



SPORTS BETTING IN DISTRICT OF COLUMBIA:

Analysis and Business Case of the Economic Impact of Regulating and Operating Sports Betting through the DC Lottery

Prepared for the Government of the District of Columbia,
Office of the Chief Financial Officer
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Executive Summary

Pursuant to a Request for Quote issued by the District of Columbia, Office of the Chief Financial Officer, Office of Contracts, on behalf of the Office of Lottery and Charitable Games (“DC Lottery”), seeking a sports betting consultant, the District of Columbia retained Spectrum Gaming Group (“Spectrum,” “we” or “our”) to “provide an independent analysis/business case of the economic impact of regulating and operating sports betting through the Lottery, as well as to serve as a qualified, cited expert for in-person hearing testimony on the report findings, if needed.”

The District of Columbia is considering legislation that would allow the DC Lottery to offer sports betting products in the District, with the Office of Lottery and Charitable Games serving as both operator and regulator. This is an ambitious plan that is uncharted and unprecedented in the United States, as it seeks to become the first lottery to offer single-game sports betting directly through its network of retailers – a model that is commonplace in European sports betting markets.

Spectrum’s economic analysis examines two expansion scenarios: DC expands into sports betting in 2019 or expands in 2022. In either case, there is a ramp-up of participation as market awareness and participation grow. The average annual impacts are shown in the table below; the yearly results are detailed in Chapter III.

If the DC Lottery were to expand into sports betting in 2019, over the 10-year analysis period, the net economic impacts would create or support on average:

- 281 jobs
- \$51.0 million of output (i.e., business revenues)
- \$28.3 million of value added (i.e., net new economic activity)
- \$3.4 million of personal income.

If DC waits to introduce sports betting in 2022, it would lose the economic impacts from 2019 through 2021 and would also bear the cost of pushing the ramp up three years into the future. Expanding sports betting in 2022 would create or support an annual average over a 10-year period:

- 144 jobs
- \$26.9 million of output
- \$15.0 million of value added
- \$2.0 million of personal income

The annual difference between the two scenarios leads to large cumulative impacts over the analysis period. Cumulatively over 10 years, by delaying the introduction of sports betting

until 2022 the district loses \$240 million of output, \$133 million of value added, and \$14 million of personal income.

Average annual economic impacts of sports betting in DC beginning in 2019 and 2022

Category	Units	2019 10-Yr Avg.	2022 10-Yr Avg.	Avg. Difference
Total Employment	Jobs	281	144	-137
Output	Millions of Fixed (2009) Dollars	\$51.0	\$26.9	-\$24
Value-Added	Millions of Fixed (2009) Dollars	\$28.3	\$15.0	-\$13
Personal Income	Millions of Current Dollars	\$3.4	\$2.0	-\$1

Source: Spectrum Gaming Group

The results from Spectrum’s economic impact analysis provide more than just the anticipated revenue that the District will realize directly from sports betting. Our economic modeling projections include total business revenues generated by the introduction of sports gaming in the District. The output numbers recognize all purchases made by customers and businesses in response to the economic changes resulting from sports betting. These economic impact projections are formulated based on available regional economic data and trends. Thus, our modeling was designed to project total economic impact, not just tax revenues.

Other findings from Spectrum’s research and analysis for this project:

- The DC Lottery will require approximately 10 to 12 positions in FY2019 to implement and operate sports betting. The positions will be in product management and development, finance, licensing, and compliance.
- Additional positions in compliance and licensing will be required in the upcoming years based on the growth on sports betting in DC and the number of independent operators that are licensed.
- As many as 200 new licensed retailers, with many coming from the food and beverage sector, will be operational within the first two years of legal sports betting.
- An estimated 65% of total sports betting gross gaming revenue (“GGR”) ¹ will be realized through a new mobile/digital channel, a level consistent with developed sports betting markets elsewhere.

Spectrum was not asked to assess the comparative advantages and disadvantages of a lottery-operated vs. an independent-operator model, which would require a thorough analysis of a host of regulatory, economic and other issues. However, the percentage of revenue to be retained by the DC Lottery in the lottery-operated model is expected to be greater than revenue

¹ Gross gaming revenue is the amount generated by a gaming provider after all winning wagers have been paid.

generated through the 10% tax rate levied on GGR that would be developed by independent operators. This expectation, combined with the expected increases in economic activity (see the analysis below) supports the conclusion that the legislation in its current form will have a significant accretive fiscal impact on the District.

Recommendations

Based on our analysis, Spectrum recommends the following:

- Given the cost-impact of the anticipated retailer commission of 6%, the DC Lottery should begin with a target payout range of sports betting wagers of between 80% and 85%, which is consistent with initial payout rates from other US states that have launched sports betting this year.
- The DC Lottery should be prepared to adjust its payout rate percentage over time to ensure that it remains competitive in what is likely to become an increasingly competitive marketplace.
- Extending and expanding the current gaming system contract with incumbent supplier Intralot is the most economically advantageous option.
- To maximize sports-betting revenues from existing channels, the DC Lottery should encourage the best-performing existing Lottery retailers – the top 40% (consisting of 163 retailers) that currently generate almost 78% of total existing Lottery sales – to apply for, and obtain, new sports-betting licenses.
- Self-Service Betting Terminals, which allow the player to self-select and strike sports bets, will be a viable and valuable new support channel for sports betting, with a capability of being located within both existing and new retailer outlets.
- Important mobile channel functions – such as account sign-up, and other associated player functions including payment processing – can be offered through both existing and new retailers, which should lead to increased footfall and associated sales revenues for both channels.
- The proposed 10% tax rate on gross gaming revenue in the legislation to be assessed on independent operators is sustainable, given the low margins in sports betting. This proposed tax rate will allow the operator to realize an acceptable return and will also provide the DC Lottery with a steady stream of reliable revenue.
- As a public agency, the DC Lottery should adopt the no-risk model, in which it would bear no risk for sporting events in which the operator loses money. It is this element of risk that makes sports betting dramatically different than the business

model of the traditional lottery. The DC Lottery must realize, however, that when adopting the no-risk model the technology provider/operator generally retains a greater share of the net revenue as the party bearing all risk.

- As mobile gaming is expected to account for nearly two-thirds of sports-book revenue, coupled with the geographic challenges and federal restrictions within DC, the Lottery should require a WiFi and global-positioning system (“GPS”) as part of its operating structure.

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Overview

On May 14, 2018, the United States Supreme Court issued its decision in *Murphy, Governor of New Jersey, et al. v. National Collegiate Athletic Assn., et al.* that allowed all states to authorize sports betting. Until that time sports betting existed only in Nevada and to a limited extent in Delaware (parlay betting only). Since the Supreme Court decision, six states² have begun offering sports betting in a retail offering through casinos (Delaware, New Jersey, Mississippi, West Virginia, Pennsylvania and Rhode Island) and two on a mobile platform (New Jersey and West Virginia). The early revenue results are positive³ but the data available are limited, making long-term projections at times difficult.

Similarly, the District of Columbia is considering legislation that will offer sports betting products in the District through the Office of Lottery and Charitable Games (“DC Lottery”) serving as both operator and regulator. The proposed legislation, Bill 22-944, the “Sports Wagering Amendment of 2018,” will provide authorization for two distinct activities for sports betting for the Lottery:

1. The Lottery will act as an operator of sports betting via a districtwide network of digital and land-based retailers; and
2. The Lottery will act as regulator of independent operators of sports betting throughout the District. The Lottery will license, monitor the independent operators for compliance and collect the proposed 10% tax on gross gaming revenue from the operator.

This is an ambitious plan that is uncharted and unprecedented in the United States, as it seeks to become the first lottery to offer single-game sports betting directly through its network of retailers – a model that is commonplace in European sports betting markets.

Pursuant to Request for Quote No. 18-RFQ-006 issued October 1, 2018, by the Government of the District of Columbia, Office of the Chief Financial Officer, Office of Contracts on behalf of the Office of Lottery and Charitable Games, seeking a sports betting consultant, the

² Although the State of New Mexico has not passed sports-betting legislation, the Pueblo of Santa Ana tribe opened a sportsbook at its Santa Ana Star Casino Hotel. See Steve Ruddock, “How New Mexico Sports Betting Started In A State Without A Sports Betting Law,” *Legal Sports Report*, November 19, 2018. <https://www.legalsportsreport.com/26007/pueblo-tribe-new-mexico-sports-betting/>

³ The first three states generated combined sports betting handle of \$416 million through September (each launched at different times). See *Insight: Sports Betting Legislation Likely to be Energized by Early Successes* published by Spectrum Gaming Sports Group in October 2018. <https://spectrumgaming.com/wp-content/uploads/2018/10/spectrum-gaming-sports-group-insight-oct-2018-insight.pdf>

District of Columbia retained Spectrum to “provide an independent analysis/business case of the economic impact of regulating and operating sports betting through the Lottery, as well as to serve as a qualified, cited expert for in-person hearing testimony on the report findings, if needed.”

One of the primary issues the Lottery asked Spectrum to consider is the advantages of offering sports betting before Virginia and Maryland do so. The District’s market is roughly 1 million adults – comprised of 569,000 resident adults and 450,000 daily commuters. This underscores the need to develop to establish customer and brand loyalty with the commuter customer prior to his or her state of residence offering sports betting.

The advantages of achieving such a first-mover status are clear:

- The Lottery will gain a head start over its closest geographic competitors, Virginia and Maryland. It will also have an advantage over nearby West Virginia, which was an early mover in legal sports betting, but which offers betting only through its licensed casinos. As there are no legal casinos in Washington, the DC Lottery plan would be an entirely new business model.
- Offering sports betting will create a new revenue stream for the Lottery, which has experienced declining interest in its traditional draw and instant games. Sports betting could capture a different demographic and – because it would not be initially offered in adjacent jurisdictions – could capture additional revenue Washington’s estimate of a daily weekday pool of 700,000 non-residents who work in, or visit, the District.⁴

At the same time, however, the disadvantages need to be considered:

- Lotteries historically rely on the examples of “first-movers” into new games and programs. Future adopters can observe and learn from any missteps or unanticipated consequences that a first-mover might have to confront. By definition, a first-mover does not have that advantage.
- Not all key decisions made by the DC Lottery can easily be undone. Once licenses are issued and sports betting is operational, the ability to move in other directions will become increasingly difficult.

⁴ Based on US Census data of 450,000 daily out-of-state commuters and 250,000 daily tourists (estimated from Destination DC visitor data at https://washington-org.s3.amazonaws.com/s3fs-public/2017_dc_visitation_and_impact_fact_sheet.pdf)

That latter point does not mean that the Lottery is powerless to adapt to changing circumstances. We expect that the Lottery will continually adapt and improve. We simply point out that future changes will come with varying degrees of difficulty.

While we point out the disadvantages, clearly in this instance the advantages of being a first mover outweigh the disadvantages. We simply urge caution.

Spectrum recently testified at a legislative hearing in Illinois on the subject of potential legal sports betting, noting:

When it comes to the authorization of legal sports betting or any other expansion of gaming, the legislators we have met from various states range from those who are eager to do it right, to those who are eager to do it in time for the beginning of the next football season, or by the next fiscal year. While those goals are not necessarily mutually exclusive, the priority should be the former, not the latter. ...

(We) urge you to abide by a sports metaphor we have developed that should be top of mind. There are no mulligans in gaming. You have to get it right the first time.⁵

US lotteries have traditionally learned from the experience of other lotteries. Given the geographic limitation on the ability to sell its products (within their own state), US lotteries do not view other lotteries as competitors, but rather as colleagues. Collaboration, not competition, defines their relationship.

