Neighborhood effects on speculative behavior[☆]

Todd Mitton [a,*], Keith Vorkink [a], Ian Wright [b]

[a] *BYU, United States*
[b] *Goldman Sachs, United Kingdom*

ARTICLE INFO

ABSTRACT

Speculative behavior plays a key role in numerous markets, but little is known about its causes. We test for neighborhood effects on speculative behavior using daily lottery sales data from 20 states in the U.S. In a sample of 160,000 retailers, lottery sales in a census block increase by $0.26, on average, for each $1 increase in neighboring blocks. We test whether this correlation is attributable to contextual effects, correlated effects, or endogenous effects. Our analysis suggests that social interaction is an important cause of speculative behavior.

1. Introduction

Speculative behavior on the part of market participants has wide-ranging effects on the economy. Perhaps most obviously, speculative behavior fuels the gambling industry, which in 2016 accounted for over $40 billion in casino revenues and over $80 billion in lottery ticket sales in the U.S.[1] But the impact of speculative behavior extends to other markets as well. In stock markets, speculative behavior has been shown to affect individual investment decisions. Investors that demonstrate a propensity to gamble tend to invest in speculative, lottery-type stocks (Kumar (2009); Kumar et al. (2011)). Speculative behavior also impacts the valuation of individual stocks. A large body of evidence shows that investors pay a premium for lottery-type stocks, or stocks with positively skewed payoffs, in the same way that lottery players pay well above expected

value for lottery tickets.[2] In addition, speculative behavior by participants in equity markets and real estate markets may play a key role in the propagation of speculative episodes, or bubbles, in these markets.[3] Other research shows the impact of lottery-like preferences in markets for options, initial public offerings, and corporate acquisitions (Boyer and Vorkink (2014); Green and Hwang (2012); Schneider and Spalt (2017)).

These streams of research reveal a great deal about the *effects* of speculative behavior, but we still know relatively little about the *causes* of speculative behavior. While many factors may contribute to speculative behavior, we focus on social interaction as one potential cause of speculative behavior. Whether in the context of lottery markets or other markets, word-of-mouth effects or observational learning may amplify speculative behavior as market participants are influenced by the enthusiasm or successes of other participants. Shiller (2005) provides a well-known expression of the viewpoint that social interaction increases speculative behavior. He describes speculative episodes, or bubbles, "as a situation in which news of price increases spurs investor enthusiasm, which spreads by psychological contagion from person to person, in the process amplifying stories that might justify the price increases and bringing in a larger and larger class of investors, who, despite doubts about the real value of an investment, are drawn to it partly through envy of others' successes and partly through a gambler's excitement" (p. 2).[4]

In this paper, we empirically test whether social interaction increases speculative behavior using U.S. lottery data. Lottery data offer three empirical advantages for our study. First, our focus is on speculative behavior, and all lottery purchases are inherently speculative. Second, lottery data allow us to identify purchases at a very granular level (by census block), thereby ensuring that our defined peers are more likely to interact with each other.[5] Third, lottery data allow us to match sales data with localized demographic data to control for demographic characteristics of neighborhoods that might also be drivers of speculative purchases.[6].

Our empirical methodology consists of testing for neighborhood effects on lottery ticket purchases. "Neighborhood effects" denote the tendency of an individual to behave similarly to others that reside in his or her neighborhood. Neighborhood effects can be caused by social interaction, but they can also arise as a result of similarities among neighbors, or due to characteristics of and events in the neighborhood itself.[7] Thus, our approach is to first test for the existence of neighborhood effects on lottery purchases, and then to determine whether the neighborhood effects are due to social interaction or some other factor. Our basic assumption throughout the analysis is that the proximity of neighbors is a good measure of the potential for interaction among individuals.

We test for neighborhood effects on lottery purchases using daily sales data from over 160,000 retailers in 20 states from 2001 to 2009. We aggregate the retailer-level data to the census block level in order to match sales data with demographic data. Given that most people purchase lottery tickets in their neighborhood,[8] our data allow us to test whether neighbors appear to influence each other to participate in speculative markets. Our primary finding is a strong positive correlation between lottery sales in a given census block and its nearest-neighbor census blocks. This finding is highly statistically significant, economically relevant, and robust to a number of alternative specifications. On average, an additional one dollar spent on lotteries in nearest-neighbor blocks correlates with about a $0.26 increase in spending in a given tested block. Additionally, we find that the correlation between *next-nearest* neighbors is also positive and significant, but not as large in magnitude as for nearest neighbors. The finding that the correlation in lottery purchases is stronger among geographically close areas is consistent with the hypothesis that neighborhood effects amplify speculative behavior.

We next examine whether the neighborhood effects are driven by social interaction or by some other factor. Following standard terminology (see Manski (1993)), neighborhood effects can be present because neighbors have similar exogenous characteristics like income or race (contextual effects), because neighbors experience similar environments like advertising or weather (correlated effects), or because neighbors influence each other through social interaction like word-of-mouth effects or observational learning (endogenous effects).[9]

To test for contextual effects, we study whether similar characteristics of census blocks drive the observed correlation in lottery sales. We identify other in-state census blocks that are far away geographically from tested blocks but that match the tested block closely on demographic characteristics such as income, education, race, and age. We find that sales in a given census block are not consistently correlated with sales in these demographically similar but geographically distant blocks. In other words, it appears that something about the closeness of neighbors, and not just the similarities of neighbors, drives the neighborhood effects on lottery sales.

---

[2] See, for example, Brunnermeier and Parker (2005), Mitton and Vorkink (2007), Brunnermeier et al. (2007), Barberis and Huang (2008), Boyer et al. (2010), Bali et al. (2011), Conrad et al. (2013), Eraker and Ready (2015).

[3] See, for example, Lux (1995), Lux (1998), Scheinkman and Xiong (2003), Shiller (2005), Baker and Wurgler (2007), Brandt et al. (2010), Zheng et al. (2017).

[4] See also Shiller (2014), his Nobel Prize lecture.

[5] As a reference point to the level of granularity in census blocks, there are about 190 census blocks in a given zip code, on average.

[6] While not focusing on speculative behavior, a number of studies address social interaction in financial markets, e.g., Hong et al. (2004), Ivković and Weisbenner (2007), Brown et al. (2008), Ng and Wu (2010), Kaustia and Knüpfer (2012), Bursztyn et al. (2014), Pool et al. (2015), Heimer (2016).

[7] See Durlauf (2004) for a survey of the economic literature on neighborhood effects.

[8] According to the National Gambling Impact Study Commission (1999), 84% of people who played the lottery more than once a year said they purchased tickets in their neighborhood.

[9] Glaeser and Scheinkman (2002) offer a review of the issues surrounding the literature that studies the effect of social interaction on various economic outcomes.