

**Supplement versus Supplant:
*A case study of the effect of internet lottery sales on
traditional lottery sales***

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ABSTRACT

In 2012, the first state lottery began to sell its product over the internet. The additional digital delivery method represents a new era for a product that has been in the market for over three decades. Permitting a potentially competing delivery method for the same product presents an opportunity to examine the impact internet lottery sales have on traditional lottery sales. The thesis builds on work that explored what motivates policy makers to approve innovative policy solutions, such as a new internet delivery method for lottery sales, and how that decision impacts the overall viability of the existing product. By analyzing sales, profits, and growth rates, I sought to determine if market cannibalization or revenue displacement occurred when the new delivery method was added. My findings show that state lotteries experienced sales growth prior to internet sales. Prior to internet sales, only one state experienced flat gross domestic product growth in the year preceding internet sales, while the five others analyzed experienced declining GDP growth. This suggests that poor economic indicators may have led decision makers to approve a new policy for a product that otherwise was growing to address fiscal stress. After internet sales were introduced, profits and in-person lottery sales at retail locations were higher than before internet sales. Total lottery sales grew in all states that permitted internet sales; however, not all states saw sales growth grow as fast as before internet sales. This suggests that internet lottery sales have a positive impact but might dilute what could have been higher sales growth rates.

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GENERAL AUDIENCE ABSTRACT

Lotteries date back to ancient times. They originated out of necessity for the primary reason we use them today - leaders need money to fund public works and programs. Often, voluntary taxes like lotteries are a more politically effective way to raise funds than mandatory taxes. Modern lotteries in the United States reemerged as a legitimate state funding source in the mid-1960s. In 2020, 45 states had lotteries. My findings show lotteries continue to see growth in sales, many to benefit public education. Yet some seek to innovate the method of delivery by allowing lottery purchases over the internet. When this is permitted, how does the ability to purchase lottery over the internet impact traditional lottery sales at retail store locations? This thesis analyzed sales data from the six states that permit internet sales to show that internet sales increased lottery profits, retail sales, and total sales. However, after implementing internet sales, two of the four states with at least three years of internet sales experienced sales growth that was slower than before internet sales were permitted. This may mean some revenue displacement occurred when the additional delivery method was implemented. It is rational for lotteries to want to increase sales and respond to rising customer demands in this digital age. However, legislators who may be interested in growing lottery sales as a way to combat other fiscal stress should consider whether any cannibalization may occur by permitting additional lottery delivery methods.

Dedication

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Chapter 1: Introduction

1.1 Introduction

There's nothing like beginning a school year with a new supply of books. That's what the Virginia Lottery thought when it started a book collection drive to support its K-12 public education mission. At an October 2019 presentation, the Lottery gifted nearly 1,000 books to a Chesterfield County public elementary school. At the same time, less than 100 miles down the road construction was finishing on a new gaming emporium to house recently legalized historical horse racing electronic gaming machines. The machines, which closely resemble Vegas-style slot machines, were the latest attempt by the horse industry to reinvigorate interest in pari-mutual wagering in the hopes of returning live racing to the Commonwealth.

Whether this new style of gaming will impact Lottery sales or directly compete with Lottery products remains to be seen. Unclear as well are the implications for the Lottery's beneficiaries (often public schools), including its ability to host book drives. This illustration exemplifies the 21st century proliferation of gambling outlets for adults. How these gambling outlets interact with each other is important for any state that may consider the legalization of additional forms of gambling.

The American Gaming Association declared in its 2019 annual survey of the commercial casino industry that gaming revenue generated \$41.7 billion in 2018, the highest-ever annual total. Of that amount, \$9.7 billion was paid in gaming taxes to state and local governments.¹ Additionally, La Fleur's 2018 *World Lottery Almanac* reported that in calendar year 2017, total

¹ American Gaming Association. State of the States 2019. https://www.americangaming.org/wp-content/uploads/2019/06/AGA-2019-State-of-the-States_FINAL.pdf

U.S. lottery sales amounted to \$72.5 billion, with \$22.6 billion in profit returned to state government.²

While these figures may be impressive, legalized gambling in the United States often comes with more questions about the financial costs to regulate this industry and the social costs of allowing its proliferation. Legislators are inclined to see gaming revenue as a saving grace to fill budget holes. Considering there are many forms of gambling, and therefore many potential streams of revenue, one must wonder whether and to what extent legalizing multiple forms of gambling results in gains for state budgets. In order for state tax revenue from multiple forms of gambling to increase as product offerings expand, there cannot be cannibalization among the competing industries.

Cannibalization occurs when a new product is introduced to an existing market and it partly or completely substitutes for current offerings. Gambling markets may introduce new games as one way to boost sales, and those new games can have a substitutive or complementary relationship with existing games. The level of replacement or reduction in sales or market share that occurs when a new product enters the market is one measure of cannibalization.

Further, inter-product cannibalization can occur across multiple industries interacting with each other, like casinos, lottery, and pari-mutual wagering. Intra-product cannibalization occurs within a single gambling industry, which is the focus of this thesis.

² Markle, T., LaFleur, B., & LaFleur, B. (n.d.). La Fleur's 2018 World Lottery Almanac (26th ed.). TLF Publications.

1.2 Research Question

My research seeks to get a fuller picture of whether adding legal forms of gambling supplements or supplants profits from existing legalized forms. Put another way, does legalizing more forms of gambling increase revenue to states or is the total amount of dollars just spread over more forms? This thesis focuses on a subset of gambling, the lottery industry, to explore innovation in lottery delivery methods. Does lottery sold over the internet, commonly referred to as iLottery, impact lottery sold at physical retail locations? This work will show the financial contributions lotteries provide for their designated beneficiaries and whether those contributions can be improved by providing new avenues for selling without detracting from existing sales.

As of October 2019, 45 states had lotteries, 24 hosted commercial casinos, and 18 permitted sports wagering. These are just a few examples of the forms of legalized gambling found in the U.S. Given the many forms of gambling, one might wonder whether multiple forms of gambling can cannibalize customer bases such that instead of seeing a net gain of gambling revenue with new forms offered, revenue could be spread across the additional outlets and have at best neutral effect. Is there room for more gambling opportunities without hurting existing forms? This thesis addresses that question, providing a clearer understanding as to whether new forms of gambling produce additional dollars for often strapped state coffers.

In the U.S., the lottery is a mature industry in a traditional setting. Its products are paper based and are largely required to be purchased with cash. But the world is evolving. To ensure longer-term sustainability of lottery profits, the industry seeks to take an analog product and

bring it into the digital world. These efforts are less about product development and more about development of product delivery methods -- and building technological infrastructure that could significantly boost the profile of a product that often appears irrelevant to new generations of adult consumers that rely on their mobile phones and the internet to conduct virtually every transaction.

Even as lotteries look to modernize their sales, not all state legislatures are rushing to allow state lotteries to sell their products over the internet. While lottery-marketing departments work frantically to fight customer jackpot fatigue or feel stymied by players' boredom with existing games, legislators express a range of concerns about internet lottery sales. Chief among them are moral and social concerns about making gambling so easily accessible, security concerns with publishing personal identifying and banking information on the internet, and a frequent refrain that lottery revenue simply substitutes rather than adds funding to the education budget or other designated beneficiaries.

My findings show that state lotteries experienced sales growth prior to internet sales. Sales growth rates of the seven states that later adopted internet sales compared to the non-iLottery state sales was mixed. Three iLottery states did not grow as fast as non-iLottery states prior to adoption of internet sales (Georgia, Michigan, Pennsylvania). Conversely, two iLottery states (Illinois and Kentucky) outperformed non-iLottery states in the period just before internet sales were adopted and New Hampshire's sales grew somewhat more slowly compared to the average of non-iLottery states and the advantage disappears when Arkansas (with a 20.93% first year growth rate) is removed.

Yet during the same time, state economies experienced flat or declining growth in gross domestic product growth. Internet lottery sales may have been viewed as a new revenue source for struggling state economies, and decision makers may have approved this new policy with the economies in mind. After the introduction of internet sales, profits and traditional lottery sales at brick and mortar retail locations increased. However, while lotteries experienced growth after the introduction of internet sales, some of the states grew at a slower rate than before internet sales. If one considers that lottery products were already growing prior to internet sales, the new delivery method could be supplanting traditional sales and slowing the overall product's sales growth rate.

1.3 Significance of Research

If it is true that multiple forms of gambling lead to a net increase in revenues returned to state governments, then state legislators and others arguably should consider legalizing more forms of gaming opportunities to fund public services. Of the 44 state lotteries in operation in October 2019, only six operated to supplement the state's general fund. The remaining 38 were dedicated to specific services that benefit others in a state like public education, senior citizen programs, property tax reductions, and transportation. Ensuring gaming revenue streams remain stable, if not grow, in a competitive market allows those services to remain available. By researching how adding forms of gambling can impact existing revenue streams, I am helping clarify the long-term impacts of revenue dedicated to vital public services as new industries emerge that could disrupt that stream.

Any findings on the relationship between traditional lottery sales and internet lottery sales are relevant not only to state legislators but also to state lotteries looking to boost revenues, lottery retailers seeking to increase their customer base, and beneficiaries of lottery profits relying on those revenues to fund programs.

As the above examples highlight, this research is pertinent in the face of real-world discussions in state government. Additionally, the study seeks to contribute to scholarship, including evolution of theory in public policy. Research related to the question of whether more forms of gambling increase or supplant revenue to states touches on three key policy theories: policy innovation, revenue displacement, and industry cannibalization. A gap exists in political science and public policy scholarship concerning whether and how lotteries navigate the modernization of their distribution channels to meet consumer demands. This study seeks to contribute to closing that gap.

First, Jack Walker refers to policy innovation as a highly visible phenomenon that represents a departure from existing approaches and creates a lasting institutional effect.³ Legalizing gambling qualifies as a policy innovation. Some scholars have moved further to research the probability of casino or lottery adoption (Calcagno, Walker & Jackson 2009, Furlong 1998, Berry & Berry 1990); yet none has looked at the adoption of new lottery delivery methods after a traditional lottery has been in operation.

Revenue displacement takes place when existing sectors of the economy lose revenue when it is diverted or shifted to new sectors. It reflects a shift in consumer spending from one

³ Walker, Jack L. (September 1969) The Diffusion of Innovations among the American States. *The American Political Science Review*, 63(3), 880-899.

category to another. Present scholarship examines the displacement of casino revenue from, for example, sales taxes (Landers 2005); however, none looks at intra-lottery displacement with the introduction of a new delivery method.

Studying industry cannibalization can help maximize tax revenues in the face of overlapping markets because it will show whether new forms of gaming produce new tax revenue in addition to retaining the previous tax revenue or siphon tax revenue from existing forms. Scholarly work has examined cannibalization effects on gambling industries, and it focuses on the size and significance of this cannibalization (Walker & Jackson 2008, Marionneau & Nikkinen 2018). Due to the advent of internet lottery sales and limited offerings available, it is not surprising that this specific subcategory of lottery cannibalization has not been analyzed.

1.4 Chapter Summary and Organization of Thesis

In this introduction, I have posed the question as to whether more gambling varieties supplement or supplant existing gaming revenue dollars. I have narrowed the many forms of gambling to lotteries and their potentially innovative opportunity to revitalize their product digitally by selling over the internet. Every industry, but especially lotteries that are constantly competing for limited discretionary spending, is exploring how to modernization distribution channels. For lotteries, it means they are going to have to think creatively about a customer's journey and figure out how to remain relevant in a digital world. But progress for the sake of progress is not consistent with the intent of most lotteries, which is to operate for the benefit of a public good. There can be no intra-product cannibalization with the addition of internet sales for it to be an acceptable modernization method.

The remainder of the thesis explores this topic. Chapter 2 is devoted to a review of scholarly literature on gambling, policy diffusion, revenue impacts, lotteries, and consequences of federal legislation. In Chapter 3, I discuss the relevant propositions, present the key variables and hypotheses, and lay out the research design. Chapter 4 is devoted to reporting the findings. Finally, Chapter 5 discusses the conclusions and suggests potential research opportunities for the future.

Chapter 2: Review of Relevant Scholarship

2.1 Introduction

Significant scholarly work examines the risks and rewards of state-sanctioned gambling. A subsection of that work considers whether cannibalization occurs within multiple gambling outlets, thereby legitimizing the concern about whether revenues will be impacted by a decision to expand the number of outlets. The relationship between gaming industries can be nuanced and complicated, and that emphasizes why a systemic review of the literature is important.

A review of this literature will begin by describing the lay of the land for gambling across the U.S., exploring how state legislatures have approached gaming policy innovation and gambling's revenue impacts. I will then focus on state-run lotteries. The chapter includes a review of the history of U.S. lotteries and their role as a revenue generating entity. Finally, it examines iLottery performance in states that offer it and the possible effect federal legislation might have on state lottery policy and internet wagering.

2.2 Legalized Gambling in the United States

To begin to understand how legalized gambling can benefit a state, we must understand how gambling has become a widely available state-sanctioned activity. The advent of commercial casinos is a relatively recent phenomenon. It was not until the 1990's that a

significant number of states legalized the activity. Prior to 1989, only two states allowed casino gambling – Nevada and New Jersey. By late 2019, 25 states hosted commercial casinos.⁴

The allure of commercial casinos is obvious. Proponents emphasize jobs, economic investment, tax revenue, tourism, and curbing organized crime when trying to persuade lawmakers who are sometimes reluctant to raise taxes to make up deficits for public services.

Casinos games are not the only form of gambling regulated in the United States. By 2020, almost all states have at least one form of legalized gambling, with three legalized forms of gambling being the most common number of offerings. As Table 1 demonstrates, by the fall of 2019, numerous states had legalized gambling, and many have more than one form. The table takes into consideration whether states have legalized lottery, commercial casinos, pari-mutuel wagering, online casino games, and sports betting. I have chosen to include these specific forms of gambling because they are available to the entire population, and the state legislature has a say in whether the type of gambling is legalized. I did not include charitable gaming because it is typically reserved to select players or members of a private organization. Dog racing, once a common type of pari-mutual wager, is now outlawed in 41 states.⁵ Therefore, I did not include it in this study because of its limited relevance. I also did not include fantasy sports because not all states have classified fantasy sports as a “game of chance,” a common qualifier in the definition of gambling, and instead have determined they are a “game of skill.” Finally, tribal casinos were not included because their approval is a federal process,

⁴ American Gaming Association. *State of Play*. <https://www.americangaming.org/state-of-play/>

⁵ GREY2K USA. Greyhound Racing in the United States. <https://www.grey2kusa.org/aGREY2Kbout/states.php>

and the state legislature has no say on their initial arrival, only on an agreement about revenue sharing after federal approval.

Table 1 Number of Legalized Forms of Gambling by State

0 Forms	1 Form	2 Forms	3 Forms	4 Forms	5 Forms
Alaska	Alabama	Arizona	Arkansas	Illinois	Delaware
Hawaii	Georgia	California	Colorado	Indiana	New Jersey
Utah	South Carolina	Connecticut	Florida	Iowa	Pennsylvania
		Washington, D.C.	Kansas	Nevada	
		Idaho	Louisiana	New York	
		Kentucky	Maine	Rhode Island	
		Minnesota	Maryland	West Virginia	
		Nebraska	Massachusetts		
		North Carolina	Michigan		
		North Dakota	Mississippi		
		Texas	Missouri		
		Vermont	Montana		
		Virginia	New Hampshire		
		Washington	New Mexico		
		Wisconsin	Ohio		
		Wyoming	Oklahoma		
			Oregon		
			South Dakota		
			Tennessee		
(3)	(3)	(16)	(19)	(7)	(3)

Source: Le Fleur's 2018 World Lottery Almanac, American Gaming Association, GREY2K USA. [states in bold offer lottery via the internet.]

As Table 1 indicates, six had legalized internet lottery sales at the time of this writing.

These states have differing numbers of gaming options, ranging from only one legal form of gaming to five forms. The availability of internet gaming is relatively new. One might think that only the states with multiple legal forms would permit it, since they have existing regulatory infrastructure in place to oversee the activity and a population that is familiar with multiple types of gambling. Georgia and Kentucky contradict that expectation, though, given that they

have relatively few forms of legalized gambling available yet still permitted internet lottery sales.