Among all the US jurisdictions seeking to offer sports betting, the DC market is unique. It is a city in which the adult population effectively more than doubles on a given work day including a thriving tourist population. This unique combination of demographics comprises its potential customer base. Accordingly, if Virginia and Maryland offer sport betting in their states before DC, then these states may establish customer relationships with portions of DC's potential base depriving the DC potential revenue that may never be recovered. The economic impact analysis discussed in this report details this potential impact.

⁵ Spectrum Gaming Group testimony before Illinois Joint House Revenue and Finance Sales and Other Taxes Subcommittee and House Executive Gaming Subcommittee, October 17, 2018. <https://spectrumgaming.com/wp-content/uploads/2018/10/pollock-illinois-testimony-10-17-18.docx.pdf>

I. Key Decision: Amending Current Gaming System Contract or Issue RFP for Sportsbook Provider

Assuming the District’s sports-betting legislation, Bill 22-944, is passed in its current form, the major decision for the Lottery is the method by which it decides to implement the necessary technology to offer sports betting via a digital platform (mobile/internet) and through what is anticipated to be a limited number of its existing retailers, as well as onboarding new social setting retailers. We note that states currently offering sports betting contracted with their respective gaming-systems providers that allowed for quick implementation and get-to-market strategy.

If the Lottery were required to issue an RFP to seek a sports betting provider outside its current system, it is safe to project that the delay to market will be at least three years. This projection is based on DC Lottery examples in the procurement of lottery gaming systems. Such a time projection is measured from the time to draft the technical portions of the RFP, approval of the RFP through the District administrative process, the issuance of the RFP, the evaluation of the proposals, then the award and go live date after any transition period.

Some industry examples supporting this projection can be seen in Massachusetts and South Carolina. The Massachusetts Lottery began drafting the RFP for a new gaming system in early 2014. The Massachusetts Lottery example reflects the fact that it was operating on an older system that required replacement, no matter which vendor was selected. The contract was awarded in 2016 and the system is expected to go live in early 2019. The South Carolina Lottery began planning the RFP for a gaming system approximately two years ago.⁶ After the issuance and cancellation on RFP, the issuance of a second RFP and award, the new provider began operating in May 2018. Given the administrative process the DC Lottery is required to follow, we believe the three-year delay estimate is conservative, thus providing a reasonable time frame during which betting revenue would be lost.

Conversely, Intralot (the incumbent DC Lottery gaming system provider) represents that it could add the necessary technology and bring betting to market both on a mobile platform and through selected retailers within six months. As is the case with most of the US lottery gaming system providers, Intralot is experienced in offering sports betting in other jurisdictions outside the United States.

⁶ “IGT takes over as new lottery systems supplier in South Carolina,” *Gaming Intelligence*, February 27, 2018 <https://www.gamingintelligence.com/lottery/46461-igt-takes-over-as-new-lottery-systems-supplier-in-south-carolina>

Rhode Island provides an additional lottery-sports betting example. In the current gaming system contract, Rhode Island’s gaming-system provider, IGT, had a right of first refusal to perform any work at an equal or better price related to the gaming system. IGT was awarded the sports betting contract in August 2018 after being the sole bidder to an April 2018 RFP and is anticipated to go live with the product prior to December 2018.⁷

If the DC Lottery chooses not to extend the existing contract and seek a competitive bid, two outcomes will inevitably occur:

- Intralot cannot be expected to make a substantial investment in the District of Columbia if its potential payback period is limited to the term of its contract.
- The RFP process, by law, is time-consuming and would delay the implementation of sports betting by as many as three years.

With those factors in mind, a decision to not extend Intralot’s contract would make it impossible to meet the goals of the DC Lottery to be an early mover. Given the unique DC market and the benefit of being first to market, Spectrum believes that extending and expanding the current gaming system contract with Intralot is the most economically advantageous option.

Spectrum is well aware of the critical benefits to be gleaned from issuing an RFP in an open, transparent competitive bidding process. In a 2016 report prepared for the Ohio Lottery,⁸ Spectrum clearly recommended in that instance that a competitive bidding process would be appropriate. We noted that “allowing vendors to maintain long-term contracts without re-bidding is an ineffective management practice”⁹ and noted that “Our response is guided in large measure by our longstanding observation of overall procurement practices, and in our belief that a well-managed competitive bidding process can advance the public interest and produce the optimal results. Extending the current contract without a competitive bid does not ensure that the Lottery is receiving its best value.”¹⁰ The Ohio Lottery elected not to follow Spectrum’s advice and received permission from the Ohio Controlling Board to extend Intralot’s contract from its original expiration date of 2021 to 2027.¹¹

⁷ Dakota Randall, “Rhode Island’s Sports Betting Delay Could Cost State \$5 Million In Revenue,” NESN, November 12, 2018. <https://nesn.com/2018/11/rhode-islands-sports-betting-delay-could-cost-state-5-million-in-revenue/>

⁸ “Business Assessment: Ohio Lottery: Identifying Opportunities, Generating Growth,” Spectrum Gaming Group, September 26, 2015. <http://spectrumgaming.com/wp-content/uploads/2018/04/spectrumreportforohiodas.pdf>

⁹ Ibid., p. 5.

¹⁰ Ibid., p. 38.

¹¹ Karen Farkas, “Ohio Lottery receives approval to extend gaming system contract without bids,” Cleveland.com, June 12, 2017. https://www.cleveland.com/metro/index.ssf/2017/06/ohio_lottery_receives_approval.html

The DC Lottery situation is materially different from that situation in Ohio in that a bidding process would forego years of revenue and eliminated the advantages of being an early adopter, which was clearly not the case in Ohio.

We do point out, however, that a decision to not issue an RFP does create potential opportunity costs in that the DC Lottery will not be in a position to receive proposals from other bidders that might offer other advantages in either revenue-generation or cost-savings. However, these opportunity costs are outweighed by the potential revenue realized by being a first-mover and not issuing an RFP.

II. Projected Revenue/Payout/Hold Percentage

The starting point for projecting the economic impact of sports betting in DC is a separate 2018 study conducted by our affiliated Spectrum Gaming Sports Group (“SG²”)¹² that projected sports betting GGR in Washington, DC.¹³ SG²'s initial approach was to focus on markets that operate retail sports betting, including that conducted within land-based casinos plus digital betting. The markets analyzed included estimates of the illegal/offshore US market, the top 10 sports betting markets in Europe by GGR, including the United Kingdom, plus Australia and Nevada. SG² estimated the spend per adult in these markets as an indicator for spend in the US and further adjusted its numbers for the higher household income in the DC market. SG² also analyzed the potential impact that a wide-area distribution network could have on GGR potential. The study also incorporated two additional methods: GGR as a percentage of GDP and GGR per point of sale.

SG² projected that DC sports betting would generate \$74 per adult annually. Based on this projection, SG² estimated that the GGR in 2019 would reach \$23 million. The study ultimately projected that DC sports betting GGR would reach \$84 million by 2023 by assuming a 10-year compound annual growth rate (“CAGR”) of 20%, in line with the growth rates noted elsewhere for sports betting in other jurisdictions.

SG² further assumed Virginia would offer sports betting in 2020 and Maryland in 2024. The study assumes 25% of Virginia and Maryland commuters would cease betting in DC each year after each of their respective states began offering sports betting. We understand that this is a conservative assumption, leading to lower GGR over time. SG² assumed that all commuters from Virginia and Maryland would play only in their home state after Year 4. SG²'s analysis also assumed that, once a Virginia or Maryland player was lost, the player would never wager again with the DC Lottery or the DC independent operators. This dollar-for-dollar cannibalization assumes a worst-case scenario in which the commuter is lost in total. In this study, Spectrum has adjusted our analysis below to account for a less-than-total dollar cannibalization from commuters once their home states begin to offer sports betting. That is less conservative but, we believe, more realistic.

The SG² study assumes that 65% of total GGR would be derived from the mobile platform. This percentage is in line with other projections in the industry. Most recently, a study by Eilers

¹² Spectrum Gaming Sports Group is a unit of Spectrum Gaming Group.

¹³ Spectrum Gaming Sports Group, “*Projections for Sports Betting and Internet Lottery – Washington, DC,*” commissioned by Intralot for presentation to the District of Columbia, Office of Chief Financial Officer, September 26, 2018.

& Krejcik Gaming for the Indiana Gaming Commission projected that 57% of total sports gaming GGR would be derived from the mobile platform, rising to 68% by Year 5.¹⁴

Thus, 65% of the projected DC sports betting GGR in Year 1, \$23 million, is \$14.95 million. The remaining 35%, or \$8.05 million, would be divided between the Lottery retailers and the independently operated sportsbooks. Based on testimony at an October 17, 2018, DC Council Committee on Finance and Revenue public hearing regarding the sports betting legislation, we believe a conservative division of the remaining GGR is 10% of GGR attributed to Lottery retailers and the remaining 25% to the independently operated sportsbooks. This division would provide Lottery-operated sports betting with 75% of the total GGR as compared to 25% of GGR attributed to the independent operators. This division of GGR may shift over time, depending on a variety of issues, including the relative marketing investment levels of DC Lottery and operators, and the relative competitiveness of competing sportsbooks, particularly in the area of the odds offered to players.

Based on the projected 75/25 split between the Lottery-operated sports and the independent-operated sportsbooks, the revenue transferred to the DC Treasury is straightforward to forecast for the independent-operated sportsbooks and purely speculative for the Lottery-operated since it will be subject to negotiation with presumably its current gaming system provider.

For 2019, SG² projected that GGR for sports betting in DC would be \$23 million. If the independent-operated sportsbooks accounted for 25% of this GGR amount, then the anticipated 10% tax would result in \$575,000 collected for DC Treasury. SG² projects total GGR from sports betting from 2019 until 2028 would result in approximately \$600 million GGR. The anticipated 10% tax on 25% of the total projected GGR would be \$15 million collected for the DC Treasury.

For the purposes of this report, the net amount realized by the Lottery-operated sportsbook is speculative because it is subject to negotiation with its technology provider. To recommend a firm revenue retention percentage would deprive the DC Lottery of its ability to negotiate with the provider. Additionally, the retention of revenue and determining which party pays costs will be affected by who bears the risk of loss. (See Tax Rate and Risk Section.)

With that being said and for information purposes only, the 75% share of the projected sports betting GGR in 2019 is \$17.25 million. The portion of total GGR attributed to the mobile platform is \$14.95 million. The GGR realized through the Lottery's network of retailers would be \$2.3 million. The retailer portion of the GGR would be subject to the anticipated retailer's 6% commission rate on the total wager. Based on the allocated \$2.3 million in GGR to Lottery retailer

¹⁴ Eilers & Krejcik, "Regulated Sports Gaming in Indiana: Landscape, Analysis And Recommendations," October 2018. <https://www.in.gov/igc/files/Indiana-SportsBettingReport-Final-Oct18-1.pdf>

sales, the retailer commission is \$690,000 for 2019. If the DC Lottery includes the remaining retailers in sports betting by allowing them to sell gift or debit cards to fund a player mobile account, it should consider a lower commission rate for these transactions. Given the low margins in sports betting, a lower commission rate for non-sports betting agents will allow for a much more sustainable business model. Based on some broad calculations, 20% to 30% of the total GGR could be subject to Lottery retailer commission.

Given the relatively low margins in sports betting, the retailer commissions constitute a unique challenge for the DC Lottery to develop an economic model that is competitive and sustainable.

