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journal homepage: [www.elsevier.com/locate/jfec](http://www.elsevier.com/locate/jfec)When saving is gambling<sup>☆</sup>

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## ABSTRACT

Prize-linked savings (PLS) accounts, which allocate interest using lottery payments rather than fixed interest, encourage savings by appealing to households' gambling preferences. I introduce new data on casino cash withdrawals to measure gambling, and examine how individual gambling expenditures respond to the introduction of PLS in Nebraska using a difference-in-differences design. After PLS is introduced, individuals who live in counties that offer PLS reduce gambling by at least 3% more than unaffected individuals. The substitution effect is stronger in low-frills gambling environments, which most resemble PLS, indicating that these accounts fulfill the desire to gamble.

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## 1. Introduction

“Why do people play the lottery or why do people gamble, period? You know, it is with the hope of winning something more. There is a sense that this (prize-linked savings) actually makes savings fun.” – Derek Kilmer, Washington State Senator, PBS Newshour, 23 November 2013

Some households prefer financial products with high variance and skew, despite earning low return (Dorn and Sengmueller, 2009; Boyer and Vorkink, 2014). Gambling in financial markets is typically viewed as problematic, but catering to a gambling preference could also encourage households to engage more with financial markets. From this standpoint, financial products that cater to gambling preferences could be beneficial, especially given the low level of engagement with household savings products (Lusardi et al., 2011). In this spirit, policymakers have proposed Prize-Linked Savings (PLS) accounts, which reward savings by offering randomly drawn lottery payoffs in lieu of fixed interest payments. PLS accounts are a potentially

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appealing way to encourage savings if people with low savings rates also like to gamble. Despite the intuitive appeal, we still know little about the effects of PLS because these programs have only recently gained academic attention (e.g., Filiz-Ozbay et al., 2015; Cole et al., 2017).

In this context, I empirically examine how household casino gambling responds to the introduction of PLS, and I find that PLS substitutes strongly for gambling. Showing that PLS substitutes for gambling in other markets is of general interest for at least three reasons. First, this finding shows that households prefer to take on some kinds of risk in a financial context, which contrasts with the traditional view that individuals require compensation for exposures to risk (e.g., Savor and Wilson, 2014). Indeed, exposure to these risks appears to incentivize saving, rather than discourage it. This aspect of my findings is similar to recent work using the callable options market to study catering to behavioral preferences (Li et al., 2018). Second, in my analysis, households substitute between gambles in different domains (i.e., savings lotteries versus traditional gambling), which indicates a general preference for gambling that is not naturally explained by narrow framing (e.g., Barberis et al., 2006). In this way, my findings provide novel evidence on individual preferences for skewness (e.g., Boyer and Vorkink, 2014; Viva et al., 2017). Third, as policies introduce lottery-like elements to financial products, it is important to understand their effects, not just for personal savings rates, but for other household behaviors as well. In finding significant effects on gambling in other markets, my work suggests that these broader effects are important.

The savings lottery accounts I study—Save-to-Win (STW) accounts—became available to members of select credit unions in Nebraska in January 2012. My empirical analysis uses proprietary transaction-level data on casino cash withdrawals to measure how households in affected counties change their casino gambling activity differently from households in nearby counties unaffected by the new accounts. Using this difference-in-difference approach, I find robust evidence that the introduction of savings lotteries reduces the amount of casino gambling. That is, households' newfound opportunity to gamble while saving in STW accounts is a strong substitute for gambling at commercial casinos.

My estimates indicate that the introduction of prize-linked savings led to economically substantial reductions in gambling activity. Relating cash withdrawals to overall casino demand, this estimated effect of STW on cash withdrawals translates into a 3.7–10.2% reduction in the amount of gambling for the average affected county. In aggregate, I estimate that the introduction of prize-linked savings reduced gambling by between \$175,000 and \$396,000, which is a substantial fraction of the approximately \$2 million in additional savings at participating credit unions. This effect arises primarily because of less visitation as individuals who were exposed to savings lotteries were 15% less likely to visit the casino in the post-period. These results are robust to a battery of alternative specifications, different subsamples, and accounting for pre-trends in the amount of casino gambling. Moreover, I find similar substitution effects away from scratch ticket lottery sales, which shows that my findings are not an ar-

tifact of the casino cash data, and indicates a broad change in gambling behavior in the wake of the introduction of prize-linked savings.

If the substitution effect works through gambling preferences, savings lotteries and casino gambling ought to be weaker substitutes when they are more differentiated along other dimensions. Consistent with gambling preferences, I present three heterogeneity tests that show substitution among similar gambles, and minimal substitution when savings lotteries and casino gambling are more differentiated. First, savings lotteries are a strong substitute for local gambling, but not for destination gambling when the trip is part of the enjoyment. Second, as the date of the savings raffle draws nearer, savings lotteries and casino gambling become stronger substitutes, consistent with the gambling payoffs becoming more similar in terms of their immediacy. Third, savings lotteries are a strong substitute for gambling at casinos without nightlife, but not for casinos with nightlife, which are better differentiated from savings lotteries.

The evidence on heterogeneity in the substitution effect helps rule out a broad class of alternative interpretations. In particular, the finding that substitution is strongest when savings lotteries and casino gambling are most similar contrasts with an interpretation that STW reduced gambling through an attention-grabbing effect, or through effective advertising that was targeted toward Nebraska consumers in served counties (Becker and Murphy, 1993; Barber and Odean, 2008; Hastings et al., 2017). Attention-grabbing effects and advertising cannot explain why gambling activity at local casinos is more sensitive to the introduction of savings lotteries, why the substitution effect is stronger among casinos without nightlife, nor why late-in-the-month casino transactions are more sensitive to savings lotteries.<sup>1</sup> In a similar spirit, the findings cannot be explained by a blanket commitment to spend less because savings lotteries affect some, but not all types of gambles. The fact that substitution is strongest when casino gambling is most similar to the experience of a savings lottery strongly suggests that the substitution effect reflects gambling preferences.

My findings can be viewed as a partial empirical validation of the Barberis (2012) model of casino gambling in which patrons exhibit different degrees of self-control at the casino. In the model, high self-control patrons receive a lottery-like payoff from casino gambling (right-skewed with a few high positive outliers), whereas low self-control gamblers do not receive a right-skewed payoff profile from casino gambling because they cannot commit to stopping while ahead. In this way, the Barberis (2012) model motivates why some gamblers would view lotteries and casino gambling as substitutes. This intuition provides the testable prediction that the substitution effect should be stronger among high self-control patrons than it is for low self-control patrons. Indeed, when I examine how the substitution effect interacts with proxies for patron self-

<sup>1</sup> Moreover, treated and control counties are likely to be located in the same advertising markets, which is the level at which advertising is determined. See Spenkuch and Toniatti (2016) for a detailed discussion of advertising markets.

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