What considerations a state weighed when it chose to legalize new or additional gambling outlets has been heavily studied. States have adopted and implemented forms of legal gambling due to several factors. My experience as a state government relations liaison for the Virginia Lottery during the 2019 and 2020 General Assembly sessions in which expanded gaming was a central topic suggested that among the reasons lawmakers may decide to regulate gambling include increased revenue, customer demand, and consumer protection. Similarly, legislators could attempt to address repatriation of gaming monies spent by residents when they gamble at casinos in other states or increase transparency for an activity that could otherwise be susceptible to illegal activity. Factors like regional competitiveness and a state's political, economic, or social characteristics also drive adoption of innovative policy solutions. Some of the factors linked to approval involve the need for more revenue in state budgets. Simply looking at what drives revenue and spending, however, does not account for all of the influences on whether to adopt a new policy in the first place. Certainly, innovativeness is key, but the conditions under which lawmakers chose to adopt a new program, like forms of gambling, also can be considered for their speed of adoption.

Jack Walker examined public policy outcomes and diffusion among states that can be applied to this discussion.⁶ He suggests that more industrialized states with greater wealth and population more rapidly adopt new programs compared to their smaller, less-developed

⁶ Walker, Jack L. (September 1969) The Diffusion of Innovations among the American States. *The American Political Science Review*, 63(3), 880-899.

counterparts. A May 2019 *U.S. News & World Report* titled “The 10 Wealthiest States” ranked states by U.S. Census Bureau median annual household income.⁷ The top five wealthiest states were Connecticut, Massachusetts, Hawaii, New Jersey, and Maryland. Those states had between zero (Hawaii), two (Connecticut), three (Massachusetts and Maryland), and five (New Jersey) forms of legalized gambling. This suggests that household income is not the only factor in gambling policy innovation. If it were, those states would have similar numbers of gambling outlets and those numbers would be relatively high.

Similarly, when considering population size, only two of the ten states with four or five forms of gaming (Illinois and Pennsylvania) were among the Census Bureau’s top ten most populous states in 2018 (California, Texas, Florida, New York, Pennsylvania, Illinois, Ohio, Georgia, North Carolina, Michigan).⁸ This suggests increased population is not the sole driver in state adoption of legalized gambling.

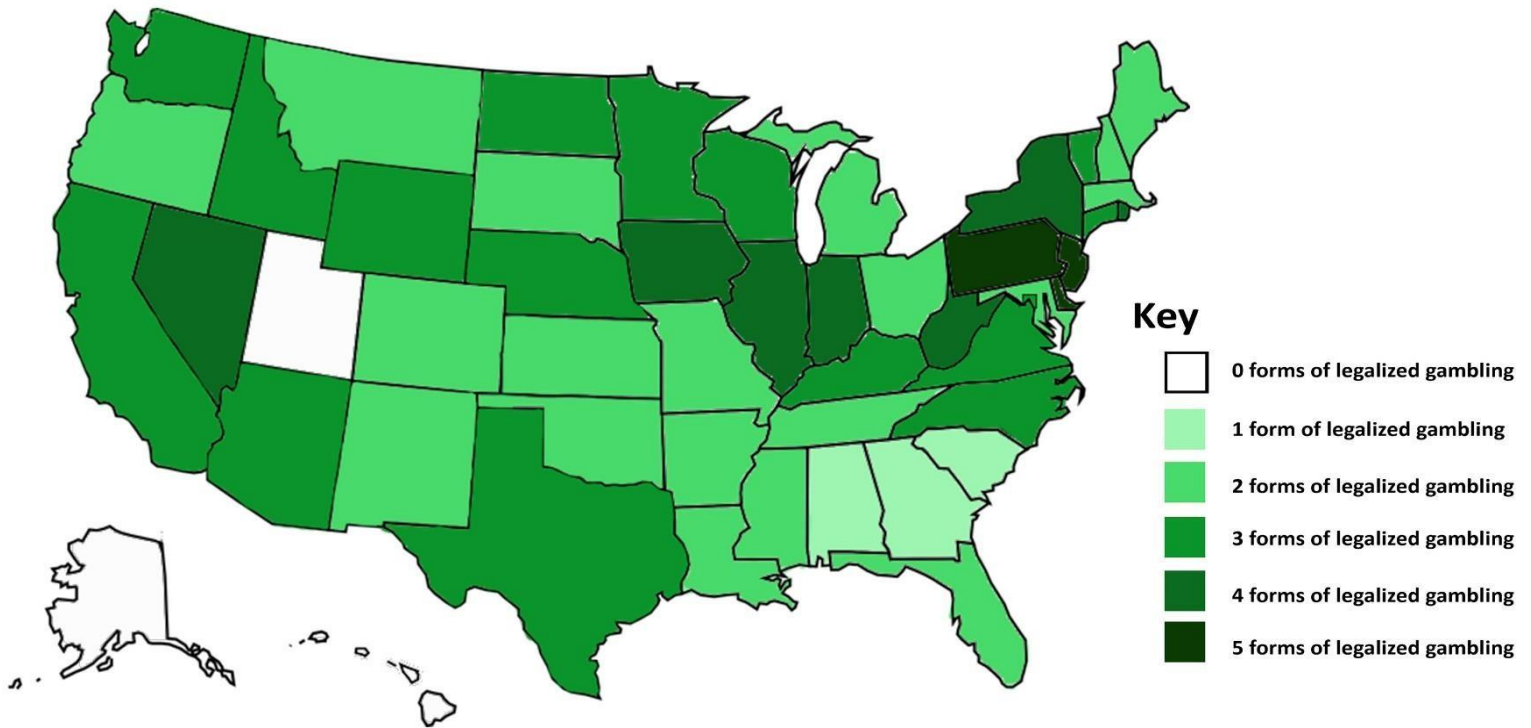
If neither wealth nor population size is a determinant of adoption, Walker points to a third factor that does seem to play a role in gambling policy adoption: the “process of competition and emulation, or cue taking.” [See Figure 1.]

⁷ Leins, Casey (May 16, 2019). The 10 Wealthiest States. *U.S. News & World Report*.

⁸ U.S. Census Bureau (Dec. 30, 2019) *2019 U.S. Population Estimates Continue to Show the Nation’s Growth Is Slowing*. <https://www.census.gov/newsroom/press-releases/2019/popest-nation.html>

Figure 1

Number of Legalized Forms of Gambling in Each State



Source: Le Fleur's 2018 World Lottery Almanac, American Gaming Association, GREY2K USA.

Figure 1 shows the number of forms of legalized gambling in the U.S. in 2018. Regional clusters are visible in the North East, South East, and Mid-West. The three states with the most forms of gambling (Delaware, New Jersey, Pennsylvania) share borders. The same is true of the states with fewer opportunities for legalized gambling (Alabama, Georgia, South Carolina). Each has only one form of legal gambling.

It appears that as neighboring northern states adopted new forms of gambling, it became a legitimate state responsibility to offer and regulate the activity. Further, Walker found that the likelihood of states adopting the same policy as a neighboring state increases if

decision makers are convinced that other states in their region already have responded to this policy idea, fueling a form of competition in addition to emulation.

The more limited nature of the offerings in the southern region could be either because of the lack of regional competitiveness (residents are not spending entertainment dollars in other states so there is no need to repatriate their consumer spending) or because the activity is not viewed as fully legitimate. This region of the United States also has been viewed as more culturally conservative, with increased residents reporting affiliations with Republican Party stances or conservative attitudes that typically oppose legalized gambling.⁹

Understanding specific policy innovation related to casino gambling, key works include those by Furlong¹⁰ and Calcagno, Walker & Jackson¹¹ that refined Walker's work. They hypothesize that state fiscal stress, efforts to keep gambling revenues within a state, and attracting tourism were leading determinants of the probability of legalizing commercial casinos. They place the reasons for adoption in four categories: revenue, political, competitive, and economic development.

Furlong finds that political feasibility and economic development provide the best explanations for casino adoption. Political feasibility conveys the idea that voluntary participation in an activity that raises state revenue like a lottery or casino gambling, is preferable to levying traditional taxes like sales taxes and achieve the same desired outcomes.

⁹ Maxwell, Angie. (Winter 2014) "The Duality of the Southern Thing": A Snapshot of Southern Politics in the Twenty-First Century. *Southern Cultures*, 20 (4), 89-105.

¹⁰ Furlong, E. (1998) A Logistic Regression Model Explaining Recent State Casino Gaming Adoptions. *Policy Studies Journal*, 26 (3), 371-383.

¹¹ Calcagno, Walker, & Jackson. (July 2009) Determinants of the probability and timing of commercial casino legalization in the United States. *Public Choice*, 142, 69-90

This includes the reduction of budgetary constraints and ability to add new or expanded programs. Economic development motives account for legislators redefining gambling from previously being an immoral behavior that potentially affects public safety and financial security and transforms it into an acceptable form of entertainment that attracts tourists and creates jobs.

Calcagno, Walker & Jackson find that promoting tourism is a key rationale for casino adoption. Casinos bring the prospect of people from outside the state to spend their money on gambling, hotel rooms, restaurants, or stage entertainment. Additionally, Calcagno, et al. identify a reduction in fiscal stress as a factor a legislator might consider when contemplating the legalization of gambling. Higher levels of fiscal stress were driven by long-term debt obligations that a state may take on for public work projects.

All of these reasons are relevant to the deliberation over gambling adoption. They represent various approaches proponents might take to sway a legislator to approve supporting the regulation of gambling. Similarly, they can be considered when weighing the legalization of a new form of gambling even if some form of gambling already exists in a state.

Although other scholars do not consider it a significant driver, I will elaborate on possible “political” motivators that could ignite adoption of a new policy idea -- progressive cultural shifts and changing voter attitudes. *Gallup* reported acceptance of gambling reached new heights among respondents, increasing from 65% in 2017 to 69% in 2018.¹² A May 2019

¹² Norman, Jim (7 June 2018) Acceptance of Gambling Reaches New Heights. *Gallup*. <https://news.gallup.com/poll/235379/acceptance-gambling-reaches-new-heights.aspx>

Gallup poll reported that only 31% of respondents believed gambling was morally wrong.¹³ This would indicate that a growing number of people see gambling as a form of entertainment rather than a morally reprehensible act. More accepting gambling attitudes could in turn encourage legislators to support legislation that legalizes more forms of gambling.

Second, parties could adapt to changing cultural norms. *Gallup* also reported in 2018 that 79% of Americans identifying as liberal believed gambling was morally acceptable compared to 58% of conservatives.¹⁴ As ideologies and party agendas evolve, candidates who identify with one of the major parties could adjust their positions accordingly.

These are national polling numbers, but they are consistent with increases in the number of legislative proposals that would legalize new forms of gambling. For example, following the 2018 U.S. Supreme Court decision to overturn the Professional and Amateur Sports Protection Act, only seven states (Idaho, Wyoming, Utah, Nebraska, Oklahoma, Wisconsin, and Florida) had no sports betting legislation during the 2019 session according to the American Gaming Association.¹⁵ Legislative proposals were backed by strong voter approval according to a survey of attitudes towards gaming conducted on behalf of the American Gaming Association. The survey found that nearly 8 in 10 Americans supported legalizing sports betting, 63% supported the Supreme Court's ruling that struck down the sports betting ban,

¹³ *Gallup In Depth: Moral Issues*. <https://news.gallup.com/poll/1681/moral-issues.aspx>

¹⁴ Brenan, Megan (13 June 2018) Above All Issues, Abortion Divides Liberals, Conservatives. *Gallup*. <https://news.gallup.com/poll/235640/above-issues-abortion-divides-liberals-conservatives.aspx>

¹⁵ *Murphy v. National Collegiate Athletic Assn. et al.*, No. 16-476 (U.S. SCOTUS. 2018)

and a majority of people believed sports betting is better regulated by states than the federal government.¹⁶

2.3 Revenue Impacts from Casino Gambling

The previous section explored how and why a state may choose to permit gambling and its expansion. Another key element to consider is the potential fiscal impact of that decision.

Citing a new historic high, the American Gaming Association reported that 2018 saw the fourth year-over-year gaming revenue growth in the casino industry, bringing the year's total to nearly \$41 billion.¹⁷ Gaming revenue alone is a purported economic benefit of legalization. Moreover, several peripheral businesses benefit from casinos, local restaurants, vendors, and hotels to name a few.

Yet to view the economic benefits of casinos in totality one must also take into account that consumers may reduce their expenditures on other goods or services by incorporating gaming into their budgets. A good way to examine casino impacts on localities and states is how existing tax revenues are affected as new gaming tax revenues are collected. The main sectors that could experience revenue displacement include retail, restaurants and bars, lodging, and amusements. There is evidence, for example, that Indian gaming in Arizona shifted consumer spending and displaced revenue from those four sectors.¹⁸

¹⁶ The Mellman Group (Sep. 2018) *Sports Betting in 2019 Survey*. <https://www.americangaming.org/wp-content/uploads/2019/01/Mellman-Group-Research-Deck.pdf>

¹⁷ American Gaming Association. *State of Play*. <https://www.americangaming.org/state-of-play/>

¹⁸ Anders, G., Siegel, D, & Munther Yacoub (July 1998). Does Indian Gambling Reduce State Revenues? Evidence from Arizona. *Contemporary Economic Policy*, 16, 347-55.

Research is mixed on whether commercial casinos compete with other forms of businesses and affect taxes in a state. Nichols, Tosun, and Yang found minimal evidence of a net impact on sales tax revenue in counties that host casinos.¹⁹ They suggest that legislative mandates that require a portion of the casino gaming tax revenue be returned to the host locality show more significant impact on the locality. Absent such a revenue sharing requirement, the opening of commercial casinos had no effect on county revenues. They conclude that claims of casino cannibalization of other businesses may be exaggerated.

Conversely, Landers finds that casino wagering does displace taxable consumer expenditures and as a result sales tax revenue.²⁰ The implications of reduced sales tax revenue move beyond that one impact and can affect the vitality of programs that depend on sales tax revenue for operation – for example, public education. To offset gaming displacement, Landers suggests increasing gaming taxes and distributing gaming tax revenue to programs that depend on the affected sales tax revenue.

A review of potential casino revenue displacement might be a precursor for lottery revenue displacement when additional delivery methods are permitted. Casino gaming could attract different players than lotteries, since casino gaming is typically more experiential in nature (one must travel to a special destination that has other entertainment opportunities compared to thousands of lottery retailers in a state with quick access). Yet scholarship that examines the impacts of casino gaming on other revenue streams is pertinent to intra-industry

¹⁹ Nichols, Tosun, and Yang (2015) The Fiscal Impact of Legalized Casino Gambling. *Public Finance Review*, 43 (6), 739-761.

²⁰ Landers, Jim (2005) The Impact of Casino Gaming on Sales Tax Revenues in States Legalizing Casinos in the 1990s. *Annual Conference on Taxation and Minutes of the Annual Meeting of the National Tax Association*, 98, 187-195.

lottery sales when a new method of purchasing lottery is made available that could impact the existing revenue stream.

2.4 Background on Lotteries

I will now turn the conversation from the broad concept of legalized gambling and concentrate on a specific form of gambling, the lottery. A brief history of lotteries is necessary to understand how state-run lotteries have been utilized in the past, their adoption across the United States to become a pivotal source of funding, and the conceptualization of how products need to find new ways to engage consumers in the 21st century.

Lotteries date back to ancient times. Feudal Europe was dotted with municipal games from Greece to Italy. They originated out of necessity for the primary reason we use them today - leaders needed money for repairs to city infrastructure. Nonfiction author George Sullivan recounted in his work *By Chance a Winner: The History of Lotteries* that Queen Elizabeth I instituted the first English lottery to restore harbors, and her version of the game allowed everyone to win a prize (if even less than the cost of the ticket).

As we know them today in the United States, lotteries are state sanctioned games run by, in most instances, state agencies. Sometimes they are run by a corporation, like in Georgia and Kentucky. In contrast, many of the first lotteries involved the help of private companies. Merchants conducted lotteries to attract customers. Other times, lotteries were a public-private venture where the state contracted with a private entity to conduct a lottery in return

for a cut of the profits. However, rumors of mismanagement and abuses by private operators quickly shut down the entire industry in Europe for many decades.²¹

Economic necessity ushered lotteries into Colonial America. Colonies, without roads or schools or churches, needed revenue to build their communities. A lottery was a substitute for public financing that did not come due to limited support from the British monarch. Coalitions formed as communities of interest where a group seeking a specific public improvement would search for a legislator (who was either unable or unwilling to raise taxes) to sponsor before the colonial government a lottery dedicated to their specific cause.