The following table provides a profitability analysis for selected existing state sports-betting operations, as well as the projected DC operation. It shows that operating expenses generally account for 60% of GGR for a sportsbook that offers both mobile and retail outlets. These operating expenses include all overhead costs including staffing, marketing costs and vendor/technology fees.

Note that this table assumes a constant hold percentage and operating expense for all the identified markets. The key variables are the state tax rate.

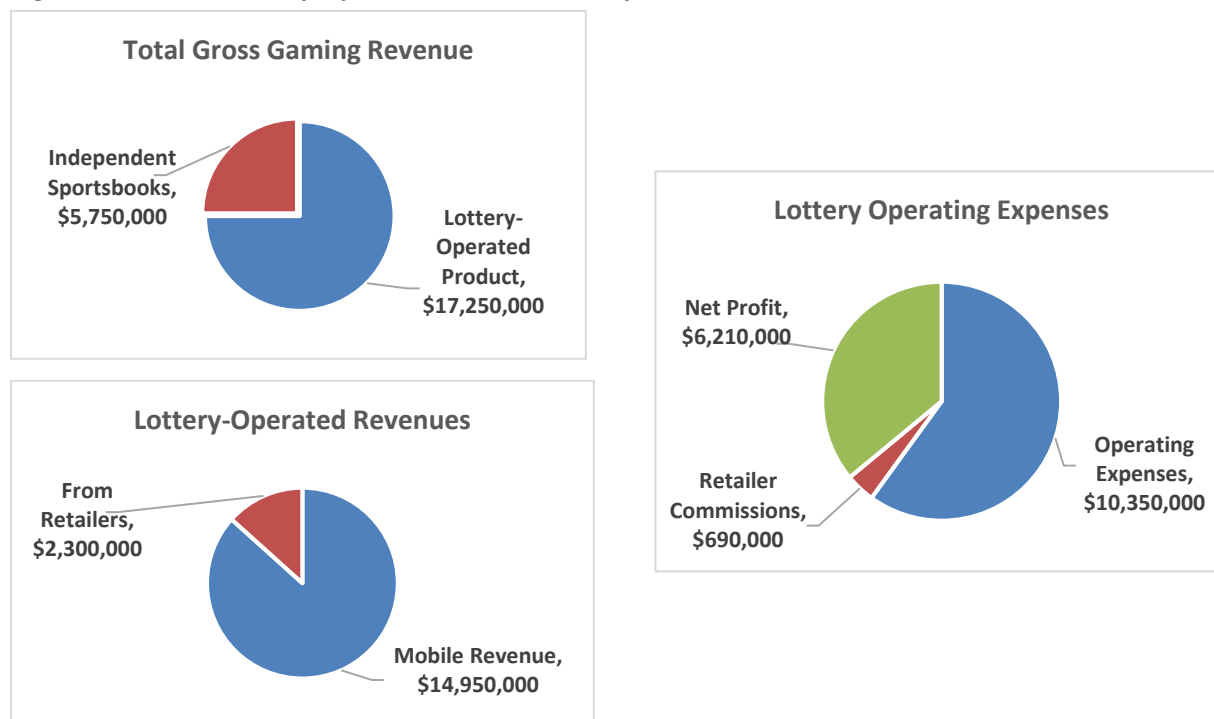
Figure 1: Profitability analysis, tax rate impact on sports-betting profit & loss, selected states

	NJ	MD	PA	DC
State Tax Rate	13%	20%	36%	10%
Gross Revenue	\$1,000	\$1,000	\$1,000	\$1,000
Gross Win Percentage	5%	5%	5%	5%
GGR	\$50	\$50	\$50	\$50
State Tax	(\$6.50)	(\$10)	(\$18)	(\$5)
Net GGR	\$43.50	\$40	\$32	\$45
Operating Expense	\$30	\$30	\$30	\$30
EBITDA*	\$13.50	\$10	\$2	\$15
EBITDA Margin	27%	20%	4%	30%

Source: State gaming commissions, Spectrum Gaming Group. * EBITDA = earnings before interest, taxes, depreciation and amortization, a widely used measure of profit.

Based on this assumption, the breakdown of GGR in the first year of sports betting in DC could be as follows based on SG² figure of \$23 million total and the division of GGR among Lottery mobile/online (65%) and retailers (10%) and the independent operators (25%). The allocation between the Lottery-operated product and the independent operators is depicted in Figure 2 below. Additionally, the charts demonstrate the allocation between the mobile platform and the brick-and-mortar retailer sales as well as the costs breakdown of the Lottery-operated product. The DC model is unique given retailer commissions and we believe these costs should be considered in addition to the standard 60% operating costs noted above.

Figure 2: Breakdown of projected revenues and expenses, 2019



Source: Spectrum Gaming Group

It is important to note that there are many variables that could alter these estimates. Specifically, any costs absorbed by the operator/provider (e.g., Intralot) would potentially decrease operating expenses. As operators identify operating efficiencies and achieve greater economies of scale, costs will decline and margins will increase. We expect that to be the case here.

For the Lottery-operated product, it is important to note that the net GGR potentially could be divided between the operator/provider and the revenue retained by the DC Lottery. This is a result of negotiation, with a key factor being which party bears the risk of any losses. The DC Lottery could retain some, if not all, of net revenue and the operator/technology provider is simply paid out of operating expenses. (See the risk models described on Page 21.) However, given that the risk will likely be borne by the operator/technology provider, net revenue will more likely be divided between the DC Lottery and the operator/technology provider. Given that DC's retained revenue will be subject to negotiation, we are hesitant to estimate or provide examples of retained revenue so as not to tie the DC Lottery to any figure as part of any future negotiations.

With respect to anticipated revenue from the independently operated sportsbooks in DC, the estimate is fairly straightforward in that the DC costs are not built into the independent operation. The DC Lottery will have costs with respect to staffing, particularly in licensing and compliance. These functions will be interwoven with the duties falling under the Lottery-operated product. In any event, in 2019 the 25% of GGR that is attributed under our assumptions

to the independent operators is \$5,750,000. The DC Lottery will collect 10% of the figure for the tax, or \$575,000.

Spectrum was not asked to assess the comparative advantages and disadvantages of a lottery-operated vs. an independent-operator model, which would require a thorough analysis of a host of regulatory, economic and other issues. However, the percentage of revenue to be retained by the DC Lottery in the lottery-operated model is expected to be greater than revenue generated through the 10% tax rate levied on GGR that would be developed by independent operators. This expectation, combined with the expected increases in economic activity (see the analysis below), supports the conclusion that the legislation in its current form will have a significant accretive fiscal impact on the District.

This assumed split of GGR between Lottery-operated and independent-operated sportsbooks could be significantly affected by the odds offered by the Lottery as compared to odds offered by the independent operator. Of importance, the SG² study does not take into account a specific payout percentage. We note that Nevada sportsbooks statewide averaged a 94.4% payout for the 12-month period ending September 2018. For decades, as the only full-scale US sports-betting jurisdiction in the country, Nevada is naturally held up as the model in which to compare all others. However, a Nevada-like payout percentage will not work in the standard lottery setting with retailers as a key component of the sports betting sale structure. This is because the retailer commission is based on the gross wager. In DC, it is anticipated that the retailer commission will be 6% of handle on each sports wager taken.

Other US sports-betting jurisdictions are recording a significantly lower payout percentage than that seen in Nevada; following are the payout percentages from date of launch through mid-October 2018 for the first four states that commenced full-scale sports betting this year:

- West Virginia: 76%
- Mississippi: 84%
- Delaware: 85%
- New Jersey: 88%

The result of a lower payout percentage (or higher hold) would be less GGR. To mitigate this reduction in GGR, and given the impact of the anticipated retailer commission, it is our recommendation that the DC Lottery begin with a target range of 80% to 85% payout. This should allow the DC Lottery to offer sufficiently attractive odds to new sports betting customers from launch, as well as through the period immediately following, during which it would have at least one year without significant competition from other markets.

Notably, the inverse of the payout percentage (i.e., the hold percentage) is the “price” of sports betting.

Sports betting is not like food or gasoline, in that it is hardly a necessity, thus the demand would be relatively inelastic, meaning that any increase in price would result in a decrease in demand.

To a certain degree, any elasticity of demand (in which price increases do not automatically translate into lower demand) may be true in a monopoly situation, but not entirely. Illegal sports betting already occurs in DC and surrounding states, and players who bet on illegal sites will not necessarily transfer to a legal provider, especially if they get better odds and have a history of being paid through their existing provider.

With that in mind, Spectrum recommends that the DC Lottery be prepared to adjust its payout percentage over time to ensure that it remains competitive, at an appropriate level, in what seems likely to become an increasingly competitive marketplace.

The payout percentage directly correlates with the odds offered to players, and Spectrum has noted, both from non-published studies in other sports-betting markets and from empirical evidence gained from channel-checks with operators in other developed markets, that many players will respond to what they perceive as better-value odds (thus, higher payout percentages) over time in a variety of ways. These include the recycling of winnings, increased frequency of betting and increased staking levels. All these factors directly lead to an increase in sports betting revenues.

III. Economic Impact Analysis

The chapter discusses the data sources, methods, and results of an economic impact analysis of the introduction of sports betting in Washington, DC. The analysis examines two scenarios: one with DC introducing sports betting in 2019 and another with betting starting in 2022. The scenarios are compared to estimate the impacts of legalizing sports betting ahead of neighboring states.

Data Sources and Methods

The economic impact analysis relied on the PI⁺ model from Regional Economic Models, Inc. (“REMI”). This model has been used in DC for a variety of policy research questions. In addition to PI⁺ being a capable and respected model, we chose to use it to keep our underlying estimation tool consistent with other analyses done in DC. A description of the REMI model is included in Appendix II.

The sports betting program analysis assumes that the DC Lottery administers a system that includes existing retailers, new food and beverage establishments, and a digital/mobile component. We assume non-Lottery providers of sports betting pay a tax of 10% on their GGR. The Lottery will also gain the profits from the operation of the digital/mobile platform. It is likely that an outside provider will run this service on the Lottery’s behalf while charging a fee to do so. Because we do not know the structure of any future arrangement or the inherent profitability of the system to be implemented, we assume that 10% of the GGR from this source will also flow back the DC government.

The existing retailers and new food and beverage establishments that choose to offer sports betting will be required to pay a license fee. We assumed a \$5,000 license fee due every other year (modeled as \$2,500 per year) for each establishment offering sports betting.

Beyond the assumptions about the structure above, the analysis requires assumptions about the number of vendors, total GGR, residence of bettors, and the source of betting dollars. When existing lottery retailers are ranked by their sales, the distribution shows that the top 40 percent of retailers are responsible for almost 78 percent of all sales. We assumed that these 163 retailers would have the foot traffic and resources necessary to offer sports betting. We also assumed 200 food and beverage establishments would choose to offer sports betting, an amount equal to 20 percent of the roughly 1,000 full-service restaurants and bars in DC. F&B establishments ramp up at 100 per year and have the same per establishment GGR as the lottery retailers. Lastly, we assumed that the digital component run by the DC Lottery would capture 65 percent of GGR, which is consistent with observations in other sports-betting markets.

Total sports betting GGR is a combination of an estimate of the number of adults, a proxy for the number of bettors, and per adult wagering. The total number of adults is estimated using DC adult population, commuters from Virginia and Maryland, and other visitors. According to the U.S. Census, there are 569,000 adults residing in DC. Estimates of daily in-commuters hover around 450,000, which we split evenly between Virginia and Maryland. Lastly, DC visitor statistics estimate 22.8 million visitors per year. Of those, we estimated that 82 percent are adults and 1 in 200 (0.5 percent) participate in sports betting yielding 95,000 participating visitors. The annual growth in population and commuters is taken from an analysis done by SG² for Intralot for presentation to the DC Office of Chief Financial Officer, as is the decline in participation by commuters once their home states allow sports betting. The amount of wagering per adult is also taken from the SG² report.

