.	−947	0.7969	AR(4)	−0.40
Illinois	5,265	0.8251	AR(2)	0.08
Indiana	−36	0.9969	None	0.00002
Massachusetts	2,221	0.9178	AR(2)	0.14
New York	86,121	0.0097	AR(2)	1.48
Ohio	22,428	0.4377	AR(1)	0.71

Presented are the coefficients on the check week variable, the probability values associated with the *t*-statistic on the check week variable, the ARMA form of the regression, and the percentage increase in Pick 5 revenues on check week over the mean for each state that has Pick 5 games. Full regression results available from authors upon request

Weekly Game Revenue is the revenue, from the lottery games. Check week is a dummy variable that is one if the week contains the third of the month; the day transfer payments were distributed. Progressive is a variable that captures the dollars spent on progressive Pick 6 lottery games. The Pick 6 has the largest weekly revenues of any game across states and also typically has the highest variance. The large variance associated with the Pick 6 game stems from the size of the progressive jackpot. The longer the game continues without a winner, the higher the progressive jackpot becomes. This variable is included to account for the possibility that as the announced progressive payout becomes higher, more people are likely to play the Pick 6 and therefore buy tickets at local convenience and grocery stores. The Purchases of Pick 6 lottery tickets may reflect a substitution away from other lottery games or could be complementary to them if infrequent Pick 6 players, lured in by higher jackpots, also purchase other tickets at the same time.

Although signs on this variable did differ across states, suggesting that progressive jackpot games could be substitutes or complements to other lottery games, the variable was found to be significant in a number of states for pick 3, pick 4, and pick 5 games.[8] It was therefore included in the regression model for all the states studied. If Progressive is not included in the regression model, the coefficient on Check Day is consistently higher across the sample with the same (or higher) level of significance.

Dummy variables are also included for the years in the sample. 1995, 1994, and 1993 are dummy variables for each year. 1992 is the excluded yearly dummy. This would capture any effects of a change in advertising or other promotions that may be annually based. Feb through Dec are dummy variables for the months of the year, with January the excluded month.

All non-binary variables were checked for their order of integration using Augmented Dickey-Fuller and Phillips-Perron tests. For any series that could not

[8] The Progressive variable is not included in the regression for Pick 6 sales as the variable is the dependent variable in that specification.

Table 4 Pick 6 (lotto) results—effects of check week

State	Coefficient on Check Week	Probability Value	ARMA Form of Regression	Percentage Increase
California	1,089,471	0.3539	AR(2)	6.24
Connecticut	−360,050	0.1110	AR(2)	−10.58
DC	6,078	0.9361	AR(2)	0.85
Georgia	146,424	0.7312	AR(3)	0.24
Illinois	372,190	0.2625	AR(1)	6.20
Indiana	1,420,974	0.0522	None	31.69
Iowa	759,018	0.1811	AR(2)	8.51
Kentucky	225,642	0.0881	AR(1)	12.42
Maryland	−128,603	0.2658	AR(2)	−8.46
Massachusetts	−31,594	0.8346	MA(1)	−0.76
Michigan	273,325	0.5080	AR(1)	4.93
Mississippi	179,976	0.1763	AR(2)	8.72
New York	−2,055,868	0.1267	AR(1)	−14.68
Ohio	660,622	0.1926	AR(2)	7.85
Pennsylvania	−224,354	0.4840	AR(1)	3.95
Texas	−3,065,876	0.0742	AR(3)	−13.74
Virginia	−102,971	0.7862	AR(2)	−2.16

Presented are the coefficients on the check week variable, the probability values associated with the *t*-statistic on the check week variable, the ARMA form of the regression, and the percentage increase in Pick 6 (lotto) revenues on check week over the mean for each state that has lotto games. Full regression results available from authors upon request

reject the null of a unit root, the series was differenced before inclusion in the model.[9]

Most of the OLS regressions suffered from an autocorrelation problem. Potential autocorrelation problems were identified through the Durbin-Watson statistic and the Breusch-Godfrey serial correlation LM test. When these tests revealed autocorrelation in the residuals, autocorrelation functions (ACF) and partial autocorrelation functions (PACF) were examined to attempt to account for the problem. Including AR terms cured most of the autocorrelation problems. After the inclusion of the AR terms, the ACF and PACF were again checked, as was the Breusch-Godfrey serial correlation LM test, to insure that the problem was successfully alleviated.

The results for the variable of interest, the check week variable, are summarized below. Included is the coefficient, the probability value associated with the *t*-statistic of check week, the ARMA form of the regression, and the percentage increase in sales revenue calculated from the mean of the series. A summary table is included for the Pick 3, Pick 4, Pick 5, and Pick 6 regressions for states that offer these lottery games (Table 5).

The regression results reveal that there are statistically significant increases in Pick 3 and Pick 4 lottery game revenues during transfer payment check week.

[9] In the few cases where the ADF and Phillips-Perron Tests differed in terms of the order of integration of the series, both the variable and the difference of the variable were separately run in the regression. No differences in hypothesis tests were observed. The full results are available from the authors upon request.