Yet from the 1880s through the early 20th century, enthusiasm for lotteries waned. The rise of Methodist, Episcopal, and Presbyterian churches that opposed all forms of gambling exploded in membership. Their organized opposition to the games was a deciding factor in many state governments passing anti-lottery laws. Religious and moral reformers considered this a victory, and by 1930 45 states had banned lotteries.²²

This era also saw the adoption and implementation of Prohibition. During this period, society became increasingly concerned about the direct effects of alcoholism and its latent effects like unemployment and inability to support a household. Organized crime found workarounds for gambling and numbers rackets in the midst of this cultural shift. During this time, bootleggers exercised significant influence over illegal numbers games. As horseracing made a comeback with the legalization of pari-mutual betting, bookmaking, numbers games,

²¹ Blakey, G. R. (1979) State Conducted Lotteries: History, Problems, and Promises. *Journal of Social Issues*, 35(3), 62-86.

²² Eitle, D. (March 2, 2011) Religion and Gambling Among Young Adults in the United States: Moral Communities and the Deterrence Hypothesis. *Journal for the Scientific Study of Religion*, 50(1), 61-81.

and racetracks became intricately intertwined. Further, the spread of gambling houses was possible with the invention of the telephone.²³

For several decades thereafter, aside from pari-mutual wagering, gambling was not legal. It was not until 1964 when New Hampshire established a lottery that interest reignited in the lottery system as a way to fund public programs without raising taxes.

When weighing the pros and cons of the efficiency and effectiveness of a public versus a private model for lottery enterprises, there were several considerations. State operated lotteries fight for limited dollars for operations in taxpayer funded budgets and may not have the same creative license to try innovative, but potentially risky, techniques that are available to private companies. In fact, some scholars, notably Fink in 2018, argued that privately run lotteries might be preferable because they can better negotiate commissions with retailers or better address problem gambling since it represents a hindrance to the success and legitimacy of their business.²⁴

However, the private versus public debate seemed to dissipate completely as more states approved lotteries as agencies of the state. There were several reasons for this shift. First, state governments did not want to share profits with private vendors. Equally compelling was states' reluctance to raise taxes to pay for increased education and other programs and the

²³ Haller, M. (1979). The Changing Structure of American Gambling in the Twentieth Century. *Journal of Social Issues*, 35(3), 87-114.

²⁴ Fink, A. (2018). The Political Economy of State-Owned Lotteries. *Journal of Consumer Policy*, 41, 257-272.

desire to curb the growth of organized crime. A state-sponsored lottery would help accomplish these goals.

Table 2 tracks state lottery adoption by decade. The majority of states adopted lotteries in the 1970s and 1980s.

Table 2 Legalization of State Lottery by Decade

No Lottery	1960s	1970s	1980s	1990s	2000s	2010s
Alabama	New Hampshire	Connecticut	Arizona	Georgia	Arkansas	Mississippi
Alaska	New York	Delaware	California	Louisiana	North Carolina	Wyoming
Hawaii		Illinois	Colorado	Minnesota	North Dakota	
Nevada		Maine	Washington, D.C.	Nebraska	Oklahoma	
Utah		Maryland	Florida	New Mexico	South Carolina	
		Massachusetts	Idaho	Texas	Tennessee	
		Michigan	Indiana			
		New Jersey	Iowa			
		Ohio	Kansas			
		Pennsylvania	Kentucky			
		Rhode Island	Missouri			
		Vermont	Montana			
			Oregon			
			South Dakota			
			Virginia			
			Washington			
			West Virginia			
			Wisconsin			
(5)	(2)	(12)	(18)	(6)	(6)	(2)

Source: Le Fleurs 2018 World Lottery Almanac

Frances Stokes Berry and William Berry conducted empirical analysis to explain state lottery adoptions. Walker believed that policy adoption could involve internal determinants or geographic influences, but not both. Using event history analysis, Berry and Berry tested both influences (internal and geographic) on a state's probability of policy adoption in a given period.

They demonstrated that state-level determinants like the robustness of the economy (defined by income levels and tax revenue per capita) and regional diffusion, such as activity by neighboring states, accounted for why many states adopted traditional lotteries.²⁵

The fiscal health of a state government should be given careful consideration when examining state lottery adoption. If a state finds itself in need of increased revenues, it could turn to mandatory tax or fee increases or to a voluntary tax like a lottery to address financial shortfalls. Elected officials weigh political risks when voting for a mandatory new tax, and the policy option that appears most politically advantageous is likely to prevail. The adoption of a lottery entails more than the creation of a new or higher tax, though. As noted at the start of this section, many states had specific statutory prohibitions against lotteries by 1894. Therefore, creating a lottery required the legalization of a previously illegal activity from which the state will generate revenue.

Coughlin, et al. considered six factors influencing lottery adoption in their 2006 work, "The Geography, Economics, and Politics of Lottery Adoption."²⁶ They acknowledge that changing attitudes, growing government expenditures, and evolving moral views might have brought about the legalization of lotteries. More specifically, the growing public opposition to new and increased taxes has been a strong reason to adopt a lottery. However, they find those factors are not encompassing enough to solidify a legislature's decision to support adoption and ignore the political realities of policy formulation. The factors Coughlin, et al. identified as

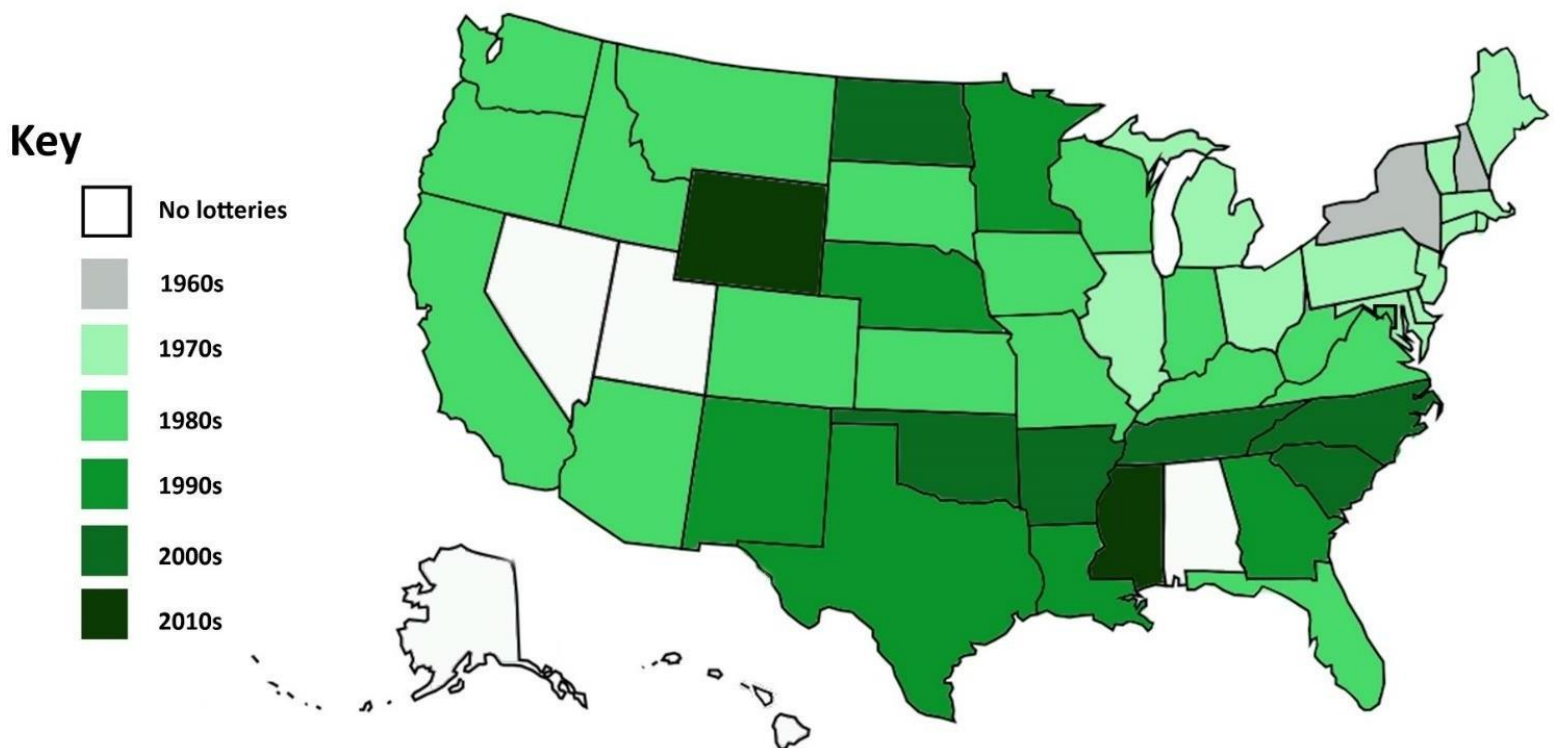
²⁵ Berry, F. & Berry, W. (June 1990). State Lottery Adoptions as Policy Innovations: An Event History Analysis. *The American Political Science Review*, 84(2), 295-415.

²⁶ Coughlin, Cletus, Garrett, Thomas, Hernandez-Murillo, Ruben. (May/June 2006) The Geography, Economics, and Politics of Lottery Adoption. *Federal Reserve Bank of St. Louis Review*, 88(3), 165-180.

fueling the supply and demand for lottery adoption are economic development, state fiscal health, election cycles, political party control, regional diffusion, and situation-specific determinants (e.g. political constraints of adopting a new sales tax versus raising the sales tax from four to five percent). Higher levels of per capita state income, urbanization, election results, the decision process (adoption through legislative proposal or public referenda), and the importance of geography provide the clearest insights into lottery adoption. Notably, having lotteries in neighboring states seemed to be the most important positive influence.

Figure 2

Legalization of State Lottery by Decade



Source: Le Fleurs 2018 World Lottery Almanac

The regional diffusion of lotteries took place in different parts of the country at different times. Adoption began in New Hampshire, and other states in New England were the first adopters. Legalization then moved to the Mid-Atlantic and Great Lakes, followed by the Midwest and the Pacific Coast before moving to the Plains and Rocky Mountains. Legalization is most recent in the South. Figure 2 emphasizes policy emulation and competition through regional diffusion.

This background on lotteries emphasizes two points. First, lotteries have consistently been utilized as a revenue generator since colonial times in the U.S. If they are to remain a prominent source of funds for government, it is reasonable to explore how they could expand their business – with internet sales being one option. Second, the discussion of lottery policy adoption can help shed light on the likelihood of policy adoption of internet lottery sales. In some states, like Virginia, there was an outright ban on internet sales in state code.²⁷ As Coughlin, et al. point out, changing attitudes, growing government expenditures, and relaxed moral views may all need to play a part in legislation lifting bans on internet lottery sales.

2.5 Impact of Modern Lotteries in the United States

As I did with casinos, I will now focus on the revenue impacts of lotteries. Since 1964, when New Hampshire launched the first modern, legal lottery in the U.S., state lotteries have generated significant revenue that returns to local economies through beneficiaries, prizes and retailer commissions.

²⁷ Virginia Code § 58.1-4007.2. Lottery tickets not to be sold over Internet. 2006, c. 352.

In fiscal year 2017, all U.S. lotteries transferred in total almost \$23 billion to state governments.²⁸ These lottery proceeds fund different programs according to each state's guidelines. They are dedicated to a variety of purposes such as education programs and scholarship funds, social programs supporting the elderly and the homeless, environmental conservation, economic development programs, medical research, and tourism.

Setting a prize structure for winner payouts on instant games, commonly known as scratcher tickets, is tricky. Lotteries attempt to balance potential sales, profits, and player interest when setting the percentage of winning tickets in a batch. Players are less likely to play a game if they do not believe they are winning often enough. In some cases, state code includes language on what the prize structure should be. Conversely, some lotteries set such percentages through administrative regulations approved by a governing board. In fiscal year 2017, all U.S. lotteries paid a total of \$41 billion to players in the form of cash prizes.²⁹

Lotteries rely on a vast network of retail partners to sell their products. Entities from corporate and independent convenience stores to grocery stores to pharmacies sign up to be lottery vendors due to the little work required to receive commissions. In fiscal year 2017, the approximately 210,000 retailers across the country that sell lottery products earned about \$4 billion in retailer commissions. Although retail commission rates vary by jurisdiction, around 6.1 percent of lottery sales are paid to retailers.³⁰

²⁸ Markle, T., LaFleur, B., & LaFleur, B. (n.d.). *La Fleur's 2017 World Lottery Almanac* (25th ed.). TLF Publications. Of that \$23 billion in profit transfers to state government, Virginia transferred \$558.19 million to the Lottery Proceeds fund. That amount accounted for about 10% of the total education budget. That information is according to the Virginia State Budget (Fiscal Year 2016). Office of Education, State Education Assistance Programs, Item 139.

²⁹ Markle, T., LaFleur, B., & LaFleur, B. (n.d.). *La Fleur's 2018 World Lottery Almanac* (26th ed.). TLF Publications.

³⁰ Markle, T., LaFleur, B., & LaFleur, B. (n.d.). *La Fleur's 2018 World Lottery Almanac* (26th ed.). TLF Publications.

This demonstrates how lottery revenue is shared among players, retailers, and operation/administrative costs. The profits that remain transfer to the state budget. If lawmakers want to see more lottery profits transferred to the state, one way to increase revenue could be to permit a new path to sell the product to new players– like internet lottery sales.

2.6 Innovation in Lotteries

The lottery transfers just discussed mostly rely on traditional lottery product sales – predominately paper-based games sold at convenience stores. However, as e-commerce grows, highlighting that consumer shopping preferences are evolving, lotteries are trying to find ways to stay relevant to younger adult consumers. One such way is to sell their product online over the internet.

Internet lottery sales can involve either the sale of draw games (e.g., purchasing a ticket for Mega Millions) or the sale of instant win digital games (e.g., electronic scratch tickets). Digital games that have an instant-win feature are sometimes referred to as e-games. These games offer a player a digital play experience and are still a game of chance where the player can interact with the game, but that interaction does not affect the outcome of the game. E-games are animated and themed with graphic interfaces.

Internet lotteries require players to create an account to verify age and location before adding a payment method, such as a linked bank account, debit card, or ACH payments like PayPal. Prizes either can be automatically loaded back to the players account or mailed in check form.

As of 2019, seven states had functioning online lottery sales that include traditional lottery games like numbers draw-based games and instant chance games: Georgia, Kentucky, Illinois, Michigan, Pennsylvania, New Hampshire, and North Carolina. Illinois was first out of the gate in March 2012, offering draw games online. That piqued the interest of other lotteries, and in November 2013, the Georgia Lottery went online, followed by Michigan in 2014, Kentucky in 2016, New Hampshire and Pennsylvania in 2018. North Carolina allowed only draw-based number games to be sold online in 2019.³¹

How and why these seven states chose to adopt and implement internet lottery sales could be due to several factors. Lottery professionals frequently mention increased revenue, customer demands, expansion of the customer base, and engagement of a younger generation of players. It is likely that at least some of those forces were involved in moving toward internet lottery sales.

2.7 Ramification of Federal “Wire Act” Legislation and Administrative Interpretation for State Lotteries

While seven states permitted internet sales in 2019, federal legislation could impact the ability of a gambling enterprise to conduct business over the internet. When the Interstate Wire Act of 1961 (frequently referred to simply as the Wire Act) passed, its purpose was primarily to combat organized crime syndicates from using landline telephones to conduct gambling.³² As

³¹ In 2014, Minnesota was the first state to offer online instant win games; however, it did so without legislative approval. Within a year of the launch, the Minnesota legislature banned internet lottery sales, and the games were pulled. The Delaware Lottery offers casino style games over the internet like poker and other table games. These games are not considered lottery games and not considered during the findings portion of this thesis.

³² U.S. Code Title 18 Part I Chapter 50 §1084. Transmission of wagering information; penalties.

the internet came into being and online gambling began to pop up legally in various states, New York and Illinois sent a letter to the U.S. Department of Justice's Criminal Division asking for clarification of the legality of internet lottery wagering in 2011. The Criminal Division had to review the broader scope of the legislation, since its historical understanding was that it applied to all gambling. Due to limited resources, however, the DOJ previously had chosen not to enforce the law in that context. Prosecutorial discretion provided the DOJ latitude to not use resources on something it believed was not as much of a concern as racketeering or gang-related crimes.³³

The Criminal Division had trouble reconciling the demands for prosecution with questions about the statutory construction of the Wire Act. It passed the question to the Office of Legal Counsel (OLC), which issued a formal legal opinion that the scope of the Act was limited explicitly to using wire transactions to conduct only sports betting. That meant that online gambling and online poker or state lotteries selling tickets over the internet could continue.