The analysis includes a number of offsetting factors. First, the intermediate inputs induced by new sales in the retail and F&B sectors were removed from the analysis. Intermediate inputs are the goods and services that firms purchase to produce their product. In neither industry would sports betting sales create more demand for these inputs. For example, selling a bet on a Wizards game would not prompt a restaurant to purchase more bread and lettuce whereas selling more meals (i.e., a restaurant's normal revenue source) would induce such demand. The online component, modeled as sales in internet publishing and broadcasting, retains all its intermediate demand.

Finally, the simulations were each conducted twice using the remaining assumptions below: the first time using very conservative assumptions and the second using slightly more relaxed assumptions. In the conservative analysis, the money spent on wagering in DC is assumed to come, dollar for dollar, from the existing household budgets of bettors. This assumption results in the increase in betting being funded by a reduction in other consumption in the bettors' places of residence. This assumption is overly conservative as it does not account for betting recaptured from either West Virginia or illegal wagering. The second expanded analysis relaxes this assumption and uses an estimate of the amount of illegal wagering (\$34 per adult) to reduce the offset. Because illegal activity does not appear in government accounts of economic activity, a decline in illegal wagering would not create negative impacts in the model. In the expanded analysis, only the amount of sports betting that exceeds the amount of illegal wagering is funded by reducing other consumption.

The first analysis also did not attempt to account for any new economic activity that might be generated by the incremental spending of people coming into DC from surrounding communities to gamble and then spending money on things like food and beverages, transportation, or entertainment. There is limited data on the extent of these activities though their inclusion in any amount would cause the impacts to grow.

In the second scenario, we relaxed the assumption on food and beverage spending to include some incremental spending from commuters and tourists. In order to count as incremental, the spending must be net new to DC because of the adoption of sports betting. Merely changing the choice of food and beverage establishment within DC from one without to one with sports betting would not count as incremental spending. Neither would shifting a Saturday visit to a Sunday visit. While we know that some incremental spending will occur, there are currently no specific estimates on how F&B patronage will change, especially because commuters and tourists already frequent DC bars and restaurants with regularity.

In the absence of an estimate for incremental spending per bettor, we chose to relate it to both average GGR per bettor and the number of commuters and tourists participating in the DC sports betting market. These two measures move in different directions in the analysis, with GGR per adult growing and commuter participation shrinking. Linking incremental food and beverage sales to these market dynamics captures both the increase in the popularity of sports betting among adults and the increase in regional competition for sports betting activity. To find new spending, first we calculated the share of total GGR attributable to commuters and tourists. Then we applied this share to the GGR coming from F&B establishments. This calculation yields the GGR from bars and restaurants that can be attributed to commuters and tourists. Lastly, we assumed that incremental food and beverage spending would be 10% of this value. In other words, for every dollar that F&B establishments win from commuters and tourists, they will also gain 10 cents of incremental sales.

Each of the two analyses assume that the sports betting license fee creates a new cost of doing business for the establishments that choose to participate. In the second analysis, these license fees are assumed to result in an increase in local government spending equal to the total value of the fees. This assumption is excluded from the first analysis to reflect the fact that incremental revenues from one source often cause collections to fall elsewhere resulting in little change in tax revenues.

Data referenced above was used to model two timelines within each of the two simulations. In the first timeline, DC allows sports betting in 2019, Virginia in 2020, and Maryland in 2024. In the second, Virginia and Maryland remain the same while DC moves later to 2022. In the late scenario, all gaming-related inputs were shifted forward from 2019 to 2022.

Economic Impact Analysis Results – Baseline Assumptions Simulation

This section begins with review of the results of the two timelines and concludes with a discussion of the differences between the two, which summarize the impacts of legalizing sports betting prior to Virginia and Maryland.

DC Sports Betting Begins in 2019

If the DC Lottery were to expand into sports betting in 2019, the economic impacts would begin modestly, ramp up to a peak in 2023, and slowly decline toward a stable long-term value in 2028. This pattern of impacts is driven first by the growth over time in wagering per adult. That annual increase continues throughout the analysis timeline. The decline in 2023 reflects the combined effects of legal sports betting becoming available in both Virginia and Maryland. A glossary of terms is available in Appendix I.

Figure 3: Summary results of sports betting beginning in 2019

Category	Units	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Avg.
Total Employment	Jobs	121	218	288	334	370	318	281	288	290	298	281
Residence Adjusted Employment	Individuals	16	33	46	53	57	41	34	35	31	31	38
Output	Millions of Fixed (2009) Dollars	\$20.4	\$36.2	\$48.6	\$57.7	\$65.1	\$57.7	\$52.4	\$55.1	\$56.8	\$59.4	\$51.0
Value-Added	Millions of Fixed (2009) Dollars	\$11.5	\$20.2	\$27.1	\$32.1	\$36.3	\$32.0	\$29.1	\$30.6	\$31.5	\$33.0	\$28.3
Personal Income	Millions of Current Dollars	\$1.1	\$2.4	\$3.6	\$4.5	\$5.2	\$3.9	\$3.4	\$3.6	\$3.3	\$3.5	\$3.4

Source: PI+, Spectrum Gaming, Spectrum Gaming Group

All impacts show a ramp up and decline reflecting the balance of increasing betting and declining bettors. As the adult population becomes aware of and participates in sports betting, the average annual spending increases. Alone, this factor would result in a steady rise in economic impacts followed by stabilized long-term results higher than what are observed here. The decline results from the assumption of reduced participation in DC sports betting by in-commuters as sports betting becomes available in their home markets. Virginia is assumed to begin in 2020 and Maryland in 2024. The results show that the increases in average betting obscure the loss in Virginia-based players. It is only in 2024 when both states are assumed to have legalized sports betting that the annual reduction in bettors outweighs the annual increase in average wagers, which results in a decrease in DC sports betting gross gaming revenues.

Perhaps the most informative years of the results shown in Figure 3 are 2023 and 2028. As the peak, 2023 shows what DC could expect if our assumptions about the dates of the introduction of sports betting in Virginia and Maryland are incorrect. Because average annual wagering increases throughout our analysis period, for every year that Virginia and Maryland delay the introduction of sports betting, the peak economic impacts in DC would increase from those shown in 2023. Alternatively, the results in 2028 reflect a value close to the long-term incremental impacts that DC could see with the introduction of sports betting locally and in its

neighboring states. While not the true long-run average, we expect that 2028 is at least illustrative of that scenario.

Total employment resulting from the introduction of sports betting reaches a peak of 370 jobs in 2023 and declines to 298 in 2028. These jobs are primarily in the sectors offering sports betting products: retail trade, food services, and information (i.e., digital/mobile platform). These industries' total employment actually accounts for over 100% of the net change in total employment because there are small losses across many other sectors as a result of the reallocation of spending toward sports betting. Occupational employment changes reflect the industry changes. Retail sales workers add an average of 37 jobs over the analysis period. Food preparation and serving occupations average 118 jobs. Computer occupations add an average of 40 jobs over the no sports betting scenario.

Adjusted for place of residence, we expect that 57 and 31 of these jobs will be held by DC residents in 2023 and 2028, respectively. For those living in DC, sports betting will generate \$3.4 million in new annual income by 2028.¹⁵ These economic impacts are supported by an increase of output of \$65.1 million in 2023 and \$59.4 million in 2028. These changes in business revenue create \$36.3 million and \$33 million in net new economic activity in DC (i.e. value added) in 2023 and 2028.

DC Sports Betting Begins in 2022

If sports betting begins in DC in 2022, per our assumptions, Virginia would have had a two-year head start and Maryland would begin in two more years. The cost of the delay is not only the foregone economic activity of the missing three years but are also the costs from the shifting of the ramp up in average wagering. The same initial annual wagering that was in 2019 in the first scenario now moves to 2022 and continues on the same growth path. As a result, every year of this analysis will have the same wagering per adult as three-years prior in the previous analysis; e.g., 2022 will have 2019's average wagering and 2028 will have 2025's.

¹⁵ Contrary to the other dollar concepts presented in this report, personal income is not adjusted for inflation which yields a different pattern in the results than the other concepts.

Figure 4: Summary results of sports betting beginning in 2022

Category	Units	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Avg.
Total Employment	Jobs	0	0	0	108	174	217	240	255	231	214	144
Residence Adjusted Employment	Individuals	0	0	0	16	26	34	37	38	29	25	21
Output	Millions of Fixed (2009) Dollars	\$0.0	\$0.0	\$0.0	\$19.2	\$30.6	\$39.1	\$44.3	\$48.3	\$45.0	\$42.8	\$26.9
Value-Added	Millions of Fixed (2009) Dollars	\$0.0	\$0.0	\$0.0	\$10.9	\$17.1	\$21.8	\$24.7	\$26.9	\$25.0	\$23.8	\$15.0
Personal Income	Millions of Current Dollars	\$0.0	\$0.0	\$0.0	\$1.3	\$2.2	\$3.1	\$3.5	\$3.9	\$3.1	\$2.9	\$2.0

Source: PI+, Spectrum Gaming Group

An accounting of the annual opportunity cost of the 2022 scenario is given below.

Difference between 2019 and 2022 Scenarios

Figure 5: Difference between 2019 and 2022 scenarios

Category	Units	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Avg.
Total Employment	Jobs	-121	-218	-288	-226	-196	-101	-41	-33	-59	-83	-137
Residence Adjusted Employment	Individuals	-16	-33	-46	-36	-31	-7	3	4	-2	-6	-17
Output	Millions of Fixed (2009) Dollars	-\$20	-\$36	-\$49	-\$38	-\$35	-\$19	-\$8	-\$7	-\$12	-\$17	-\$24
Value-Added	Millions of Fixed (2009) Dollars	-\$12	-\$20	-\$27	-\$21	-\$19	-\$10	-\$4	-\$4	-\$7	-\$9	-\$13
Personal Income	Millions of Current Dollars	-\$1	-\$2	-\$4	-\$3	-\$3	-\$1	\$0	\$0	\$0	-\$1	-\$1

Source: PI+, Spectrum Gaming Group

The most obvious discrepancies between the two scenarios occur between 2019 and 2021, where they account for the entirety of the estimated economic activity generated by legalized sports betting in DC. But the delayed ramp-up, now starting in 2022, means that each subsequent year will see less activity than there would have been had DC begun sports betting in 2019. While this difference would likely diminish over time, they are still present in 2028, leading to 83 fewer jobs, \$16.6 million in foregone output (of which \$9.2 million is value added), and roughly \$1 million dollars in foregone personal income. Cumulatively, by delaying the introduction of sports betting until 2022 the District loses \$240 million of output, \$133 million of value added, and \$14 million of personal income over the 10 years analyzed.

The estimates in Figure 5 may understate the opportunity cost of delaying until 2022 because they assume an identical rate of adoption once sports betting becomes available in DC. In reality, the availability of sports betting in Virginia prior to the introduction of sports betting in

DC would lead to an outflow of consumer spending from DC prior to 2022. This outflow would cause the economic impacts of the late scenario to be negative in 2019 through 2021 rather than zero as they are now. After sports betting becomes available in DC in 2022, Virginia-based bettors could participate at rates lower than we assume if they establish betting habits and patterns with Virginian retailers or mobile/online platforms. Such a difference in adoption patterns would reduce the positive impacts of the late scenario from 2022 and 2028. The cumulative effect of the pre- and post-2022 effects would be to increase the opportunity costs of delaying the implementation of sports betting in DC relative to the impacts shown in Figure 5.