Table 5 Pooled regression results for check week effects

Variable	Pick 3	Pick 4	Pick 5	Pick 6
Check week	181,503	74,960	39,917	−137,729
	(0.0000)	(0.0001)	(0.3028)	(0.4345)
	[3.4272%]	[2.6183%]	[1.8520%]	[−2.2507%]

This table presents the effects of the check week variable on revenues of the different lottery games. Regressions for each game are run as AR(1). The coefficient on the check week variable from each regression is presented for each lottery game, with probability values associated with the *t*-statistics presented in parentheses and percentage increases (or decreases) over the sample mean in brackets. Full regression results are available from authors upon request

Seventeen of the 18 states with Pick 3 games had significant increases, almost all at the 1% level. Iowa was the only exception, but it was marginally significant at 0.12. Eight of nine states with Pick 4 games were found to have statistically significant increases in game revenues during check week. Again, most were found to be significant at the 1% level. In Pick 5 games, however, only New York, out of seven states, exhibited significant increases during check week. Three of the seven states, Connecticut, the District of Columbia, and Indiana, had negative coefficients on the check week variable. In Pick 6 progressive games, only two of 17 states showed positive and significant increases in revenues during check week.

The increases in game revenues were larger on Pick 3 games than in Pick 4 games in every state except for Indiana. Six of the nine states that had both Pick 3 and Pick 4 games exhibited a larger percentage increase in game revenues for Pick 3 games than Pick 4 games. For Pick 5 games, each state had less of an increase in revenues in dollar terms and in percentage terms than Pick 3 and Pick 4 games.

Although most of the increases in Pick 3 revenues account for an increase of less than 5% of total revenues, the increases are statistically significant. Increases in revenues of well over 100,000 dollars for Pick 3 and tens of thousands in Pick 4, in most cases, are attributable to the check week variable. These increases suggest that a portion of the transfer payments are used immediately for purchases of Pick 3 and Pick 4 lottery tickets.

Further evidence of these increases is found in observing pooled regression results across states. In the pooled regression, check week effects were found to be positive and significant at the 1% level for Pick 3 and Pick 4 games. Check week effects for Pick 5 games were positive but not significant, and the check week effects for Pick 6 games were negative and insignificant.

From the regression results, lumpy patterns of consumption of lottery tickets are shown to exist for Pick 3 and Pick 4 games, but not for Pick 5 and Pick 6 games. For an unconstrained individual who controls some wealth, has access to credit markets, and conforms to the income-smoothing nature of consumption suggested by the permanent income hypothesis, the proposition of a lottery ticket with an expected value of $.50 for each dollar bet is unlikely to be particularly compelling. If such a consumer won the Pick 3 or Pick 4, increases in immediate consumption are likely to be very small since the consumer is expected to smooth out consumption over the course of a lifetime. Meanwhile, in the long run, continued play of such games is expected to lead to a reduction in wealth.

While purchases of Pick 3 and Pick 4 tickets increase when transfer payments are distributed, purchases of Pick 5 tickets do not increase. The lack of increase in Pick 5 sales is consistent with the theory that increases in lottery purchases reflect the aspirations of a liquidity constrained group to increase immediate consumption. Even though the expected payout is equal for the Pick 3, Pick 4, and Pick 5 games, the Pick 5 game, with its higher jackpot, may be less appealing to the group because the expected frequency of jackpot wins is much lower for the Pick 5 game. For example, a person who purchases one Illinois Pick 3 or Pick 4 ticket every day is expected to win once every 2.74 or 27.4 years, respectively, while a person who purchases one Illinois Pick 5 ticket every day is expected to win once every 1,577 years.[10] As a result, near-term relief from liquidity constraints through lottery purchases is particularly unlikely with the larger payout games.

Conclusion

This paper examines United States lottery revenues and demonstrates an increase in lottery activity during weeks in which transfer payments are distributed. Further, this study finds that spending increases during check week are relatively more concentrated in games with lower jackpots, indicating differences in preferences for the transfer recipient group from the population at large. The Pick 3 and Pick 4 games are found to exhibit significant increases in sales during check week, while Pick 5 and Pick 6 games do not. One interpretation of these results is that the choice of lottery games is at least partially influenced by wealth and ready access to credit markets. Transfer recipients appear to be more willing to play the Pick 3, a game with an expected payout of only 50 cents per dollar wagered because the $500 (or $5,000 in the case of Pick 4 games) is expected to have a significant impact on current consumption. This result is consistent with the notion that transfer recipients are likely to face binding liquidity constraints and may not have ready access to low-cost credit options.

The behavior of transfer payment recipients is consistent with the expected behavior of liquidity-constrained individuals, because the prizes associated with the Pick 3 and Pick 4 games are not expected to significantly impact the consumption patterns of consumers that do not face binding liquidity constraints. Meanwhile, sales of the Pick 5 tickets, which offer a prize at least ten times greater than the Pick 4 and 100 times greater than the Pick 3, are not affected by the distribution of transfer payments. Sales of Pick 6 tickets, which offer progressive payouts, similarly do not exhibit evidence of increased sales during check-week. While it is impossible to be certain of the motivation of the players driving this result, this behavior is consistent with rational play by a group of liquidity-constrained individuals seeking opportunities to increase current consumption. The extent to which current income or wealth determines individual preferences for payout structures is an important area of future research, which may ultimately lead to the refinement of our understanding of the utility of wealth and local risk preferences.

[10] Using a system of choosing five balls from one batch of 39, labeled 1 through 39.

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