In a reversal, the OLC issued a revised opinion in November 2018 that concluded the opposite –the Wire Act extends to all forms of online gambling.³⁴ The 2018 OLC opinion found that the Wire Act prohibits gambling businesses, including state lotteries and the companies

³³ Breuer, L. (27 Mar. 2019). An Insiders Perspective on DOJ Wire Act Reversal & DOJ Enforcement. American Gaming Association Sports Betting Executive Summit breakout session.

³⁴ According to the Office of Legal Counsel website, "By delegation from the Attorney General, the Assistant Attorney General in charge of the Office of Legal Counsel provides legal advice to the President and all executive branch agencies. The Office drafts legal opinions of the Attorney General and provides its own written opinions." At the time of the September 2011 Wire Act Opinion, Virginia Seitz was Assistant Attorney General in charge of the OLC. She was appointed by President Obama and confirmed by the Senate in a voice vote. At the time of the 2018 Wire Act Opinion, Steven Engel was Assistant Attorney General. He was appointed by President Trump.

that support their operations, from knowingly using the internet or a mobile network to transmit across state lines

(1) bets or wagers relating to any type of gambling (2) information assisting in the placing of bets or wagers on any sporting event or sporting contest (3) information entitling the recipient to receive money or credit as a result of bets or wagers relating to any type of gambling and (4) information entitling the recipient to receive money or credit as a result of information assisting in the placing of bets or wagers relating to any type of gambling.³⁵

Thus, the 2018 reinterpretation calls into question interstate transmissions related to all bets or wagers, even where fully authorized for in-state players under current state laws. DOJ enforcement of this new guidance could negatively affect the daily operations and annual revenues generated by state lotteries regardless of whether they have internet sales.

Additionally, the 2018 opinion could go beyond just questioning the legality of lotteries using the internet to sell their product. It may cast doubt on the continued viability and vitality of multi-state lottery games such as Powerball and MegaMillions even if sold in the traditional manner. It appears as well to threaten many contractual relationships that lotteries have with key vendors, since most lottery transactions are transmitted by wire, wireless, satellite, cable or other communications channels across state lines for processing at vendor-operated data centers.

³⁵ Department of Justice, Office of Legal Counsel. (2018). Reconsidering Whether the Wire Act Applies to Non-Sports Gambling. Memorandum Opinion for the Acting Assistant Attorney General Criminal Division.

A lawsuit challenging the DOJ's 2018 opinion was filed on February 15, 2019, in the United States District Court for the District of New Hampshire [might put in footnote: *New Hampshire Lottery Commission v. US Attorney General et al.*, Civil Case No. 1:19-cv-00163-PB]. In the lawsuit, the New Hampshire Lottery Commission and NeoPollard Interactive (a lottery vendor) requested a declarative statement on whether the Wire Act applies to state lotteries. Oral arguments were held on April 11, 2019. Several state lotteries and attorneys general signed *amicus* briefs in support of the New Hampshire Lottery. The National Association of Convenience Stores has filed an *amicus* brief in support of the OLC.

To alleviate concerns about prosecution while this legal question was explored, on April 8, 2019, Deputy Attorney General Rod Rosenstein issued an official memo proclaiming the Department of Justice had failed to consider any potential ramifications the new opinion might have on state lotteries. He said the DOJ would need more time to think about possible impact on lotteries; therefore, DOJ would refrain from prosecutions until it could reach a decision at some point in the future. The memo did not commit to a specific date by which the Department would reach a decision.

As the role of the judicial branch is to act in cases where a party has been harmed, New Hampshire Lottery and NeoPollard Interactive asserted that the 2018 OLC interpretation harms their business. Opinions issued by the U.S. Department of Justice do not carry the force of law; rather, they provide guidance and set priorities for the U.S. attorneys who prosecute federal crimes throughout the United States. The case in New Hampshire sought to settle the question of threatened prosecutions with a controlling court decision.

On June 3, 2019, Judge Paul Barbadoro rejected the 2018 OLC opinion that redefined the Wire Act. He indicated he fully expects this case to be appealed all the way to the U.S. Supreme Court—a process that takes multiple years to complete. Although the New Hampshire Lottery saw this as a victory, other state lotteries were not as relieved because questions of applicability still abound. Did the New Hampshire ruling extend to all state lotteries? In the meantime, the DOJ filed an appeal to the First Circuit Court. As of October 2019, that appeal was still pending.

It is important to monitor this ongoing legal battle because it could immediately stop a state lottery from conducting internet sales and even question its ability to sell popular jackpot games in the traditional manner. If federal courts determine that a state lottery cannot conduct internet sales or sell common lottery games for in-person purchases, lotteries could lose revenue and force legislators into budget decisions they were hoping to avoid with gaming revenue. Conversely, if the federal courts clarify the extent of the Wire Act to make clear that federal laws do not affect state lottery internet wagers, it could remove a concern of legislators who are considering the policy adoption of internet sales.

2.8 Summary and Conclusions

This review discussed how gambling became a state-sanctioned activity, the potential fiscal impacts of that decision, the advent of lotteries and their revenue sharing model, internet sales as a way for lotteries to innovate their sales model, and how federal legislation may impact a state's ability to permit gambling over the internet.

I discussed early work that explored lawmakers' motivations to adopt a new policy, like the legalization of a type of gambling. This is relevant to understand some of the reasons a state may adopt a new policy like internet lottery sales. Figure 1 validated Jack Walker's argument that competition and emulation play a major role in whether a state chooses to implement a new program. Such findings suggest that the first states to pioneer internet lottery sales could legitimize the activity for other states that in turn would legalize internet lottery sales to compete with their neighbors.

Although gambling may well generate new state tax revenue, displacement spending may affect the total revenue coming to the state. Research highlights instances of consumer spending shifting from restaurants or lodging to gaming once a casino opens. Even though this is not quite the same as the intra-product cannibalization explored in this thesis, it does suggest that substitution can appear when additional markets are opened.

Lotteries have traditionally been utilized as revenue generators for states. If such revenue is expected to continue to see increases, internet sales could be a way to grow. As Figure 2 demonstrates, policy emulation and competition through regional diffusion likely play roles in the decision to implement a lottery, much like casino adoption. Therefore, now that a few states have pioneered internet sales, more states are likely to be adopted and the states that border the current iLottery states are likely to be next.

I concluded with discussion about the federal "Wire Act" legislation and the 2018 DOJ reinterpretation of the law which calls into question interstate transmissions related to all bets or wagers, even where fully authorized for in-state players. A judicial declaration is necessary to

clarify the legal interpretation from what could otherwise have devastating impacts to the lottery industry (i.e. debit purchase transactions). More immediately, questions around the scope of the Wire Act could halt any future state from implementing internet lottery sales.

The foray into legalization of competing gaming outlets and the duality of multiple lottery delivery methods has been discussed in this chapter. Internet lottery sales must produce higher profits, sales, and improve total sales growth rates to be effect. A review of these impacts is discussed in the next chapter.

Chapter 3: Propositions, Hypotheses and Research Design

3.1 Introduction

This chapter introduces the propositions, hypotheses, and research design for the examination of traditional lottery sales after the introduction of internet sales, focusing on revenues generated by different lottery delivery methods. This provides the basis for exploring whether cannibalization took place when the new delivery method was introduced.

One way to tell if a new method of product delivery is adding to total revenues, rather than siphoning revenues from another delivery method, is to look at the change in the rate of sales growth. If a new delivery method is added and total sales grow at a higher rate than before, the method is adding revenue. If total sales growth rate does not increase with the new delivery method and the same amount of the product is being sold as before the new method was introduced, the new method could be taking sales from the old method. In that scenario, it would siphon sales from one delivery method to the other and not have a net positive effect on sales.

The dependent variable in what follows is total sales, profit, or sales growth rate, and the lottery delivery method is the independent variable. Seven states had internet lottery sales in 2019. Some state lotteries only sell draw-based games online, like Pick-3 or Pick-4 and jackpot games like Mega Millions and Powerball. Other state lotteries offer e-instants, the digital equivalents of a scratch ticket. This thesis compares the growth rates before and after internet lottery sales were introduced in six of the seven states that permit internet lottery sales; it also compares growth rates with states that have only traditional lotteries. Of the seven state lotteries that permit internet lottery sales (Georgia, Kentucky, Illinois, Michigan,

Pennsylvania, New Hampshire, and North Carolina), six have at least one year's worth of data on sales revenue post internet sales (Georgia Kentucky, Illinois, Michigan, New Hampshire and Pennsylvania). North Carolina began offering internet sales in 2019; at the time of this study written audited year-end 2019 lottery revenues had not been reported, excluding North Carolina from consideration. Since I am most concerned with the possible effect internet sales have on traditional sales, I isolate analysis of lottery data to the states that have this additional delivery method and have audited year-end financial reports to better understand the impact the additional delivery method has on the existing product line. I include as a baseline sales over the same time period in the states that have only traditional lotteries.

3.2 Propositions

Drawing from the scholarship reviewed in Chapter Two, I suggest two propositions that I use as the bases for testable hypotheses. The propositions are predictions based on available evidence and experience. They led me to several hypotheses that permit empirical testing of these predictions by pinpointing certain measurable characteristics to test its validity.

Coughlin, et al. discovered that increasing government expenditures were a driving factor in the legalization of a state lottery. Their analysis guided my first proposition: the lotteries in the six states had performed well before the states legalized internet lottery. If a traditional lottery had been a reliable source of revenue, then its expansion to the internet may be a reasonable way to generate more money in the face of otherwise economic uncertainty. By analyzing state economic indicators like gross domestic product to measure how a state economy was performing alongside how lottery sales performed, the results from Coughlin, et

al. suggest that state economic indicators would be flat or declining while lottery sales grew. The positive lottery sales could drive legalization of internet sales to combat economic woes.

Proposition Two explores the effect of internet sales on traditional sales, including sales growth rate, with the expectation of a positive relationship. This is based on Walker's work on the role emulation plays in whether a state chooses to implement a new program. Multiple states have implemented internet sales, thereby legitimizing the activity. The decision to adopt the new program likely underwent legislative discussion and committee meetings during which proponents and opponents had opportunities to present their positions. Media reports that include testimony given during those legislative hearings are discussed below. Because decision makers chose to legalize the activity, the proponents must have had a more compelling case including reporting positive data from other states' experiences. The decision to legalize internet lottery sales leads me to believe that lawmakers saw positive impacts from other states and wanted to emulate them.

Proposition One

First, I considered whether lotteries delivered traditionally were growing revenues prior to enacting internet sales. To compare the growth of lottery's that ultimately did adopt iLottery to the growth of lottery's that have not adopted internet sales is an informative comparison to surmise a justification for the adoption of internet sales. One approach then is to track state lottery sales before and after the state adopted an iLottery. If lottery sales were growing in a state, it may be a reliable source of revenue to expand in the face of otherwise economic uncertainty. Therefore, if a state adopted internet sales one might expect that the lottery was performing better than other state lotteries. Comparing the growth of lotteries in states that

ultimately adopted internet lottery sales to the growth of lotteries in states that had not adopted internet sales permits examination of that possibility. The state of traditional lottery revenues and the state's economy as measured by gross domestic product growth rates also could indicate whether fiscal stress was a motivating factor in the decision to permit internet sales.

Conversely, if lottery revenues were declining, what would be the need to venture into the world of internet sales where there could be concerns about underage play, increased addiction, and revenue siphoning from other gaming taxes? Two reasons lottery revenues might decline are the rise of other forms of legal gambling and the style of play. As casinos open, sports wagering is permitted, and online poker ramps up, the multiple offerings of different ways to gamble could lead to a decline in traditional lottery sales. Similarly, lottery is a paper-based game purchased when visiting a convenience store, grocery or drug store, or other lottery retailer. If people make the majority of their purchases in ways other than physical interactions or visit convenience stores less frequently, potentially driven by a decline in smoking,³⁶ lottery revenues may suffer.

If lottery revenues are growing it could be due to a loyal customer base who may not change their buying habits as other forms of gaming are legalized. As lotteries expand their retailer base and improve their game release strategy with more sophisticated data analysis,

³⁶ Centers for Disease Control and Prevent. "Fast Facts and Fact Sheets: Current Smoking Among Adults in the United States."
https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm#anchor_1549902047693

lotteries could be performing better now than ever. To add more paths for sales delivery may be a good way to capitalize on this growth.

If the state's overall economy was not growing, legislators may have looked for additional sources of revenue. The growth rate of gross domestic product as an indicator for the state of the economy could signal whether fiscal stress played a role in approving the new lottery delivery method.

By examining total sales in all states without internet sales compared to the focal six states before internet delivery, one can establish the state of the industry and provide a comparison for sales following internet delivery. My first proposition is: ***State lotteries with internet sales experienced sales growth before the first internet sales.***

The following hypothesis flows from this proposition.

Hypothesis One: The six states that have adopted internet sales saw higher total sales and growth rates in the three years prior to the implementation of internet sales than the states that have not adopted internet sales.

Hypothesis One analyzes at least three years' worth of sales data for each of the six state lotteries prior to their first internet sales, which began at different times, and compares that to the sales data from states that have not adopted internet sales. Three years is sufficient time to get a general sense of the direction sales were taking in the state prior to internet sales. I begin with Fiscal Year 2009 because the first internet lottery sales were offered in 2012.

Proposition Two

Proponents of internet sales believe the additional delivery method does not impede existing lottery sales. Opponents question whether the new delivery method will help expand total revenues. To study the relationship between revenues generated and delivery method, one must consider total profits from both delivery methods and lottery sales at traditional brick and mortar retail locations after internet sales are introduced.

The Virginia, Massachusetts, and Connecticut lotteries supported legislation during the 2019 legislative sessions to allow online lottery sales. During a campaign in support of the legislation, the Connecticut Lottery Director told *The Middletown Press* that internet lottery sales would “create new players.”³⁷ The Connecticut Office of Fiscal Analysis projected a “potential net revenue gain to the General Fund of \$4.7 million in FY 20 and \$7.6 million in FY 21.” The article concluded, “Lottery officials say that their 2,900 retailers, such as convenience stores, would not see a drop in their revenue.”

Similarly, Massachusetts Lottery officials supported the 2019 legislative proposal that promised internet lottery sales would increase revenues. Michael Sweeney, Massachusetts Lottery Executive Director, told the Joint Committee on Consumer Protection and Professional Licensure that the Massachusetts lottery “is at a pivot point and we need to have some serious conversations about technology and how we engage consumers because consumers have already radically changed.”³⁸ Retail representatives at the same meeting tried to convince

³⁷ *The Middletown Press* (14 June 2019) Connecticut lottery wants Millennials to play. <https://www.middletownpress.com/opinion/article/Jacqueline-Smith-Connecticut-lottery-wants-13989533.php>

³⁸ *Daily Hampshire Gazette* (2 July 2019) Massachusetts retailers resist Lottery’s push for online sales. <https://www.gazettenet.com/massachusetts-lottery-online-sales-26707472>

legislators that internet lottery would “destroy small businesses and threaten the Lottery’s success.”³⁹

New Hampshire Lottery Director Charlie McIntyre appeared to testify in support of the Massachusetts Lottery efforts. Speaking about internet lottery, he told the Joint Committee that “it’s been a significant growth for us. We are the fastest growing lottery east of the Mississippi [River]. So our growth in the past year is 16 percent. So the suggestion that it cannibalizes, that it attacks, the traditional lottery would be inaccurate. Our retailers will receive a record year of income this year.”⁴⁰

The North Carolina Joint Legislative Program Evaluation Oversight Committee was directed in 2017 to look at ways that the North Carolina Lottery could increase its contributions to education. One of its four recommendations was to authorize the Lottery to offer Lottery games online. The Committee stated: “Online lottery ticket sales represent an untapped market for state lotteries, potentially reaching out to younger generations of players.”⁴¹

Comments like these made at official public meetings are the basis of the second proposition: ***internet sales positively affect the sale of all lottery products***. That is, lottery profits and sales at brick and mortar locations will not decline following the advent of internet sales.