Economic Impact Analysis Results – Expanded Simulation

While the results above represent a conservative estimation of the results, an attempt was made to estimate at least some economic activity for which data was scarce and present the results as an alternative to the baseline simulation. As described in detail in the methodology, three specific changes were made for these simulations. First, the reduction in consumption that was used to offset the increase in spending on sports betting was reduced by \$34 per adult to account for spending that is reallocated from illegal wagering. Second, for every dollar of GGR at food and beverage establishments attributable to commuters and tourists, we assume 10 cents of additional revenue in those sectors that would not have occurred without sports betting. Finally, spending by the DC government was increased to reflect the revenue coming in license fees levied on sports betting retailers.

DC Sports Betting Begins in 2019

This expanded scenario leads to a greater economic impact, with an average of 328 jobs per year versus 281 in the initial early scenario. Average value added grows by \$4.7 million per year. Annual average personal income grows by \$1.8 million. The difference in employment in food and drinking places or local government account for little of the difference in employment, with most of the difference being attributable to the smaller amount of spending reallocated from other consumption in and out of the District.

Figure 6: Summary results of sports betting beginning in 2019, expanded simulation

Category	Units	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Avg.
Total Employment	Jobs	174	282	347	390	422	364	323	326	324	328	328
Residence Adjusted Employment	Individuals	36	55	66	72	76	56	47	46	41	39	54
Output	Millions of Fixed (2009) Dollars	\$27.0	\$44.9	\$57.0	\$65.8	\$73.1	\$65.0	\$59.2	\$61.4	\$62.8	\$65.0	\$58.1
Value-Added	Millions of Fixed (2009) Dollars	\$15.6	\$25.7	\$32.5	\$37.4	\$41.4	\$36.8	\$33.4	\$34.7	\$35.4	\$36.7	\$33.0
Personal Income	Millions of Current Dollars	\$2.5	\$4.1	\$5.5	\$6.4	\$7.2	\$5.8	\$5.2	\$5.3	\$4.8	\$4.9	\$5.2

Source: PI+, Spectrum Gaming Group

DC Sports Betting Begins in 2022

As with the early scenario, the economic impact of the late scenario is also somewhat larger under these new assumptions. Employment, value added, and personal income grow by 29 jobs, \$3 million, and \$1 million, respectively.

Figure 7: Summary results of sports betting beginning in 2022, expanded simulation

Category	Units	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Avg.
Total Employment	Jobs	0	0	0	148	228	264	282	293	266	247	173
Residence Adjusted Employment	Individuals	0	0	0	31	44	49	50	49	39	34	30
Output	Millions of Fixed (2009) Dollars	\$0.0	\$0.0	\$0.0	\$24.7	\$38.3	\$46.1	\$50.9	\$54.5	\$50.9	\$48.4	\$31.4
Value-Added	Millions of Fixed (2009) Dollars	\$0.0	\$0.0	\$0.0	\$14.4	\$22.0	\$26.4	\$29.0	\$31.0	\$28.9	\$27.5	\$17.9
Personal Income	Millions of Current Dollars	\$0.0	\$0.0	\$0.0	\$2.6	\$3.8	\$4.7	\$5.1	\$5.5	\$4.6	\$4.3	\$3.1

Source: PI+, Spectrum Gaming Group

Difference between 2019 and 2022 Scenarios

The difference between the early and late scenarios in the expanded simulations is wider than that for the baseline simulations. Because the consequence of the late scenario is foregone economic activity in the first years and a delayed ramp-up in the latter years, the difference between the early and late scenarios is greater when the economic model accounts for more economic activity. Cumulatively in the expanded simulations, DC loses \$267 million of output, \$151 million of value added, and \$21 million of personal income by waiting until 2022 to allow

sports betting. These amounts differ by \$27 million, \$17 million, and \$7 million from the baseline simulation values for output, value added, and personal income, respectively.

Figure 8: Difference between 2019 and 2022 scenarios, expanded simulation

Category	Units	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Avg.
Total Employment	Jobs	-174	-282	-347	-242	-194	-100	-40	-33	-58	-80	-155
Residence Adjusted Employment	Individuals	-36	-55	-66	-41	-32	-7	3	3	-2	-6	-24
Output	Millions of Fixed (2009) Dollars	-27	-45	-57	-41	-35	-19	-8	-7	-12	-17	-27
Value-Added	Millions of Fixed (2009) Dollars	-16	-26	-33	-23	-19	-10	-4	-4	-7	-9	-15
Personal Income	Millions of Current Dollars	-3	-4	-5	-4	-3	-1	0	0	0	-1	-2

Source: PI+, Spectrum Gaming Group

It is important to note that the results from Spectrum’s economic impact analysis provide more than just the anticipated revenue that the District will realize directly from sports betting. Our economic modeling projections include total business revenues generated by the introduction of sports gaming in the District. The output numbers recognize all purchases made by customers and businesses in response to the economic changes resulting from sports betting. These economic impact projections are formulated based on available regional economic data and trends. Thus, our modeling was designed to project total economic impact, not just tax revenues.

IV. Key Considerations

Tax Rate and Risk

One of the fundamental differences between operating lottery games and sports betting is the element of risk that exists in sports betting. In the sports betting industry, the risk-management skill of the operator is pitted against the forecasting skill of the player. The ultimate result of the sports event is out of the control of both operator and player. The operator weighs the statistical probability of sporting contest outcomes along with other factors to set odds – an expression of probability – that theoretically allow the operator to make money over the long term and encourage as many players as possible to place a wager.

In that context, there will be both individual events and patterns of events that may result in the operator losing money. While the sports betting industry is different to casinos, where the Law of Large Numbers applies in generating a long-term return, the higher the volume of wagers taken over time the higher the probability a skilled sports-betting operator will successfully manage its risk and generate positive GGR.

Here the policy decision is how much, if any risk, does the DC Lottery want to bear. If it wants to bear *some* risk, then it will share in the earnings and sometime losses in addition to collecting the 10% tax on GGR of independent operators. Spectrum recommends that the DC Lottery adopt a *no*-risk model in which the company contracted to provide the platform and perform all services bears all risk. This model will provide a greater predictability of revenue to the District.

Note that the following three risk models were considered by the Rhode Island Lottery in its sports-betting regime:

- **Option 1 – Fully-Managed-Services Model:** The service provider provides all services and functions as scoped within the RFP and manages entire sports-betting risk on behalf of the Lottery. Commercial offer to reflect economic model where resultant gross-win performance/risk is retained/borne entirely (100%) by the service provider.
- **Option 2 – Fully-Managed-Services, Shared-Risk Model:** The Service Provider provides all services and functions as scoped within the RFP and manages sports-betting on a shared-risk basis on behalf of the Lottery. Commercial offer to reflect economic model where resultant gross-win performance/risk is shared/borne equally (50%/50%) between the Service Provider and Lottery.
- **Option 3 – Fully-Managed-Services, Shared-Risk Model:** The Service Provider provides all services and functions as scoped within the RFP, and manages sports-

betting on a shared-risk basis on behalf of the Lottery. Commercial offer to reflect economic model where resultant gross-win performance/risk is shared (75%/25%) between the Service Provider, at 75% and the Lottery at 25%.

Bidders were required to submit cost proposals for each risk model.

Rhode Island chose the fully-managed service model, with the service provider bearing all risk. Spectrum recommends that the DC Lottery employ the same fully-managed model with the service provider bearing all the risk. For a lottery of DC's size and scope, this make the most sense to ensure a risk-free and quick-to-market strategy that also minimizes IT, infrastructure and staffing costs.

The District tax rate and the overall regulatory structure of sports betting should be reasonable to allow for the development of a sustainable industry in that the provider can earn money over time.

The Rhode Island Lottery entered into a contract with its current gaming system provider to expand its current platform to offer sports betting in the two casinos it regulates. This is not the same as the independent operator portion of the DC legislation. In Rhode Island, the lottery is the operator, the provider is the current gaming system provider, and the casinos are in essence a licensed retailer receiving a commission percentage.

When a provider is bearing all the risk, a sustainable commercial model requires a reasonable tax rate and for the provider to be incentivized to perform through a reasonable commercial return.

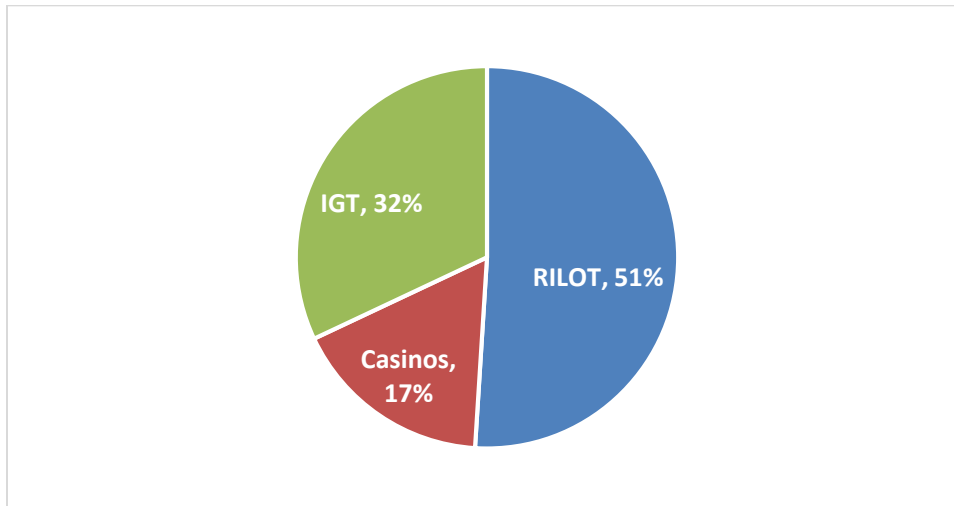
The proposed 10% tax rate on gross gaming revenue in DC will enable a competitive and sustainable sports-betting industry to be established. As shown in Figure 1 (Page 9) for every \$1,000 wagered on sports in DC at that proposed 10% tax rate, and assuming a payout rate of 95%, the operator will earn \$15 in expected earnings before interest, taxes, depreciation and amortization ("EBITDA," a widely used measure of profitability), deemed sustainable by any reasonable businessperson contemplating market entry. By comparison, the same \$1,000 wagered in Pennsylvania, with its 36% tax rate on sports betting GGR, will earn the operator \$2 in expected EBITDA, deemed wholly unsustainable on its own (but worthwhile for at least some Pennsylvania casino operators because the sports betting offers a significant ability to attract new customers and generate visitation to the overall property).

Provider Costs/Revenue Share

The DC legislation offers a sports betting operating structure that does not exist elsewhere in the country. No other state is using both the lottery retailer base and a mobile platform and while excluding casinos. DC will have independent operators over time, but it is difficult to accurately estimate how many will ultimately operate.

In Rhode Island, the state lottery is the operator of sports betting. The Rhode Island Lottery (“RILOT”) offers its retail product through its two casinos but does not have a mobile platform and it does not offer sports wagers through lottery retailers. RILOT has contracted with IGT to provide the technology and operates all sports gaming functions as part of IGT’s joint venture with William Hill. All net sports betting revenues are transferred to the Lottery fund on a weekly basis. RILOT pays all marketing costs then divides net revenue as follows:

Figure 9: Rhode Island Lottery distribution of sports betting net revenue



Source: Rhode Island Lottery

In DC, the anticipated retailer commission will be 6%, while the operator will bear the financial risks. Moreover, the DC Lottery will act as regulator and tax collector for the independent operators. For the appropriate tax rate on independent operators please refer to the Tax Rate section.