³⁹ *Daily Hampshire Gazette* (2 July 2019) Massachusetts retailers resist Lottery’s push for online sales. <https://www.gazettenet.com/massachusetts-lottery-online-sales-26707472>

⁴⁰ *Daily Hampshire Gazette* (2 July 2019) Massachusetts retailers resist Lottery’s push for online sales. <https://www.gazettenet.com/massachusetts-lottery-online-sales-26707472>

⁴¹ Joint Legislative Program Evaluation Oversight Committee (1 May 2017) Options Exist for Increasing Lottery Proceeds for Education. https://www.ncleg.net/PED/Reports/documents/Lottery/Lottery_Report.pdf

The following hypothesis flows from this proposition.

Hypothesis Two: In the states that permit internet sales, following the introduction of internet sales, total lottery profits will increase.

This hypothesis compares profits pre-and-post-internet sales in states that permit internet sales. Profits were collected from FY2009 through FY2018.

Hypothesis Two allows one to examine whether and how profits were affected following adoption of internet sales. If profits to the state government did not increase after internet sales, there would be no public benefit to permitting lotteries to offer this new delivery method. Two potential reasons internet sales may not make profits increase are they typically offer higher pay out percentages, and the administrative cost to launch the technology could cut into profits. If profits increased after internet sales, it would benefit the public and could encourage policy innovation.

The next critical step is to examine whether internet sales supplant traditional lottery sales. To measure that, one must look at sales at brick and mortar lottery retail locations where the traditional product is sold and at the rate of sales growth after the introduction of internet sales.

Hypothesis Three: From three years prior to its first internet sales through FY18, states with internet sales continued to see positive year over year sales growth at brick and mortar retail locations.

Finally, I compare the total sales growth for states that permit internet sales both before and after the new delivery method. I expect to find that states with internet sales had higher

sales rates at brick and mortar retail locations after the introduction of the new internet delivery method. This is consistent with the statements by lottery officials who testified that internet sales did not cannibalize physical retail sales. This thesis predicts the additional method does not cannibalize the traditional method.

Hypothesis Four: For states that permit internet sales, the total lottery sales after the introduction of internet sales will be higher than before internet sales.

If states with internet sales see increased sales after introduction of the new delivery method, the additional delivery method is a net revenue positive for the state. If states with internet sales saw total sales decline or slow following the introduction of internet sales, internet availability is not adding to the total sales and instead supplanting it. Complementary to total sales is the rate at which sales change year-over-year, making sales growth rates just as important to examine as total sales. If overall annual lottery sales growth rates do not rise at a faster pace after internet sales, the internet sales option evidently is not engaging customers to play more frequently or not making the product relevant to a new customer base – two common policy reasons cited to allow internet sales.

Table 3
Summary of Propositions and Hypotheses

<p><u>Proposition 1</u> <i>State lotteries with internet sales experienced sales growth before the first internet sales</i></p>	<p><i><u>Hypothesis One:</u> The six states that have adopted internet sales saw higher total sales and growth rates in the three years prior to the implementation of internet sales than the states that have not adopted internet sales.</i></p>
<p><u>Proposition 2</u> <i>Internet sales positively affect the sale of all lottery products</i></p>	<p><i><u>Hypothesis Two:</u> In the states that permit internet sales, following the introduction of internet sales, total lottery profits will increase.</i></p> <p><i><u>Hypothesis Three:</u> From three years prior to its first internet sales through FY18, states with internet sales continued to see positive year over year sales growth at brick and mortar retail locations.</i></p> <p><i><u>Hypothesis Four:</u> For states that permit internet sales, the total lottery sales after the introduction of internet sales will be higher than before internet sales.</i></p>

3.3 Research Design

To test the hypotheses, it was necessary to examine state lottery sales at licensed retailers, annual sales and the rate at which they changed year-over-year, and lottery profits. To calculate annual sales growth rate, I subtracted the net sales of the prior period from that of the current period. Then, I divided the result by the net sales of the prior period. Finally, I multiplied the result by 100 to get the percent sales growth from year to year. In some cases, I averaged that number for a period of years, typically three, to produce a general trend of the growth rate.

My primary data were procured from two types of publications. First are La Fleur's publications, the only nationally recognized repository for lottery statistics. Le Fleur's produces an annual *World Lottery Almanac* that is the complete reference source on the worldwide lottery industry. In addition to its longstanding *World Lottery Almanac*, it began publishing an *Internet Report* in 2018 that provides an annual snapshot of lotteries selling products via the

internet. The publisher of these resources, TLF Publications, was founded in 1990 and has published over 90 statistical descriptions of the lottery trade. It publishes a monthly newsletter and quarterly magazine, and it hosts annual conferences and forums both in the United States and Canada for the entire lottery trade and its partners and vendors.

Second, I utilize year-end annual financial reports published by individual state lotteries. It is important to note that when reviewing year-end annual financial reports that some lotteries refer to “instant” sales; this means scratcher sales. Alternatively, they refer to “online sales,” the sale of games where the ticket is produced from the network of retailers connected to the gaming system and encompasses all games except scratchers. It in no way implies the sale of lottery tickets over the internet. The “online” term is lottery jargon that has been around since before the advent of the internet, and “online” refers to gaming terminals being connected to the gaming system through a communications line. In some cases, reports from the state auditor of accounts was necessary to validate the year-end financial reports published by the state lottery.

For the purposes of this study, I looked at lottery sales only in states that offer internet sales and that have at least one year’s worth of audited year-end financials. To consider at least three years’ worth of data prior to the first internet sales in Illinois, the time analyzed always begins in 2012. Due to the nature of annual financial reporting, the most recent data that include internet sales were available through fiscal year 2018.

	2012	2013	2014	2015	2016	2017	2018
Georgia		X	X	X	X	X	X
Illinois	X	X	X	X	X	X	X
Kentucky					X	X	X
Michigan			X	X	X	X	X
New Hampshire							X
Pennsylvania							X

Source: Annual reports from state lotteries

A primary factor to understand the relationship between internet and traditional sales is the array of internet products available to players. More options typically equate to more sales, while limited offerings could dampen sales. Internet instant win digital offerings, keno-style games, jackpot, and daily drawings all offer different internet sales expectations. It is uncommon for lotteries to parse out specific game sales in financial reporting statements for internet sales. Since I am not comparing internet sales across states, just the effect of internet sales on traditional products within specific states, it was irrelevant to the data analysis here if states offered different internet products. As such, this thesis analyzed the total internet sales for a state regardless of whether it offered different products. (See Table 5.)

	Instant Win	Jackpot	Daily Drawing	Keno
Georgia	X	X	X	X
Illinois		X		
Kentucky	X	X	X	X
Michigan	X	X	X	X
New Hampshire	X	X		
Pennsylvania	X			

Source: Annual reports from state lotteries

Lottery industry groups have discussed the lack of standardized reporting for internet sales. It is important that lotteries report revenue in the same way so that fair comparisons can be made, and there is consistency across many reporting entities. Internet sales can either be reported as sales (i.e. “handle” or total amount bet) or gross gaming revenue, GGR (handle minus prize payout or net win), which more closely reflects profit. Lotteries in the United States have followed the accounting policy that casino-type products, like Video Lottery Terminals that resemble slot machines, are reported as gross gaming revenue. The Michigan Lottery adopted the gross gaming reporting method for its iLottery instants but as handle sales for the draw-based iLottery products. La Fleur’s attempts to standardize the reporting in its Internet Report as handle sales.

In addition to clarifying how internet sales data are reported, it is necessary to operationalize the other key variables in the hypotheses. Internet sales means the sale of lottery products, either instant win or draw games, where the internet is utilized to complete the transaction. This would not include, for example, Virginia MobilePlay Lottery sales, which are done with a mobile device but require a Bluetooth connection to a licensed retailer gaming

terminal (not the internet) for the transaction to go through. Lottery profits indicate what the lottery made after accounting for prize payout, retailer commissions, and operating costs. Brick and mortar retail sales are lottery sales at the physical location of a licensed lottery retailer where the player must be present to complete the transaction.

To examine sales growth prior to internet sales in Hypothesis One, I placed on a line graph year-end sales totals for the six focal states' lotteries from 2009 through the state's first year of internet sales. The x-axis is labelled years and the y-axis is labelled dollars. To place these data in a broader national context, I also report the same information averaged for the states with only traditional lottery options.

Only four of the six states with internet sales lottery data were utilized to test Hypothesis Two that examines lottery profits because they have enough years' worth of internet sales to provide an understanding of its fluctuations. As of October 2019, New Hampshire and Pennsylvania had not yet reported their first year of internet sales. For the remaining internet lottery states, profits were tracked for three years prior to internet sales through 2018. This time period shows profits before internet sales through the most recently available data that include internet sales to examine if profits changed after internet sales.

Hypothesis Three graphs traditional sales from before internet sales through the deployment of that delivery method. A comparison of average percent change before and after internet sales is made.

To test Hypothesis Four, the average sales growth rates in states with both types of lottery sales in a time period three years before internet sales were offered (2012) and at least three years with internet sales were analyzed.

All of these hypotheses and tracings of changes in total sales, profits, and traditional product sales help examine the relationships between internet sales on overall traditional lottery sales growth rate.

3.4 Limitations

Understanding the impacts of internet sales in North Carolina is limited because internet sales are so new that year-end financial reports were not available yet. Similarly, New Hampshire and Pennsylvania only have one-years' worth of data with internet sales. The limited number of years may mean the available data do not fully reflect the ability of internet lotteries to generate revenue or to affect traditional sales. Because the product is so new, it has likely not reached its full potential.

3.5 Summary and Conclusion

This chapter presented how I developed testable hypotheses to study the relationship between internet lottery and traditional lottery. How the traditional lottery performed could impact a decision maker's choice to legalize a new method, and the best way to understand traditional lottery performance is total sales and sales growth rates (Hypothesis One). If there is intra-product cannibalization with the additional internet delivery method, it would affect profits and sales at traditional retail locations – the focus of Hypotheses Two and Three. Finally, once both delivery methods are available, considering the rate at which sales grew to determine if there was augmentation is addressed in Hypothesis Four.

The four hypotheses are rooted in two propositions that frame the analysis. First, if state lotteries with internet sales experienced sales growth before the first internet sales, one can examine year-over-year sales growth to establish the state of the industry prior to internet sales. Second, based on the expectation that internet sales have a positive relationship with traditional lottery sales, the study examines the relationships between internet sales and overall lottery profits, brick and mortar retail sales, and total lottery product sales. In addition to total sales, the study considers changes in annual growth rate to determine if sales, if growing, were growing as fast once internet sales began. If the sales are not growing as fast with two delivery methods, the new delivery method could be supplanting rather than supplementing the existing method.

Chapter Four turns to the results of examining these expectations.

Chapter 4: Findings

4.1 Introduction

This chapter describes the findings of the research, and it analyzes the relationship between internet lottery sales and total lottery sales, looking for evidence of possible cannibalization or augmentation. If there is augmentation, it will be seen in Hypotheses Two through Four that consider comparable data following internet delivery.

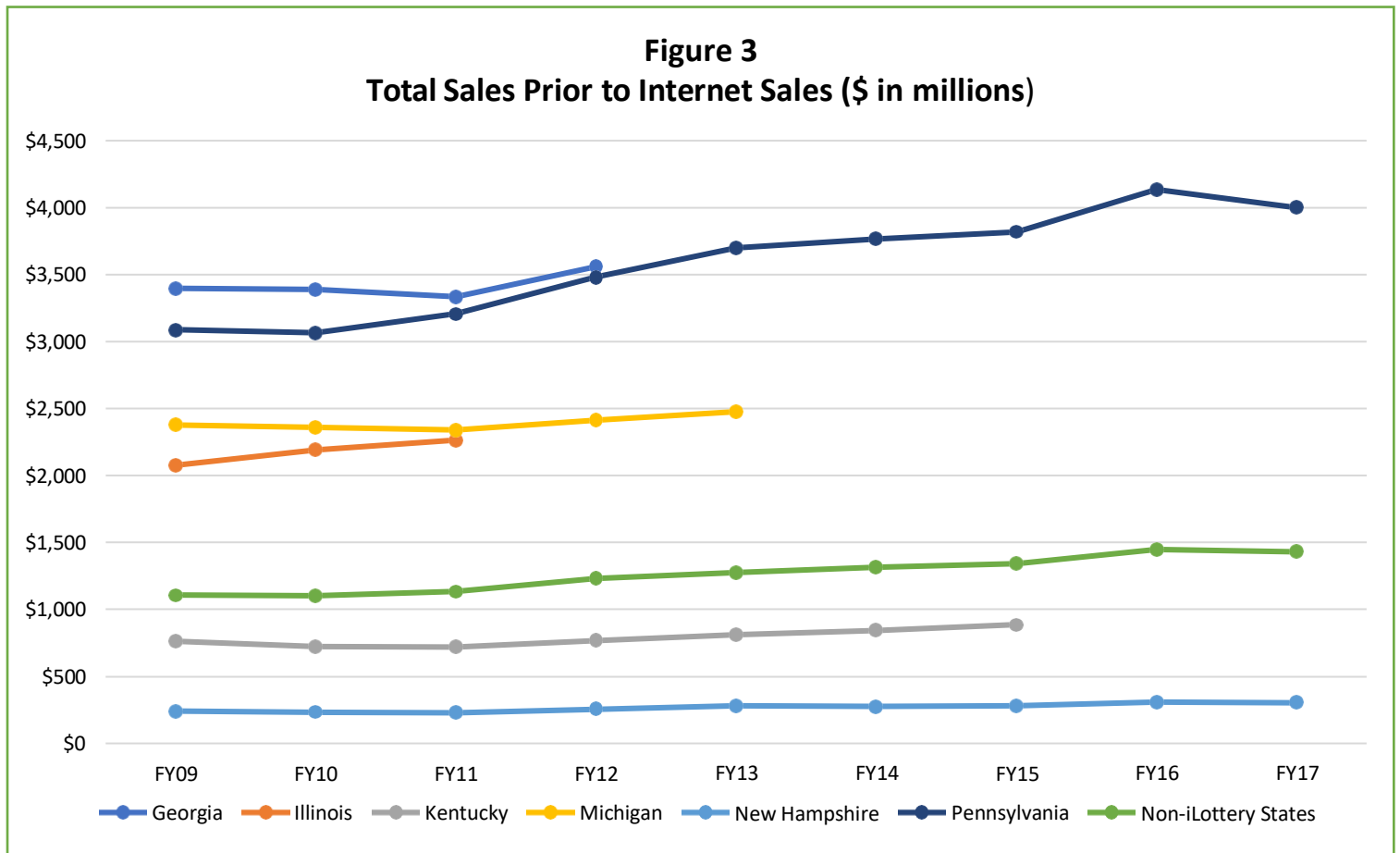
4.2 Hypothesis One

Hypothesis One: The six states that have adopted internet sales saw higher total sales and growth rates in the three years prior to the implementation of internet sales than the states that have not adopted internet sales.

Proposition One was based on the notion that strong growth in lottery sales was a motivating factor in adopting internet lotteries. To test the related hypothesis, I tracked lottery sales for all non-iLottery states to compare sales with those lotteries that do permit internet sales. Further, I calculate growth rates in each iLottery state for the three years prior to the adoption of internet sales to compare how such states performed compared to average non-iLottery states. The hypothesis predicts that the iLottery states were performing better than non-iLottery states.

For Hypothesis One to be supported, sales in states that adopted internet sales would have seen continued positive annual growth before the start of internet sales at a rate higher

than non-iLottery states experienced. Figure 3 displays annual sales from 2009 through 2017 for the six focal states along with the mean sales in non-iLottery states.



Source: La Fleur's World Lottery Almanac

Figure 3 illustrates that while modest in some cases, all six states experienced lottery sales growth between Fiscal Year 2009 through the year that preceded internet sales. Some lotteries saw sales declines in a single year even though their sales were higher the year immediately before internet sales started. For example, Michigan's revenues declined between FY09 through FY11; however, the year before internet sales began, FY13, sales were higher than in FY09.

The green line in Figure 3 represents the average total sales for all non-iLottery states. In FY09 there were 36 operating state lotteries without internet sales. That number rose to 38 in

FY17. Much as in the states that eventually adopted iLotteries, all non-iLottery states saw average sales grow between FY09 through FY17.

Table 6 provides the three-year average annual sales growth rate prior to internet sales. That is compared to the average growth rate, during the same time period, for all non-iLottery states. The three-year periods for some iLottery states overlapped with a year when a new non-iLottery state began operation. If a new lottery becomes operational, it can dramatically skew growth rates in the first two years. The two states that began operating lotteries between FY09 through FY18 were Arkansas in 2010 and Wyoming in 2015. When the three-year period overlapped with implementation of the lottery in Arkansas or Wyoming, I broke out average growth rates with and without their growth rates included. If no new lottery was implemented during an iLottery's three-year period, it is compared to all other lotteries in operation.

		Non-iLottery States (with new Lottery)	Non-iLottery States (without new Lottery)	Non-iLottery States
Georgia	+1.65%	+4.37%	+4.24%	
Illinois	+4.42%	+2.51%	+2.26%	
Kentucky	+4.92%			+2.10%
Michigan	+1.64%			+4.74%
New Hampshire	+3.45%	+3.50%	+2.97%	
Pennsylvania	+2.14%	+3.50%	+2.97%	

Source: Analysis of La Fleur's World Lottery Almanac

Table 6 shows that for three years prior to internet sales, all six states experienced, on average, positive sales growth rates. They experienced positive growth rates even if a single year saw sales declines. For example, Georgia experienced sales declines in FY10 and FY11, but its positive sales growth in FY12 outweighed the earlier negative years, resulting in overall positive sales three years prior to internet sales.

Three iLottery states did not grow as fast as non-iLottery states prior to adoption of internet sales (Georgia, Michigan, Pennsylvania). Conversely, two iLottery states outperformed non-iLottery states in growth during the period examined. Illinois and Kentucky were performing well above the average of non-iLottery states. New Hampshire's sales grew somewhat more slowly compared to the average of non-iLottery states; the latter's advantage disappears when Arkansas (with a 20.93% first year growth rate) is removed.

Results are mixed as to whether iLottery states performed better than non-iLottery states immediately before the implementation of internet sales. This is not fully consistent with the hypothesis. Some iLottery states were growing faster than non-iLottery states, supporting the expectation that decision makers saw a reliable source of revenue they could expand, and strong growth was an impetus for internet sales. However, two iLottery states did not grow faster than non-iLottery states. Decision makers in those two states may have believed that the new delivery method would attract new customers. Decision-makers in the states with only traditional lotteries evidently chose to stay with the steadfast revenue generated by the existing lottery and may have felt a new method would jeopardize the reliable traditional lottery.

If lotteries sales are growing instead of declining, permitting a new way to sell an already growing product could be a way to respond to state economic stress. Harkening back to research examined in previous chapters, a primary driver for policy innovation was fiscal stress. If lotteries experienced declines, they may not be a reliable source to address budget holes. When the lotteries experienced growth, investing in that growth by offering a new delivery method for lottery products (via the internet) may have been an easier policy decision than a

new mandatory tax. The data suggest that lotteries were not experiencing declines immediately prior to the policy adoption of internet sales, and the beneficiaries of lottery profits were not facing reductions from that revenue source. The potential additional profit that the new delivery method offers could have been a primary reason for adoption.

Even though lottery sales and sales growth rates were improving during the years preceding the implementation of internet sales, it could be that a decline in the overall economy of a state highlighted internet lottery sales as a new source of revenue. To examine the state of the economy in the six states, I tracked the percent change in annual gross state domestic product (GDP) for each state in the three years preceding internet sales in Table 7.

	2008- 2009	2009- 2010	2010- 2011	2011- 2012	2012- 2013	2013- 2014	2014- 2015	2015- 2016	2016- 2017
Georgia		1.6%	1.6%	1.0%					
Illinois	-2.4%	1.8%	1.7%						
Kentucky				1.8%	0.3%	0.7%			
Michigan			2.6%	1.8%	1.3%				
New Hampshire							2.8%	1.8%	1.8%
Pennsylvania							2.2%	1.3%	0.6%

Source: Bureau of Economic Analysis

Table 7 shows that New Hampshire saw flat GDP growth in the year preceding internet sales, while all others experienced declining GDP growth. Given that lottery sales were growing in the same time period, thereby a reliable source of revenue, declining GDP growth as an indicator of the overall economy could be a reason lawmakers looked to internet lottery sales as a new source of revenue to compensate for fiscal stress.

It should be noted that around the start of the Georgia and Illinois internet lottery sales program, the United States was still pulling itself out of the 2008 recession. This notable economic downturn lasted for roughly two years, with economic decline beginning in the last quarter of calendar year 2007 through summer 2009. Until 2020, this recession was regarded as the most severe the United States had experienced since World War II.⁴² Dips in the gross domestic product and increases in unemployment rates across the United States reached record numbers. As financial crisis deepened, many states implemented measures intended to revive economic growth. For Georgia and Illinois, the economic pressures from the 2008 recession may have been a motivating factor in turning to internet lottery sales.

The next section explores profits following the advent of internet sales.

4.3 Hypothesis Two

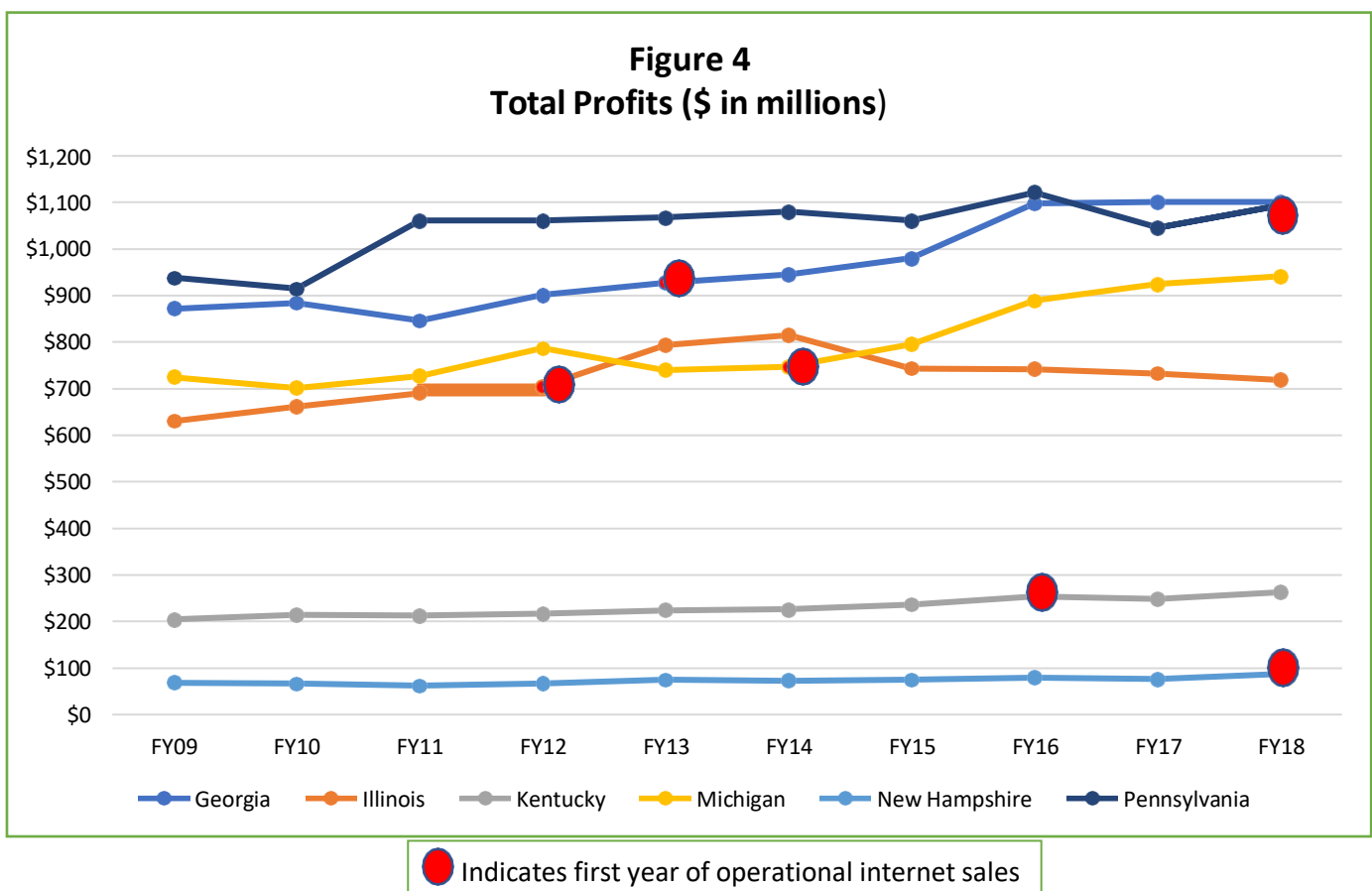
Hypothesis Two: In the states that permit internet sales, following the introduction of internet sales, total lottery profits will increase.

Hypothesis Two examines the impact that internet sales had on profits. Profits are considered in this analysis to determine if there is a public fiscal benefit to offering internet sales. Increased profits contribute more to a lottery's designed beneficiary and could persuade legislators to adopt this policy. Profitability could also be affected because e-instants, the digital equivalent of a scratch ticket, typically offer higher prize payouts to engage customers in a more frequent winning experience so they will continue to utilize the new product. Offering a higher prize payout could negatively affect profits if more people win on a single play compared

⁴² Aliber, Robert Z. (Winter 2012). Great Recession or Mini-Depression? Words may be failing economists and others who characterize the economic downturn that began in 2008 as "the Great Recession." "Mini-Depression" may be more like it. *The Wilson Quarterly*, 36 (1).

to playing multiple times to get their first win. Two factors that might influence profits with internet sales are increased administrative costs (like new staffing and advertising) and start-up costs for the new technology and platform.

For Hypothesis Two to be supported, the six iLottery states would need to generate more profits after the introduction of internet sales than before. Greater profits suggest the new delivery method contributed to the overall profitability of the lottery.



Source: La Fleur's World Lottery Almanac, Year-End reports (Georgia, Illinois, Michigan, New Hampshire, Pennsylvania), Financial Audits from the Illinois Auditor General, Illinois Commission on Government Forecasting and Accountability, and the Kentucky Auditor of Public Accounts

Figure 4 displays total lottery profits for FY09 through FY18. It shows that while some states experienced fluctuations in the period between adoption and FY18, in all states profits were higher

after internet sales launched. Nonetheless, not all states with multi-year data saw continuous increases in profits from the year iLotteries launched to FY18. Although Georgia and Michigan saw year over year profit increases after iLotteries were introduced, Kentucky and Illinois experienced some fluctuations.

It may not be a surprise to find profit increases, given that Figure 3 showed that traditional sales in these states prior to internet sales were increasing, roughly much as lottery sales increased nationally. The continuation of higher sales produces higher profits. Yet neither the higher prize payouts nor potential technological start-up costs from some lottery products sold over the internet seems to have been a factor in overall profits. If internet sales were supplanting rather than supplementing traditional lottery sales, then profits would have plateaued because sales were spread over a wider base instead of adding to the bottom line. Figure 4 shows that even after implementing the new delivery method, profits post internet sales increased in all four states beginning in the year internet delivery was implemented, though not all states grew steadily or continuously.

Illinois is an interesting case. Profits in the year internet sales started were \$705.08m; profits in the most recent available year were \$718.75m. Although profits were higher, the profits show a quick increase and then a quick decline over the six-year period. A review of what was happening in the state during this period bears discussion. In 2014, the Illinois Governor terminated the contract with the private management group running the Illinois Lottery, citing a contentious relationship for several years. Navigating the disentanglement of Lottery operations from the private provider and the search for a new provider meant the lottery likely experienced some turbulence in operations. This period also included a state legislative budget impasse that rendered the lottery unable to pay

some high prize amounts that tarnished its overall image.⁴³ If people could not claim top prizes, they were less inclined to play. This evidently affected profits; in FY14 profits reached a high of \$815 million and dropped to \$718.75 million in FY18, a loss of \$96.25 million. It seems the contract issues with the management provider and prize payouts affected profits. Even so, the FY18 profits of \$718.75 remained higher than the highest years' profits prior to internet sales.

Table 8 reports the mean profits for three years prior to internet sales and for the first three years with internet sales for the four states that have at least three years' worth of internet sales data.

Table 8		
Mean Profits (\$ in millions)		
	Three Years before Internet Sales	First Three Years with Internet Sales
Georgia	\$877.11	\$962.80
Illinois	\$660.80	\$804.50
Kentucky	\$228.67	\$255.70
Michigan	\$751.36	\$842.20

Source: Analysis of La Fleur's World Lottery Almanac, Year-End reports (Georgia, Illinois, Michigan), Financial Audits from the Illinois Auditor General, Illinois Commission on Government Forecasting and Accountability, and the Kentucky Auditor of Public Accounts

The average profit for lotteries prior to internet sales is smaller than the average profit for the first years with internet sales. The higher profits could be due to additional sales through the new delivery method. This further supports Hypothesis Two.

⁴³ Walberg, Matthew. (11 Nov 15) "Illinois Lottery's failure to pay prizes draws other states into lawsuit." Chicago Tribune. <https://www.chicagotribune.com/news/ct-lottery-lawsuit-tro-met-20151111-story.html>

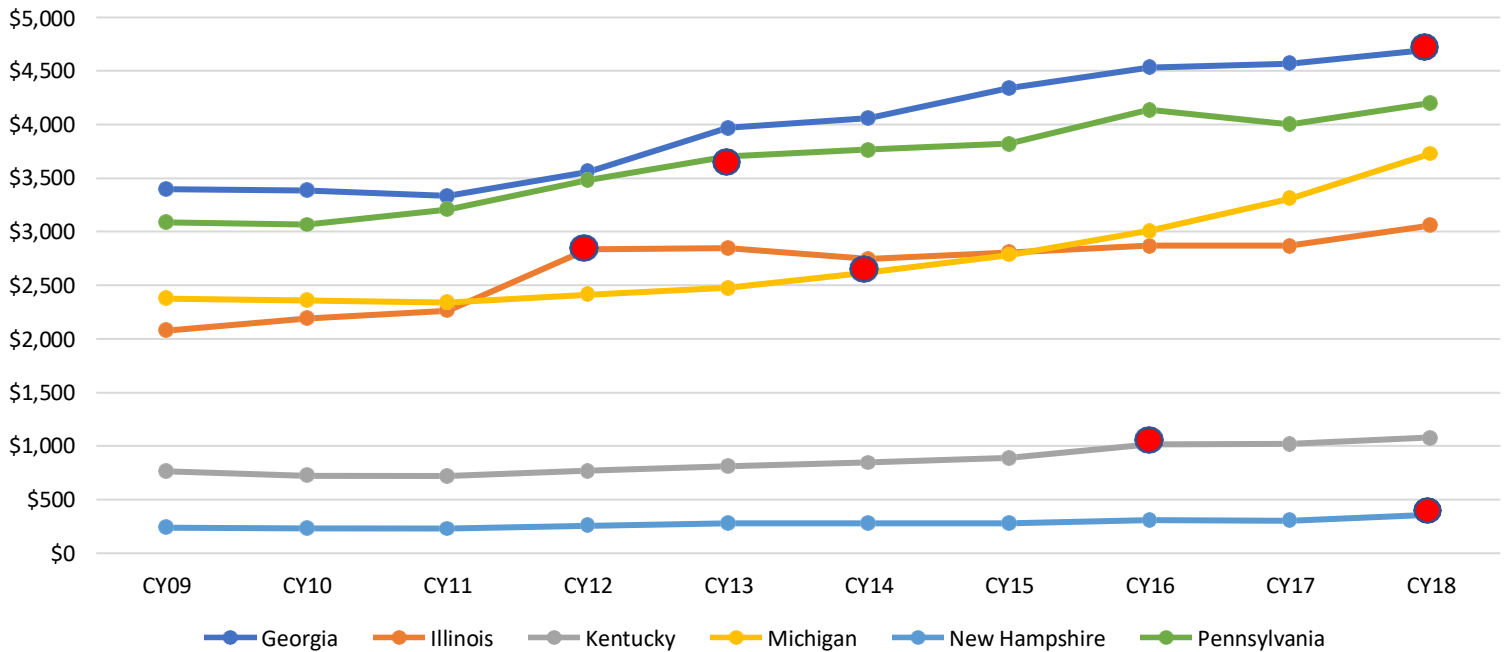
4.4 Hypothesis Three

Hypothesis Three: From three years prior to its first internet sales through FY18, states with internet sales continued to see positive year over year sales growth at brick and mortar retail locations.