New Player Development

Sports betting offered on a mobile platform could be an ideal channel to create new players. Research shows that younger, educated, urban and higher-income groups – all attributes to be found in the DC market – have the highest ownership and usage patterns of smartphones,¹⁶ devices which are ideally suited to the preferred usage patterns of sports-betting players in other developed sports-betting markets,¹⁷ and precisely the demographic the DC Lottery is aiming to attract through offering sports betting via a mobile channel. It should also be noted that DC

¹⁶ Pew Research Center, “Mobile Fact Sheet,” February 5, 2018. <http://www.pewinternet.org/fact-sheet/mobile/>

¹⁷ “Mobile Gaming KPI,” *Online Gambling Quarterly*, September 2018, p. 14. <https://view.publitas.com/mecn/online-gambling-quarterly/page/1>

already has “significantly higher” smartphone adoption and usage rates than most other states, according to the latest US Census data.¹⁸

Self-Service Betting Terminals

Self-service betting terminals (“SSBTs”) are defined as terminals that enable the consumer to self-select and strike sports bets through a networked-system typically consisting of a touch-screen, barcode scanner, under-counter unit housing a contactless card reader, cash acceptor and receipt printer.

With the ability of SSBTs to offer and support a wide variety of bet types and markets, in multiple-languages, and with a variety of payment mechanisms, operators typically find gross-win margins (or hold percentage) from bets struck on SSBTs to be well above average due to the nature of player betting patterns, and above-average selection of higher-margin multiple/parlay bets by the player.

Bearing in mind the recommendations made earlier concerning payout percentages from launch, Spectrum thus believe SSBTs to be a viable and valuable potential channel for sports-betting, located within both existing and new DC Lottery retailer outlets.

On a global basis, the main SSBT provider to date has been Austrian-based BGT, founded in 2005; BGT was acquired in 2016 by Playtech plc, and now operates as Playtech BGT Sports. Existing US-facing suppliers, with alternative offerings, are operating within Nevada, including Kiosk.com and Golden Entertainment/William Hill.

To date, most SSBTs operated by sportsbook operators are located in Europe, with UK, Eastern Europe and Greece being the most densely-populated markets.

Operationally, SSBTs typically require the following to function within a retail environment:

- Power supply
- Internet connectivity
- 6 square feet to 7 square feet of floor space, where approximately 60% is needed for the SSBT and 40% the standing-room needed for the consumer

¹⁸ “Computer and Internet Use in the United States,” US Census, May 2013.

<https://www.census.gov/content/dam/Census/library/publications/2013/demo/p20-569.pdf>

- Ability to securely fix a unit within retailer environment

Other operational features typically include:

- Cash/coins/debit card payment-in options
- Loyalty Card (tap-to-ID) function
- Ticket-out, cash-in at retailer cashier/pay-out function

The following is a summary of typical contractual arrangements, prevalent in Europe, relating to the supply and operation of SSBTs.

- Units supplied on a rental basis, with a typical rental period of three years
- Revenue-share model, where 15% to 20% of net gaming revenue generated by SSBT is paid to supplier, covering notional rental cost and profit contribution
- Usually subject to minimum revenue levels
- Volume-related discounts commonly available

Although existing penetration of SSBTs is currently low within the US, Spectrum’s channel checks, undertaken in October 2018 at the Global Gaming Expo in Las Vegas, indicates that SSBT suppliers anticipate adopting similar contractual arrangements within the US, which all suppliers see as a valuable market-expansion opportunity.

New Retailer Development

In Spectrum’s discussions with both DC Lottery staff and Intralot, each mentioned that DC restaurants and bars are not lottery retailers. This is an anomaly as compared to other state lotteries, such as Ohio and Massachusetts, where this sector is a significant sales generator. This is particularly true in the keno and instant ticket products. Obviously, an increase in lottery retailers would also be expected to increase the sale of lottery traditional products. According to Destination DC, 2,233 restaurants operate in the District, representing a significant upside in the number of potential lottery retailers.²⁰

Impact on Staffing

The DC sports betting legislation will require potentially long-term, significant changes to staffing at the DC Lottery. The short-term changes may be modest as the product is launched, and then develops in the District. Based on discussions with DC Lottery management, knowledge

²⁰ Destination DC, “Restaurant Facts.” <https://washington.org/dc-information/washington-dc-facts#Restaurant%20Facts> (accessed November 7, 2018)

of comparable operations and recent implementation of sports gaming in other jurisdictions, the DC Lottery will be required to adjust its staffing model through changing the duties of current positions and transferring staff or create new positions to address new functional needs in product management and development, licensing and compliance. The majority of gaming system operations occur under the Intralot operation and will be covered under any vendor fee paid to Intralot. Accordingly, impact on the IT operation is not part of the analysis. Moreover, it is our understanding that if the DC Lottery expands its current contract with Intralot to implement sports gaming that Intralot will fund four to five positions for the DC Lottery. The use of these positions by the DC Lottery is a management decision of the DC Lottery and we do not offer a recommendation on that point.

With respect to product management and development, we anticipate the initial creation of up to six positions providing product leadership, management and support for the Lottery-operated sports betting product. It is anticipated that the staffing structure would consist of a department head with four to five support staff performing different functions including channel management, promotions planning and business intelligence/analysis.

In licensing, the DC Lottery currently has three staff members who as part of their duties perform licensing functions. The District has 408 active licensees whose licenses are renewed every other year and new applications are received at a rate of one to two per month. We believe that the current volume of work by staff to perform licensing tasks is minimal. The introduction of sports betting and the expansion of the range of license-types will significantly increase workload certainly in the short-term and potentially long-term.

The growth in the licensing department will depend on several factors. First, the addition of staff will be dependent on how many retailers decided to participate in Lottery operated sports betting. In looking at sales by retailer location, we anticipate at least 150 to 200 retailers will participate.

Since this is a separate license and subject to separate requirements, this addition will increase the licensing workload requiring at least a rework of current duties or the addition of staff.

The legislation provides for numerous different types of licenses, all of which are applicable to the independent operators. Thus, the impact on staffing will require an estimate of how many independent operators apply and how many service providers apply. This estimate will provide the anticipated workload that will allow for an in-depth analysis of licensing staff needs.

The legislation is unclear what, if any, of the different types of licenses apply to lottery retailers participating in sports betting. For example, the legislation provides for an occupational license for any employee engaged in the sale of sport betting. In certain convenient store

locations, this could add numerous additional licensing applications per location. Lottery counsel believes it is possible to draw this distinction via rule-making or possibly seek clarification that under the current of the legislation that retailer employees are not subject to separate background checks before the bill's final reading.

The introduction of sports betting and the expansion of the range of license types will significantly increase workload certainly in the short term and potentially the long term.

In FY 2019, the DC Lottery should increase licensing staff with additional full-time staff members solely dedicated to the licensing function. These positions would be a manager, an administrative support person and two other full staff members to create the licensing process, standards and applications, and to manage the process. One new staff member must have ability to assess reports relative to financial ability of license applicant to handle unique nature of sports betting. These positions in FY 2019 will focus on the lottery-operated/retailer side of sports betting. As the independent operator side of sports betting gets started, an additional staff member may be needed to manage that process and while other four positions will work on licensing on both the lottery and independently operated side of business. Additional staff may be needed in FY 2020 depending on how workload develops.

The addition of sports betting will require both regulatory and compliance staff. The Lottery will be required to develop operation standards and rules and regulations for independent operators, suppliers, and service providers. Staff will be required to regularly and frequently monitor and check for compliance with all such standards, such as, but not limited to, know your customer, anti-money-laundering, operations and advertising/promotions.

Staffing needs will be dependent on how many of each licensee type and where the independent operators are located, the size of the facility, and operating hours. By way of example, the Ohio Lottery adopted a staffing model to regulate its Racinos and VLT operation, which offers a valuable comparative industry standard model to use in determining future staffing needs for DC Lottery. In both Ohio and DC, the Lottery is being asked to regulate independently operated facilities that are subject to heightened compliance and regulatory requirements, requirements that simply don't exist in most lottery jurisdictions.

For FY 2019, we recommend two staff members focus on the development of standards, developing a process to conduct compliance checks of retailers and to conduct the compliance checks. As independent operators begin operation, an additional compliance staff person would be needed to develop additional criteria for this operation and conduct compliance checks with other member of compliance department. Additional staff may be needed in FY20 depending on how workload develops.

The majority of IT operations related to lottery-operated sports betting will be undertaken by Intralot and fall under its budget. Accordingly, no recommendations are made on IT staffing.

Policy Considerations

We recognize that there are no clear lottery precedents in the United States that can provide overall policy guidance to advance the DC Lottery's goals. However, we also point out that the District's ambitious goal of establishing sports betting takes it far beyond traditional lottery games, and more into the realm of legal casino gaming. With that in mind, there are policy precedents to be reviewed, and issues to be considered.

Licensing Concerns

The DC Lottery's plans would effectively allow an indeterminate number of existing and future retailers to offer sports betting within their respective establishments. That would change the nature of the existing relationship between the Lottery and its retailers, which raises issues that need to be addressed, as per the following examples.

Will existing and future retailers undergo the same licensing and review process currently in place, or will they undergo a more extensive process, similar to that for casino licensees in other markets? Among the differences are that casino license applicants and all of their qualifying executives and owners, as well as key financial sources, reveal significant personal and financial histories under the casino licensing process.

- Will there be licensing or background checks for employees who handle sports-betting transactions?
- Will there be restrictions on employees, owners, vendors and other key people as to being able to place bets?
- Will there be ongoing camera coverage of retail establishments, and who will have access to such coverage and recordings?
- Will licenses have to submit internal-control procedures governing areas ranging from anti-money-laundering controls to responsible-gaming practices, as well as other areas? Or will the DC Lottery develop standard protocols that all licensees must adhere to?
- Will the DC Lottery be empowered to issue fines or take any other disciplinary measures, short of licensure revocation?

- Will licensees be required to pay for the cost of their own regulation, background checks and other requirements, as is common practice in commercial gaming regulation?

Business, Operating Concerns

As the DC Lottery correctly expects that many of the best-performing retailers will likely be food-and-beverage establishments, particularly those with a business model that focuses on sports aficionados, a range of other questions will inevitably arise, including:

- Will the DC Lottery establish licensing fees that will have the effect of limiting the number of establishments?
- If fees are established, will they be determined by the relative market value of such licenses, the cost of regulation, or will they be based on other criteria, such as the ability to limit licensure to outlets that are generally well capitalized with greater resources?
- Will requirements be established that govern the overall quality of a facility and the capital investment in such facilities?
- Will licensed retailers be empowered to develop third-party sponsorships with sports teams, leagues or casino operators in other markets, or will the DC Lottery reserve for itself the right to establish such relationships?

Geolocation

The prospect of sports betting on mobile devices presents particularly difficult challenges for the District of Columbia. Effective geofencing – ensuring that no sports wagers occur outside the District – is necessary to ensure conformity with the Federal Wire Act,²¹ a 1961 law that prohibits “the transmission in interstate or foreign commerce of bets or wagers or information assisting in the placing of bets or wagers on any sporting event or contest, or for the transmission of a wire communication which entitles the recipient to receive money or credit as a result of bets or wagers, or for information assisting in the placing of bets or wagers, and to prevent any incursion into neighboring states.” Effective geofencing is also critical to ensure that wagers are not made in Virginia and Maryland, neither of which approves online wagering.