To examine the impact of internet sales on traditional lotteries, brick and mortar sales – where traditional sales take place -- must be examined. If internet sales supplanted traditional sales, brick and mortar sales would be lower following the introduction of internet sales. Hypothesis Three predicts that beginning three years prior to the first internet sales through FY18, states with internet sales saw positive year over year sales growth at brick and mortar retail locations. For Hypothesis Three to be supported, the findings would show brick and mortar lottery sales growing after internet sales are offered.

Figure 5 shows brick and mortar retail lottery sales continued to grow after the introduction of internet sales. Data for Figure 5 are presented by calendar (not fiscal) year, reflecting how the lotteries reported the data.

Figure 5
All Lottery Sales
at Brick and Mortar Stores (Calendar Year) (\$ in millions)



● Indicates first year of operational internet sales

Source: La Fleur's World Lottery Almanac

All states with data following the introduction of internet sales experienced growth of traditional lottery products even when lottery products were available via the internet. This means that people were still going in to stores to purchase lottery tickets even though they could have made lottery purchases through a mobile device or by computer with internet access.

Table 9 shows compound annual growth rates for brick and mortar sales prior to and after internet sales in states that had at least three years' worth of data with internet sales. The data reported are the means for three years before and after internet sales.

Table 9		
Mean Annual Growth Rates at Brick and Mortar Retail		
	Three Years before Internet Sales	First Three Years with Internet Sales
Georgia	1.65%	6.88%
Illinois	4.42%	7.34%
Michigan	4.92%	6.90%
Kentucky	1.64%	6.70%

Source: Analysis of La Fleur's World Lottery Almanac

In the four states with three years of internet sales, on average brick and mortar sales grew at faster rates after internet sales. This suggests that brick and mortar retail sales were not cannibalized by internet sales because brick and mortar sales were growing faster even when the option for internet sales was available. One reason brick and mortar sales grew may have been because the internet delivery method introduced the product to a new player who had not previously played the lottery. Once they started to play through the internet and they visited a traditional lottery retailer, they may have recognized common branding or particular games that synced with the internet offerings.

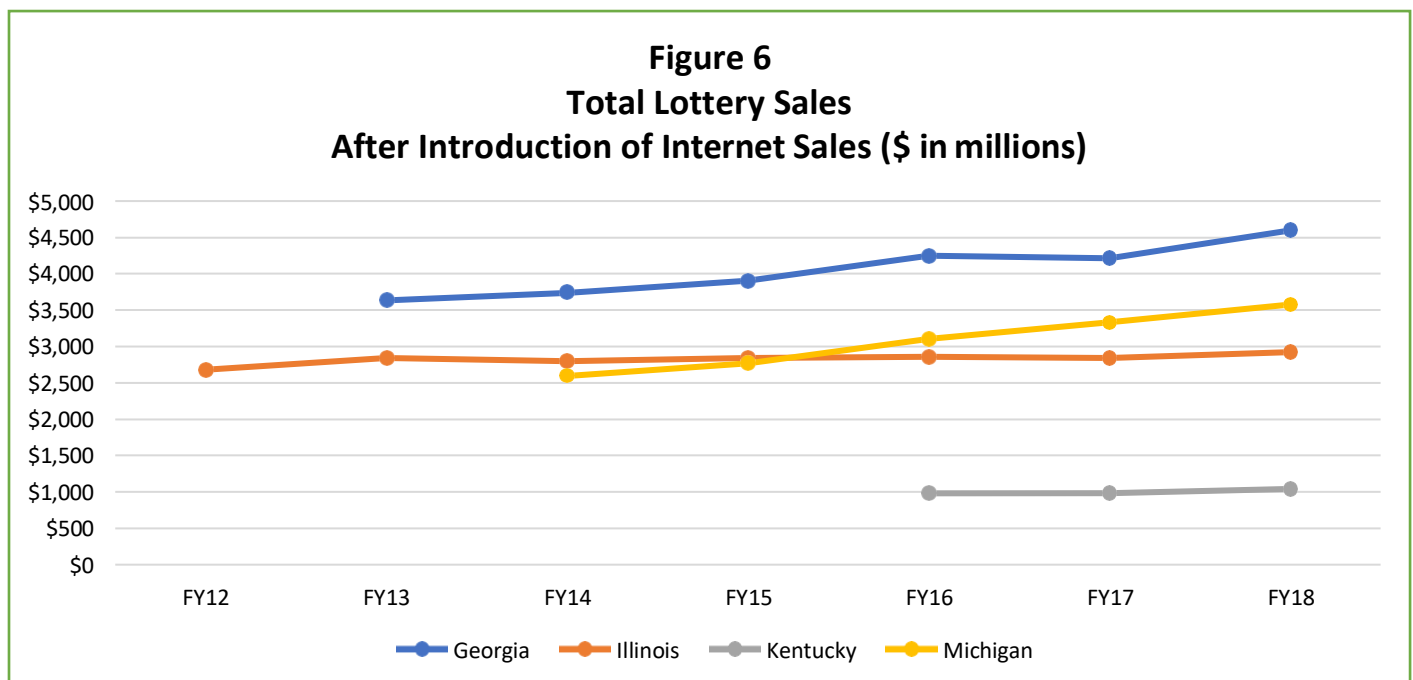
Hypothesis Three is supported. Brick and mortar retail stores had positive sales after internet sales. In addition, the sales growth rate at brick and mortar retail grew faster with internet sales than it had immediately before.

4.5 Hypothesis Four

Hypothesis Four: For states that permit internet sales, the total lottery sales after the introduction of internet sales will be higher than before internet sales.

Hypothesis Four looks at total lottery sales after introduction of the internet lottery to determine whether there was cannibalization. The prediction is that total lottery sales after the introduction of internet sales will be higher than before internet sales.

Data for both total sales and sales growth rates were examined. If cannibalization were to occur, one would see total sales that included internet sales being roughly the same as before internet sales started even though there was a new delivery method. The hypothesis predicts instead that the additional delivery method will add to total sales. As we have seen, only four states have multi-year data that include internet sales (Georgia, Illinois, Michigan, Kentucky).



Source: La Fleur's World Lottery Almanac

Figure 6 shows total lottery sales, including both traditional and internet sales, following the first year of internet sales. Between the first year of internet sales in a state through fiscal year 2018, total sales in all four states grew, though Kentucky's growth was minimal.

Table 10 shows average sales growth rate change for the three years immediately preceding internet sales and the first three years with internet sales.

Table 10		
Three-Year Average Sales Growth Rate Before and After Internet Sales		
	Three-Year Average Annual Sales Growth Rate Before Internet Sales	Three-Year Average Annual Sales Growth Rate With Internet Sales
Georgia	+1.65%	+5.35
Illinois	+4.42%	+1.96
Kentucky	+4.92%	+2.99
Michigan	+1.64%	+8.67

Source: Analysis of La Fleur's World Lottery Almanac

Although Figure 6 reveals that total sales increased in the four states after the introduction of internet sales, Table 10 shows that the three-year average sales growth rates after internet sales slowed in Kentucky and Illinois. Georgia and Michigan continued to see increased growth rates in total sales; in these states internet sales added to total sales for a product that was experiencing growth already.

Total sales in Illinois and Kentucky still grew after the introduction of internet sales; however, they did not grow as fast. In Illinois, as previously discussed, the state government's budget impasse led to an inability to pay out prizes, which could have had an overall dampening effect on sales. In Kentucky, both draw and e-instant games were offered when internet lottery was first launched so it had a robust internet product offering. Because Kentucky total sales growth rate slowed after internet sales, it could be because players who typically played traditional lottery began to play online. The sales still occurred but may have shifted from one delivery method to another. This is the only example of a state where internet sales could be

supplanting traditional sales without other known internal causes like Illinois experienced. For both Illinois and Kentucky, Table 10 suggests that total lottery purchases increased but were spread over two delivery methods so as to not add to the bottom line as quickly as before the second delivery method was available.

The evidence for Hypothesis Four is mixed. Although all four states experienced growth with both delivery methods, two states saw slower growth rates with internet sales than before the delivery method was available.

4.6 Summary and Conclusion

The four hypotheses performed relatively well. Support for Hypothesis One is mixed. While modest in some cases, the six states experienced growth in lottery sales between Fiscal Year 2009 through the year that preceded internet sales. When compared to performance in non-iLottery states, however, only some of the iLottery states grew at a faster rate. Exploration of state GDP during the same time period revealed that state economies were struggling immediately preceding internet adoption. Struggling state economies could have played a pivotal role in swaying a legislator to permit additional ways to sell lottery, in some cases a reliable revenue source that was experiencing growth. That cannot account for all of the iLottery states. For iLottery states that were not growing as fast non-iLottery states, perhaps the decision to permit internet sales reflected legislators' beliefs that the new delivery method would bring new customers.

Hypothesis Two was supported. In the states that have multi-year data on profits following the introduction of internet sales (Georgia, Illinois, Kentucky, Michigan), profits were

higher after internet sales launched. This finding would be valuable to beneficiaries of lottery proceeds, because it could mean the additional delivery method supplements profits that the traditional lottery already generated.

In the four states with three years' worth of internet sales, brick and mortar sales on average grew at a faster rate than before internet sales, supporting Hypothesis Three. Brick and mortar retailers are particularly concerned about potentially competing lottery delivery methods because they make commissions off lottery sales in their stores. If there were cannibalization when internet sales were permitted, retail store owners could see a decrease in sales and corresponding commissions. This finding should give retailers some comfort that internet will supplement their traditional lottery sales.

Between the first year of internet sales through Fiscal Year 2018, total sales in all states grew. Yet when one calculates the year-over-year growth rate in iLottery states, not all states grew as fast following the introduction of internet sales. Support for Hypothesis Four is mixed and suggests there could be some intra-product cannibalization when permitting a second delivery method for lottery sales.

If profits, brick and mortar sales, and total lottery sales grew with the addition of the internet delivery method, external factors may well explain why sales growth was not occurring as fast in some states as before internet sales. The following chapter returns to this point.

Chapter 5: Conclusions

5.1 Review of Findings

This thesis set out to explore the impacts on existing forms of gambling when additional forms are legalized. It looked at a subset of gambling, the lottery industry, to understand how the modernization of changes in lottery delivery methods might cannibalize profits from traditional delivery methods. In an effort to increase the lottery's overall market share of the discretionary entertainment dollar, some states have looked to additional delivery methods of lottery products. This work examined the impact of a new delivery method on the existing method, asking does the internet vie for the same lottery customers as physical retail stores, or does it expand the customer base and customer purchases, generating additional revenue?

The long-term sustainability of a lottery depends on finding new ways to engage customers that expect commerce to be on demand, online, and on their smart phones. When the first lottery started in New Hampshire in the 1960s, smart phones and the internet did not exist. Many lawmakers and citizens expect lotteries to sell more product every year to benefit public services, and many in the lottery industry consider internet delivery as a way to do that.

To permit this new delivery method via the internet is a policy innovation as it represents a departure from existing approaches. Should the legalization of internet lottery sales be allowed, stakeholders need to be sure that revenue displacement and industry cannibalization would not occur.

A review of relevant literature discussed the proliferation of gambling across the United States. Cue-taking and emulation play a pivotal role in the likelihood of a state adopting more

forms of legalized gambling. This was seen visually in Figure 2 that showed the timing of lottery adoption, which occurred in regional clusters. Cue-taking and emulation provide insight into reasons for states adopting gambling policies and should be considered pertinent when anticipating which and when a state may permit internet lottery sales. The scholarship pointed to other factors that may entice decision makers to legalize internet lottery sales, including state fiscal stress and retention of entertainment revenue being spent in other states. However, lingering questions about the applicability of the federal Wire Act could render state legislatures handcuffed from permitting internet lottery sales until the federal courts weigh in.

This study examined four hypotheses: one to understand traditional lottery sales prior to internet sales, and three others to examine relationships between internet sales and traditional sales. I explored changes in total sales, profits, and traditional product sales to clarify the possible effects of internet sales on overall lottery revenues.

Hypothesis One looked at the performance of state lotteries before internet sales. I wanted to know if iLottery states were performing better than their peers, and that strong performance could have been justification for approving the additional method. A reliable traditional lottery could be scaled to perform even better with two methods. The findings for Hypothesis One show that all state lotteries experienced sales growth prior to internet sales. The performance of iLottery states against states without iLotteries was mixed. In three states, iLottery states prior to internet adoption performed worse than the average of all non-iLottery states, and two states performed better. During the same time period, GDP growth slowed in all but one of the focal states, which saw flat GDP growth. This produced mixed results as to whether fiscal stress pushed decision makers to approve permitting internet lottery sales.

Lottery sales were growing. The state economy was stagnant. Did lawmakers see the lottery as a reliable revenue source to address budget holes the otherwise stagnant economy was creating? Further, the states that permit internet sales do not share borders with each other, suggesting that regional competitiveness was not a primary reason for the adoption of the new policy.

I then turned to analysis of lottery data after the introduction of internet sales. I examined the aspects of sales that could be impacted by a new delivery method –profits, sales generated by the previous delivery method (retail sales), and overall sales using both delivery methods. The average state profit for lotteries prior to internet sales is smaller than the average profit for the first years with internet sales. This suggests that internet sales improve profitability. In the four states that have three years’ worth of internet sales, brick and mortar lottery sales grew even with the potentially competing delivery method. In addition to continued growth, they grew on average at a faster rate than before internet sales. The existing method of selling lottery products appears to not have been cannibalized by the new delivery method. Finally, between the first year of internet sales through Fiscal Year 2018, the states increased total lottery sales; however, some states’ sales did not grow as fast as before internet lotteries were introduced.

5.2 External Factors for Consideration

This presents a curious situation. The data showed brick and mortar sales in all of the states with iLotteries continued to grow and to grow faster following internet sales; although state total sales grew, in two states they did not grow at a rate as fast as before internet sales

(Kentucky and Illinois). Because total sales growth rate in two states slowed after internet sales, it indicates that internet lottery sales could cannibalize traditional sales.

Several additional factors may affect these findings. First are two that I considered but think can be ruled out: product mix and participation in multi-state jackpot games.

Product mix might have an effect. The more a lottery makes available over the internet, the more cannibalization there potentially could be. Yet, as displayed on Table 5, Kentucky and Michigan make the same broad array of games available over the internet. So, a state that saw a continual increase in sales and growth rates was offering as many games online as a state that was not growing as fast. I ruled that external factor out.

Next, maybe participation in the multi-state jackpot games impacted sales growth rates. Jackpot games, like Powerball and MegaMillions, that accrue very large jackpots are a strong sales driver at traditional retailers. Maybe Kentucky and Illinois do not participate in those games, but Georgia and Michigan do and missed out on sales when a jackpot got high. But Hypothesis 3 showed brick and mortar sales were growing and growing at a faster rate even with two delivery methods. It seems unlikely then that participation in multi-state jackpot games explain why growth rates slowed in Kentucky and Illinois but not in Georgia and Michigan.

Four additional factors that could have contributed to the patterns that emerged include: player styles, gaming expansions, economic indicators, and activity in border states.

One possible factor is player styles. Internet sales may have brought completely new customers to lottery who besides making internet lottery purchases also began to purchase

traditional lottery products at brick and mortar retailers. This could help account for the increase at brick and mortar stores. At the same time, some loyal brick and mortar players could have switched to internet only or reduced their retail purchases, which may have accounted for overall slowing of growth in total sales. Because traditional sales are anonymous, and typically paid for in cash, it would be impossible to track player data at that level.

Another reason for the patterns of changes in sales and profits could be isolated to particular actions like expansion of other forms of gambling in a state besides the lottery. For instance, Illinois legalized video gaming devices in 2009. These machines are similar to slot machines and are permitted to operate in retail locations like bars and taverns. In 2017, Illinois had 26,589 machines in 6,604 establishments.⁴⁴ Georgia underwent a similar gaming expansion during the period just before it legalized internet lottery sales. Coin Operated Amusement Machines (COAM) are slot-like video gaming terminals that require a level of skill, rather than pure chance, to win. The Georgia Lottery was required to take over regulation of the machines in 2013. Since the regulatory requirements were put in place, proliferation of the machines resulted in Georgians spending close to \$2.65 billion on them in 2018 across 4,586 establishments.⁴⁵

Meanwhile, Michigan in 2020 has 15 land-based casinos in operation. Four of those casinos opened between 2009 and 2013. Kentucky legalized historical horse racing machines in

⁴⁴ Decatur, Ryan V. (6 July 2017) Illinois flush with video gaming but problems arising. *Illinois Herald & Review* https://www.nwitimes.com/business/gambling/illinois-flush-with-video-gaming-but-problems-arising/article_c91643cf-1885-512a-9e6a-fce26eb625f3.html

⁴⁵ Heck, Katelyn (28 Aug. 2019) How much do coin-operating gambling machines contribute to Georgia? *WMAZ-TV* <https://www.13wmaz.com/article/news/local/how-much-do-coin-operating-gambling-machines-contribute-to-georgia/93-f52470d8-d867-4da0-a459-b20bf7ac9d0e>

2011; these are slot-like machines where the player wagers on past horse races. All four racetracks in Kentucky now host the machines, with over 5,300 in operation as of April 2020.⁴⁶

In sum, the four states that had operational internet lottery sales for more than one year also saw increases in competing forms of legal gambling around the same time that internet lottery sales were permitted. It is possible these additional forms of gambling influenced lottery sales.

Economic indicators other than state GDP were not considered during the time when internet sales were offered. Unemployment rates and household income are two examples of economic indicators that could impact a person's discretionary entertainment spending.

Finally, was there activity in border states? Did neighboring states legalize new forms of gaming that drew out of state players? Perhaps that influenced lottery sales in Illinois and Kentucky, producing slower sales growth rates.

5.3 Implications

Given that lottery sales growth rates after the introduction of the internet did not increase faster in the four states examined, some cannibalization might occur within the subset of lottery gambling when more than one method of delivery is available. Even so, other states might consider adoption of internet lottery sales because it does increase profits. Chapter 3 discussed the general liberalization of increased gambling adoption. Additional states legalizing internet lottery sales would be consistent with this observation. The states that permit internet

⁴⁶ Kentucky Horse Racing Commission (April 2020). Kentucky Pari-Mutuel Excise Tax and BIF by Source, FYTD 2020. <http://khrc.ky.gov/reports/2020-04%20-%20Pari-Mutuel%20Wagering%20Monthly%20Report.pdf>

sales now are scattered across the United States. If internet lottery legalization follows the model set by traditional lottery legislation, states that border the ones where it is now legal could be next to adopt internet lotteries.

During legislative deliberations, two themes might guide discussions on whether to permit internet sales. The first is the political culture around gambling acceptance. One might predict that actions like gambling once debated for their moral ethics are now more often viewed in the context of personal choice as much as embraced for potential revenue. The second is the need for businesses to innovate in a rapidly changing world. For example, the omni-channel approach to product delivery, where more than one method is available to customers, is becoming a requirement for retailers in a digitized world. Companies encourage the public to use more than one channel or method to shop. The advent of features like sales-force automation, customer relationship management databases, and web applications has shown that the retailers that implement these features typically see increases in efficiency, effectiveness, and ultimately sales.⁴⁷

This research evidently has value for policy makers, state lotteries, and retail store owners. It can be used to predict the impact on lottery sales should a new delivery method be adopted. The findings should bring some comfort to retail store owners who may fight permitting internet sales for fear of siphoning off their sales and thereby reducing their sales

⁴⁷ Thaichon, P., Surachartkumtonkun, J., Quach, S., Weaven, S. & Palmatier, R. (11 Feb. 2018). Hybrid sales structures in the age of e-commerce. *Journal of Personal Selling & Sales Management*, 38 (3), 277-302

commissions. Lottery administrators should be careful as to monitor growth rates after internet sales to ensure the entire portfolio is growing at an increased rate.

5.4 Future Research

Because internet lottery sales are limited to a small segment of the states that offer lotteries, doing similar research after more states have adopted internet sales could provide a fuller picture of the effects on sales of additional delivery methods. Similarly, due to the relative infancy of internet sales, the analysis would benefit from more years of data to get a better understanding of the dynamics and impact of the internet delivery method over a longer period.

Future research also could look at other segments of the gambling industry when a new delivery method is considered. For example, Arkansas, Mississippi, Delaware, New York, and Montana have legalized sports betting but only through in-person purchases at physical locations. To this point, they have not legalized a mobile component to sports betting. This is similar to traditional lottery and internet lottery sales. A review of internet sports betting wagering on total sports betting revenue could be compelling for legislators in the same way as a review of the effects of internet lottery sales on traditional sales.

5.5 Conclusion

As the 21st century brings a proliferation of legalized gambling outlets for adults, how will these potentially competing forms of enterprises interact with each other? This thesis focused on a subset of the gambling industry, lotteries, to understand how multiple delivery methods for lottery sales would impact profits and growth. Beneficiaries of the lotteries want

revenues to increase. If states are considering adding internet lottery delivery to traditional sales, there cannot be significant cannibalization among the competing methods. Sales from the new delivery method must supplement, not supplant, sales from the existing delivery method.

Results from states that have implemented internet sales show that profits and sales increased with the internet delivery method, but their overall growth may have slowed in some cases. Such information could hinder internet adoption in more states. Yet decision makers cannot turn a blind eye to the future of consumer shopping, and that will inevitably involve a more robust digital presence. They must look for ways to enhance traditional lottery sales, and internet sales proves a formidable option.

The current pool of lotteries that offer products over the internet is very limited compared to traditional lotteries. If more states adopted internet sales, lotteries could glean information and best practices from early adopters so as to replicate what went right in the states that saw positive profits, steady or increased sales at brick and mortar retailers, and sales growth after adding internet delivery, thereby ensuring a supplemental relationship, not one with intra-product cannibalization.

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Appendix A: Data for Hypotheses One through Four

Below are data associated with Hypothesis One.

Total Sales Prior to Internet Sales (\$ in millions)										
	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
GA	\$3,395.64	\$3,387.42	\$3,335.61	\$3,559.89	Internet started					
IL	\$2,077.16	\$2,191.42	\$2,264.69	Internet started						
KY	\$765.00	\$723.42	\$719.36	\$767.89	\$810.84	\$843.22	\$886.93	Internet started		
MI	\$2,377.44	\$2,359.23	\$2,339.95	\$2,413.46	\$2,476.40	Internet started				
NH	\$239.58	\$233.15	\$229.15	\$254.92	\$279.34	\$275.61	\$281.13	\$308.53	\$304.22	Internet started
PA	\$3,088.16	\$3,065.72	\$3,207.91	\$3,480.90	\$3,699.66	\$3,766.55	\$3,819.64	\$4,135.17	\$4,001.04	Internet started

Total Sales (in millions) (Non-iLottery States)										
	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
AZ	\$484.49	\$551.49	\$583.54	\$646.67	\$692.94	\$724.00	\$750.00	\$870.90	\$852.00	\$981.38
AR		\$383.70	\$464.02	\$473.09	\$439.55	\$410.10	\$408.70	\$455.60	\$449.10	\$499.71
CA	\$2,954.84	\$3,040.96	\$3,438.58	\$4,371.49	\$4,443.39	\$5,034.70	\$5,524.90	\$6,275.60	\$6,233.50	\$6,965.79
CO	\$493.36	\$501.20	\$518.92	\$545.30	\$566.26	\$545.00	\$538.00	\$594.40	\$555.30	\$611.99
CT	\$991.30	\$996.85	\$1,016.61	\$1,081.74	\$1,122.70	\$1,112.40	\$1,144.00	\$1,230.80	\$1,216.30	\$1,267.59
DE	\$123.25	\$136.94	\$136.85	\$134.68	\$144.11	\$148.40	\$149.80	\$175.00	\$218.70	\$231.54
D.C.	\$245.37	\$230.16	\$231.75	\$249.68	\$242.46	\$216.00	\$212.50	\$228.20	\$169.70	\$210.26
FL	\$3,938.04	\$3,900.50	\$4,008.72	\$4,449.90	\$5,013.00	\$5,368.20	\$5,583.30	\$6,062.40	\$6,156.50	\$6,700.81
ID	\$139.65	\$147.23	\$147.15	\$175.84	\$197.45	\$208.90	\$210.20	\$236.10	\$239.90	\$265.09
IN	\$732.66	\$740.34	\$791.45	\$855.58	\$934.03	\$1,018.70	\$1,040.70	\$1,207.60	\$1,213.10	\$1,270.06
IA	\$243.34	\$256.26	\$271.39	\$310.85	\$339.25	\$314.10	\$324.80	\$366.90	\$352.20	\$370.96
KS	\$230.51	\$235.41	\$232.37	\$246.14	\$244.77	\$245.70	\$250.00	\$272.00	\$258.00	\$268.95
LA	\$378.52	\$372.39	\$383.59	\$429.62	\$447.42	\$449.00	\$452.50	\$507.00	\$455.00	\$490.98
ME	\$210.67	\$217.03	\$216.43	\$228.35	\$227.72	\$230.00	\$253.10	\$272.30	\$266.00	\$294.13
MD	\$1,698.07	\$1,706.57	\$1,714.40	\$1,794.89	\$1,756.12	\$1,724.00	\$1,760.90	\$1,905.50	\$1,931.60	\$2,042.79
MA	\$4,425.48	\$4,412.09	\$4,416.29	\$4,729.60	\$4,839.27	\$4,853.60	\$5,005.70	\$5,223.50	\$5,087.90	\$5,279.65
MN	\$481.25	\$498.96	\$504.44	\$520.03	\$560.40	\$531.50	\$546.90	\$592.90	\$563.50	\$596.48
MO	\$968.45	\$971.86	\$1,000.68	\$1,097.43	\$1,140.83	\$1,157.10	\$1,127.40	\$1,315.60	\$1,342.70	\$1,400.22
MT	\$43.83	\$46.85	\$46.04	\$52.76	\$56.80	\$53.10	\$52.30	\$59.70	\$52.40	\$56.40
NE	\$123.25	\$130.58	\$131.92	\$150.61	\$160.75	\$157.90	\$160.00	\$179.50	\$173.80	\$183.37
NJ	\$2,503.27	\$2,605.10	\$2,636.45	\$2,758.90	\$2,821.40	\$2,908.10	\$3,027.30	\$3,321.70	\$3,235.80	\$3,359.07
NM	\$143.93	\$143.59	\$135.54	\$133.79	\$141.76	\$136.00	\$137.00	\$154.30	\$126.00	\$134.03
NY	\$6,695.07	\$6,781.07	\$6,758.65	\$7,012.69	\$7,108.92	\$7,314.20	\$7,251.00	\$7,703.10	\$7,679.10	\$7,938.83
ND	\$21.72	\$24.42	\$23.00	\$26.04	\$27.84	\$26.90	\$27.00	\$35.60	\$27.60	\$31.31
OH	\$2,417.68	\$2,490.19	\$2,600.99	\$2,738.98	\$2,697.92	\$2,743.10	\$3,665.00	\$3,059.60	\$3,001.70	\$3,160.11
OK	\$193.27	\$199.75	\$198.15	\$199.86	\$200.21	\$191.10	\$171.60	\$189.60	\$151.50	\$221.11
OR	\$313.78	\$320.70	\$317.45	\$323.16	\$330.46	\$310.10	\$318.30	\$353.00	\$332.20	\$368.35
RI	\$238.48	\$234.62	\$230.59	\$249.48	\$253.37	\$242.80	\$243.10	\$260.80	\$249.90	\$258.37
SC	\$1,005.11	\$1,007.16	\$1,047.06	\$1,135.53	\$1,199.21	\$1,264.40	\$1,401.70	\$1,600.40	\$1,635.70	\$1,750.16
SD	\$41.05	\$45.54	\$47.17	\$53.14	\$57.35	\$54.10	\$51.20	\$55.30	\$49.10	\$58.18
TN	\$1,014.94	\$1,060.11	\$1,102.58	\$1,215.86	\$1,275.27	\$1,319.10	\$1,368.50	\$1,511.70	\$1,495.90	\$1,616.40
TX	\$3,720.11	\$3,738.37	\$3,811.27	\$4,190.82	\$4,376.29	\$4,384.60	\$4,529.70	\$5,067.50	\$5,077.50	\$5,626.85
VT	\$95.98	\$97.48	\$95.54	\$100.93	\$102.09	\$102.30	\$111.80	\$124.30	\$122.40	\$132.42
VA	\$1,365.61	\$1,435.13	\$1,482.69	\$1,616.00	\$1,689.24	\$1,810.80	\$1,843.90	\$2,006.90	\$1,989.90	\$2,139.82
WA	\$487.72	\$491.02	\$510.46	\$535.20	\$569.59	\$594.50	\$600.30	\$694.90	\$673.30	\$733.94
WV	\$198.10	\$181.23	\$193.57	\$201.29	\$195.62	\$188.60	\$180.00	\$188.20	\$166.50	\$177.03
WI	\$473.42	\$481.10	\$502.66	\$547.68	\$566.10	\$568.80	\$574.60	\$627.20	\$602.80	\$667.39
WY							\$17.50	\$33.40	\$25.30	\$28.75
Average Sales	\$1,106.54	\$1,103.08	\$1,133.76	\$1,231.99	\$1,275.19	\$1,315.19	\$1,342.51	\$1,447.87	\$1,432.35	\$1,536.59

Below are data associated with Hypothesis Two.

Total Profits (\$ in millions)										
	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
GA	\$872.08	\$883.88	\$846.11	\$901.33	Internet started \$927.48	\$945.10	\$980.50	\$1,097.60	\$1,101.10	\$1,143.51
IL	\$630.16	\$662.12	\$690.11	Internet started \$705.08	\$794.00	\$815.00	\$743.90	\$742.20	\$732.70	\$718.75
KY	\$204.34	\$214.25	\$212.25	\$216.44	\$223.80	\$226.10	\$236.10	Internet started \$253.0	\$248.60	\$262.80
MI	\$724.50	\$701.30	\$727.30	\$786.92	\$739.85	Internet started \$746.8	\$795.50	\$888.90	\$924.10	\$941.30
NH	\$68.35	\$66.22	\$62.21	\$66.77	\$74.34	\$72.40	\$74.30	\$79.20	\$76.10	Internet started \$87.20
PA	\$937.95	\$914.95	1,061.00	\$1,060.89	\$1,067.38	\$1,079.60	\$1,060.90	\$1,121.30	\$1,045.70	Internet started \$1,093.65

Below are data associated with Hypothesis Three.

All Lottery Sales at Brick and Mortar Stores (Calendar Year) (\$ in millions)										
	CY09	CY10	CY11	CY12	CY13	CY14	CY15	CY16	CY17	CY18
GA	\$3,395.64	\$3,387.42	\$3,335.61	\$3,559.89	Internet Started \$3,968.85	\$4,057.96	\$4,338.45	\$4,535.20	\$4,568.10	\$4,700.50
IL	\$2,077.16	\$2,191.42	\$2,264.69	Internet Started \$2,835.96	\$2,846.83	\$2,744.50	\$2,807.04	\$2,869.60	\$2,870.77	\$3,057.30
KY	\$765.00	\$723.42	\$719.36	\$767.89	\$810.84	\$843.22	\$886.93	Internet Started \$1,013.60	\$1,019.03	\$1,079.00
MI	\$2,377.44	\$2,359.23	\$2,339.95	\$2,413.46	\$2,476.40	Internet Started \$2,622.29	\$2,784.40	\$3,007.70	\$3,309.89	\$3,727.00
NH	\$239.58	\$233.15	\$229.15	\$254.92	\$279.34	\$275.61	\$281.13	\$308.53	\$304.22	Internet Started \$357.89
PA	\$3,088.16	\$3,065.72	\$3,207.91	\$3,480.90	\$3,699.66	\$3,766.55	\$3,819.64	\$4,135.17	\$4,001.04	Internet Started \$4,200.57

Below are data associated with Hypothesis Four.

Total Lottery Sales After Introduction of Internet Sales (\$ in millions)							
	FY12	FY13	FY14	FY15	FY16	FY17	FY18
GA		\$3,635.93	\$3,739.92	\$3,903.47	\$4,247.93	\$4,218.43	\$4,597.78
IL	\$2,680.12	\$2,841.41	\$2,798.76	\$2,837.25	\$2,855.54	\$2,845.56	\$2,923.27
KY					\$983.42	\$986.96	\$1,042.51
MI			\$2,596.41	\$2,771.93	\$3,104.58	\$3,329.82	\$3,578.00