From a geographic standpoint, the District must confront a series of difficulties that are arguably more challenging than in any other domestic jurisdiction. Washington, DC, has only 63

²¹ 18 U.S.C. § 1084 - U.S. Code - Unannotated Title 18. Crimes and Criminal Procedure § 1084.
<https://codes.findlaw.com/us/title-18-crimes-and-criminal-procedure/18-usc-sect-1084.html> (accessed October 24, 2018)

square miles of land,²² and much of that acreage is in the federal enclave, where lottery products cannot be sold. At the same time, the District’s borders with Maryland and Virginia are easily – and continuously – traversed by commuters and others, who cross boundaries by foot, on bicycles, in cars and on the extensive DC Metro system.

As mobile gaming is expected to account for nearly two-thirds of sports-book revenue, coupled with the geographic and legal challenges within DC, geo-location information from a provider must be valid, up-to-date and with a proven ability to meet all challenges.

With that in mind, the DC Lottery must traverse the following:

- Ensure that all wagers are made by adults who are physically situated within the allowed DC acreage.
- Maximize revenue by not cutting off adults – or licensed retailer locations – that are too close to the borders.

This singular challenge is similar to that being faced in a jurisdiction such as New Jersey, where the most populous areas are separated from neighboring states via rivers. In our view, New Jersey – because much of its population resides within the Philadelphia and New York metropolitan areas – offers the most relevant experience. To some degree, as the Potomac River separates DC from other jurisdictions, and both DC and New Jersey are part of the densely populated Northeast, this would be the most apt comparison.

The options for any jurisdiction seeking robust geolocation technologies are:

- Internet Protocol (“IP”) and cell-tower data
- WiFi and global-positioning system (“GPS”)

New Jersey relies on WiFi and GPS technology supplied by GeoComply, a firm formed in 2011 that supplies geolocation services in Nevada, Delaware, Georgia, Mississippi and West Virginia, as well as New Jersey.²³ Based on our experience, jurisdictions that rely on GeoComply appear satisfied with the efficacy of its technology, which has been tested by Gaming Laboratories International and other testing laboratories.

Notably, GeoComply is not a disinterested third party in providing insight to the DC Lottery, as it hopes to be retained to provide such services. With that caveat in mind, however, it has provided valuable insights to help inform our study.

²² “District of Columbia,” city-data.com. <http://www.city-data.com/states/District-of-Columbia-Location-size-and-extent.html> (accessed October 24, 2018)

²³ GeoComply, “About Us.” <https://www.geocomply.com/about-us/> (accessed October 24, 2018)

GeoComply CEO David Briggs and Vice President of Regulatory Affairs Lindsay Slader provided the following insights, which we have edited for length:

If you can't discern with enough accuracy whether a user indeed within the District, there's no way to ensure violations of the Wire Act do not occur with each bet struck. The approach taken with geolocation technology will therefore dictate the District's ability to both take legal bets, and also the extent of the accessible pool of users, ultimately having a very large impact on the economic viability of sports betting.

So appropriate and usable geolocation technology would need to effectively block traffic from outside the district but right on the borders, all the while ensuring that the legitimate, legal users inside the district could be pinpointed accurately within the borders.

High compliance risk as can be spoofed easily, either accidentally from within exclusion zones (due to known problems with Cell Towers – as per 911 examples of emergency responders struggling to locate callers that way) and via easy to access software such as VPN's or Remote Desktop Programs.

Based on our live transaction data in DC today, we can see that the average accuracy of an IP-based check is 30.5 miles. Such a system may be augmented with a cell tower check that brings the average accuracy to 11.5 miles. Note that the ability to access this cell tower data is contingent upon users successfully opting into the sharing of their location data through their phone carrier; a method which fails about 25% of the time. Given that 11.5 miles is still greater than any dimension of the district border, it's safe to say that the ability to pinpoint a user inside the district is virtually impossible. This would rule out this option completely.

Again, when examining live DC data, we can see that there is much more accurate location data available via Wi-Fi and GPS, in comparison to IP and cell tower data, to make the New Jersey approach to geolocation very feasible. Average accuracy of Wi-Fi data is 63 meters, and GPS accuracy is 14 meters. Considering the potential need to block federal buildings conservatively, one could assume that a 63-meter buffer zone around such exclusion zones would make this workable without any adaptations.

Spectrum is neither directly nor indirectly endorsing GeoComply. Rather, the District would be best served by developing a Request for Proposals from appropriate vendors before selecting any such vendor or ensuring that a fully managed service includes the provision of such geolocation services. For purposes of this section, we are simply transmitting that firm's views, based on its experience in New Jersey.

Appendix I: Economic Concepts Glossary

Employment: Employment is a count of jobs, not people, by place of work. It counts all jobs with the same weight regardless of whether the position is full- or part-time or the labor of a self-employed proprietor. Additionally, jobs are counted as job-years, which are equivalent to one job lasting for one year. This is a similar concept to “person-hours.” Jobs often carry over from year to year and therefore the jobs in one year include many of the same jobs as in the previous year. For example, if a new business opens with 10 employees then the host community of that business will have 10 more jobs than it would have had in every future year that the company maintains its workforce. For example, over 5 years, the business will have created 50 job-years (10 jobs at the company x 5 years = 50 job-years) though it is possible that it is not the same 10 people who are working there over time. When reviewing changes in employment across multiple years, knowledge of the concept of job-years is vital to proper interpretation.

Output: Output is the total economic value of production, sales, or business revenues, whether final (i.e., purchased by the end user) or intermediate (used by another business to produce its own output). It includes the value of inputs to production, wages paid to employees, capital expenses, taxes, and profit. It is useful as an indicator of business activity, but it should not be construed as net new economic activity.

Personal Income: Personal income is income and benefits from all sources earned by all persons living in an area. It excludes the income earned by non-resident workers who commute into an area but includes the income of residents who commute out.

Residence Adjusted Employment: This is employment adjusted for place of residence. The adjustments include adding out-commuters and removing in-commuters from employment thereby turning a place of work concept into a place of residence concept.

Value Added: Value added is the value of all final goods and services created in an economy. It represents new economic activity and is also known as gross product or net economic impact. It differs from output by the value of inputs to production. Value added provides a useful summary of the economy which is why all nations and US states report their economic growth in this way, calling it either gross domestic product or gross state product as appropriate. Its usefulness derives from the elimination of the double-counting inherent in output, which stems from the inclusion of inputs. An example of the double-counting of inputs can be found and simplified in the process of making and selling a loaf of bread. A farmer sells wheat to a mill, which then sells flour to a baker, who then sells bread to the final customer. The sale price of the bread includes the cost of all necessary inputs including growing the wheat, milling the flour, and baking the bread. Value added only counts the sale price of the bread to the final consumer which is the net new value created in the economy. On the other hand, output

counts the revenues earned by every business in the supply chain which means that the value of the wheat and flour are counted more than once.

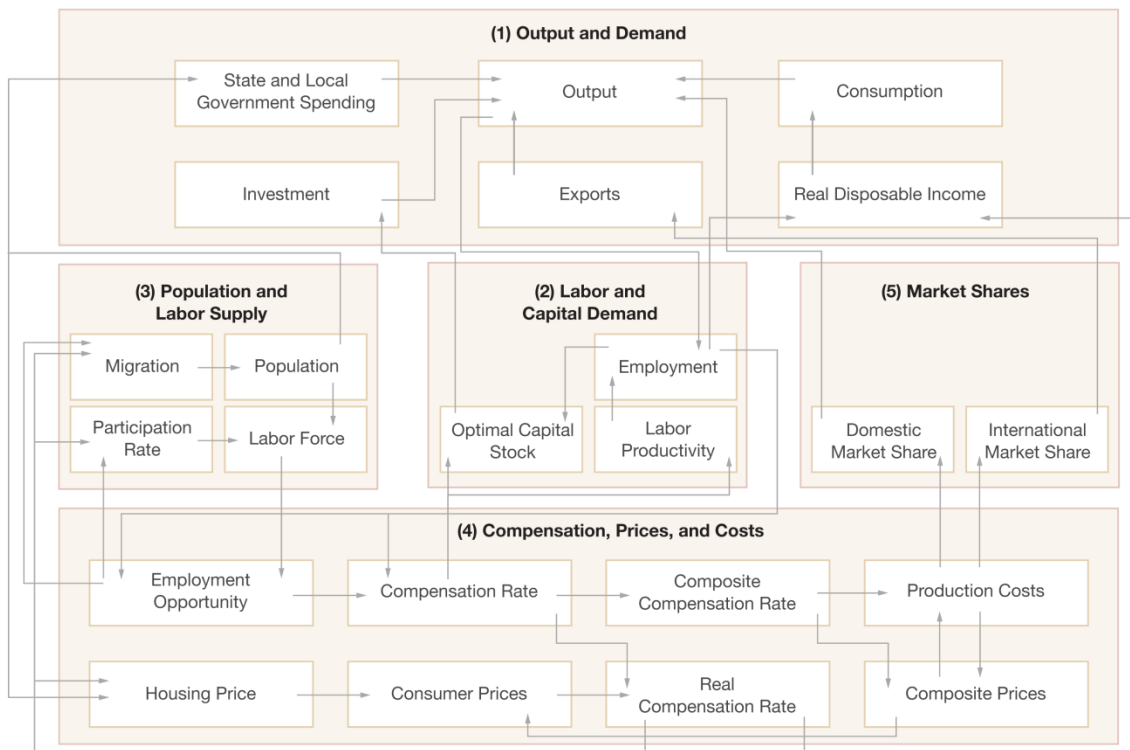
Appendix II: The PI⁺ Model

PI⁺ is a structural economic forecasting and policy analysis model. It integrates input-output, computable general equilibrium, econometric and economic geography methodologies. The model is dynamic, with forecasts and simulations generated on an annual basis and behavioral responses to compensation, price, and other economic factors.

The model consists of thousands of simultaneous equations with a structure that is relatively straightforward. The exact number of equations used varies depending on the extent of industry, demographic, demand, and other detail in the specific model being used. The overall structure of the model can be summarized in five major blocks: (1) Output and Demand, (2) Labor and Capital Demand, (3) Population and Labor Supply, (4) Compensation, Prices, and Costs, and (5) Market Shares. The blocks and their key interactions are shown in Figure 10 and Figure 11.

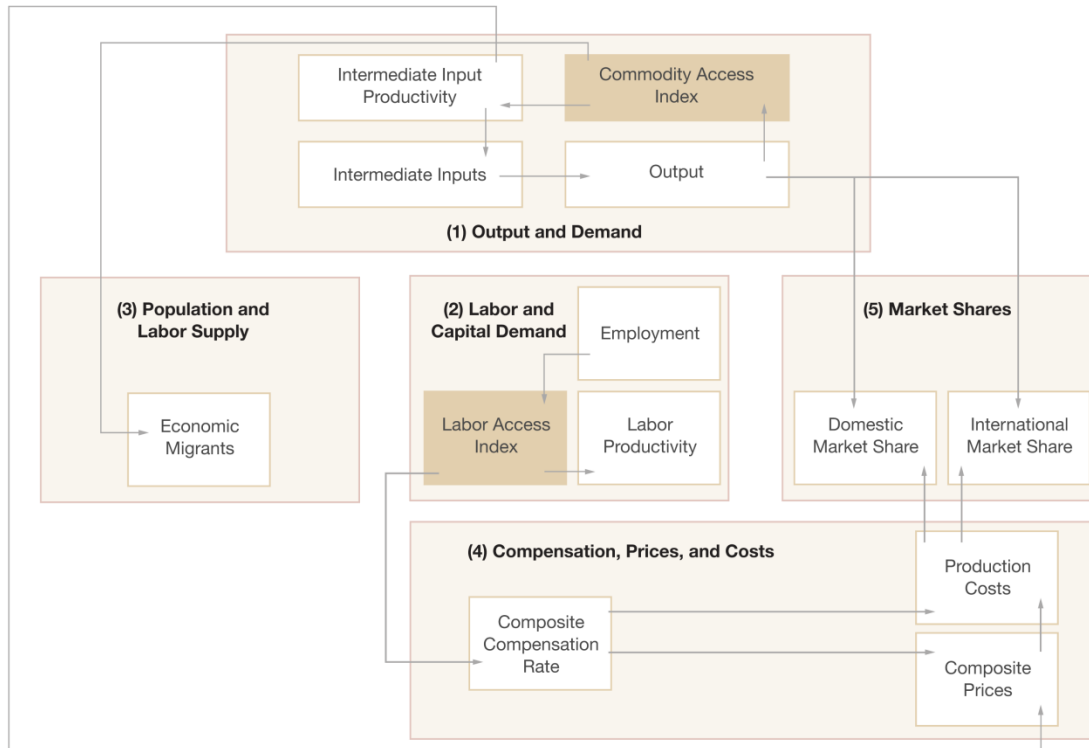
Figure 10: REMI model linkages

REMI Model Linkages (Excluding Economic Geography Linkages)



Source: Regional Economic Models Inc.

Figure 11: Economic geography linkages



Source: Regional Economic Models Inc.

The Output and Demand block consists of output, demand, consumption, investment, government spending, exports, and imports, as well as feedback from output change due to the change in the productivity of intermediate inputs. The Labor and Capital Demand block includes labor intensity and productivity as well as demand for labor and capital. Labor force participation rate and migration equations are in the Population and Labor Supply block. The Compensation, Prices, and Costs block includes composite prices, determinants of production costs, the consumption price deflator, housing prices, and the compensation equations. The proportion of local, inter-regional, and export markets captured by each region is included in the Market Shares block.

Models can be built as single region, multi-region, or multi-region national models. A region is defined broadly as a sub-national area, and could consist of a state, province, county, or city, or any combination of sub-national areas.

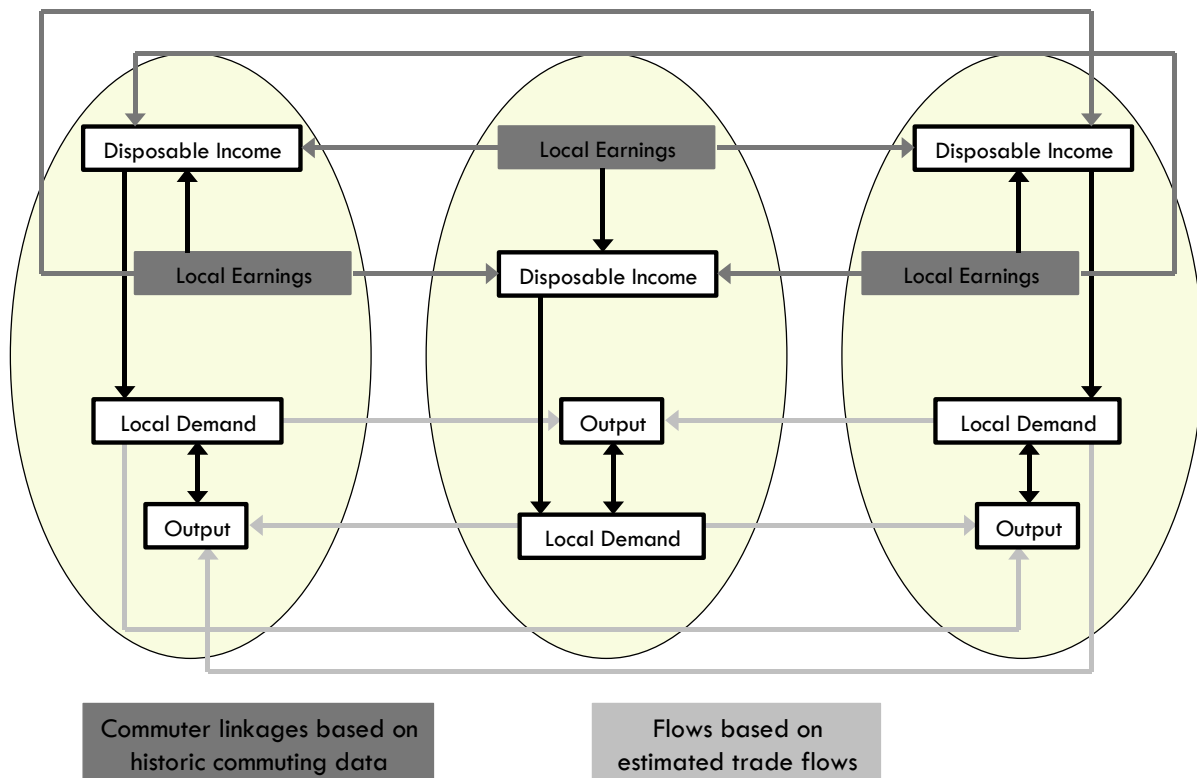
Single-region models consist of an individual region, called the home region. The rest of the nation is also represented in the model. However, since the home region is only a small part

of the total nation, changes in the home region do not have an endogenous effect on the variables in the rest of the nation.

Multi-regional models have interactions among regions, such as trade and commuting flows. These interactions include trade flows from each region to each of the other regions. These flows are illustrated for a three-region model in Figure 12.

Figure 12: Trade and commuter flow linkages

Trade and Commuter Flow Linkages



Multiregional national models also include a central bank monetary response that constrains labor markets. Models that only encompass a relatively small portion of a nation are not endogenously constrained by changes in exchange rates or monetary responses.

Block 1. Output and Demand

This block includes output, demand, consumption, investment, government spending, import, commodity access, and export concepts. Output for each industry in the home region is determined by industry demand in all regions in the nation, the home region's share of each market, and international exports from the region.

For each industry, demand is determined by the amount of output, consumption, investment, and capital demand on that industry. Consumption depends on real disposable income per capita, relative prices, differential income elasticities, and population. Input productivity depends on access to inputs because a larger choice set of inputs means it is more likely that the input with the specific characteristics required for the job will be found. In the capital stock adjustment process, investment occurs to fill the difference between optimal and actual capital stock for residential, non-residential, and equipment investment. Government spending changes are determined by changes in the population.

Block 2. Labor and Capital Demand

The Labor and Capital Demand block includes the determination of labor productivity, labor intensity, and the optimal capital stocks. Industry-specific labor productivity depends on the availability of workers with differentiated skills for the occupations used in each industry. The occupational labor supply and commuting costs determine firms' access to a specialized labor force.

Labor intensity is determined by the cost of labor relative to the other factor inputs, capital and fuel. Demand for capital is driven by the optimal capital stock equation for both non-residential capital and equipment. Optimal capital stock for each industry depends on the relative cost of labor and capital, and the employment weighted by capital use for each industry. Employment in private industries is determined by the value added and employment per unit of value added in each industry.

Block 3. Population and Labor Supply

The Population and Labor Supply block includes detailed demographic information about the region. Population data is given for age, gender, and race, with birth and survival rates for each group. The size and labor force participation rate of each group determines the labor supply. These participation rates respond to changes in employment relative to the potential labor force and to changes in the real after-tax compensation rate. Migration includes retirement, military, international, and economic migration. Economic migration is determined by the relative real after-tax compensation rate, relative employment opportunity, and consumer access to variety.

Block 4. Compensation, Prices and Costs

This block includes delivered prices, production costs, equipment cost, the consumption deflator, consumer prices, the price of housing, and the compensation equation. Economic geography concepts account for the productivity and price effects of access to specialized labor, goods, and services.

These prices measure the price of the industry output, taking into account the access to production locations. This access is important due to the specialization of production that takes place within each industry, and because transportation and transaction costs of distance are significant. Composite prices for each industry are then calculated based on the production costs of supplying regions, the effective distance to these regions, and the index of access to the variety of outputs in the industry relative to the access by other uses of the product.

The cost of production for each industry is determined by the cost of labor, capital, fuel, and intermediate inputs. Labor costs reflect a productivity adjustment to account for access to specialized labor, as well as underlying compensation rates. Capital costs include costs of non-residential structures and equipment, while fuel costs incorporate electricity, natural gas, and residual fuels.

The consumption deflator converts industry prices to prices for consumption commodities. For potential migrants, the consumer price is additionally calculated to include housing prices. Housing prices change from their initial level depending on changes in income and population density.

Compensation changes are due to changes in labor demand and supply conditions and changes in the national compensation rate. Changes in employment opportunities relative to the labor force and occupational demand change determine compensation rates by industry.

Block 5. Market Shares

The market shares equations measure the proportion of local and export markets that are captured by each industry. These depend on relative production costs, the estimated price elasticity of demand, and the effective distance between the home region and each of the other regions. The change in share of a specific area in any region depends on changes in its delivered price and the quantity it produces compared with the same factors for competitors in that market. The share of local and external markets then drives the exports from and imports to the home economy.

Appendix III: Pareto Analysis

Figure 13 below shows the total sales of all Lottery products from the total universe of 408 Lottery retailers, broken down into the top four deciles, and which demonstrates that the top 40% of retailers sell 77.74% of all Lottery products. Spectrum recommends that these top-performing 163 retailers be encouraged to apply for, and obtain, a sports-betting license.

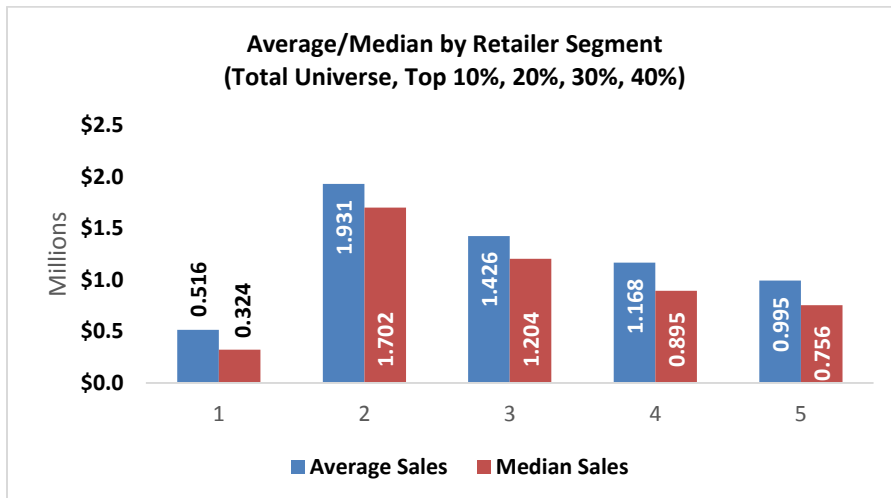
Figure 13: Total lottery sales by retailer segment, top four deciles market share

Segment	Universe	Retailers	Total Revenue (M)	Share	Average (M)	Median (M)
1	All	1 to 408	\$ 210.7	100.00%	\$ 0.516	\$ 0.324
2	Top 10%	1 to 41	\$ 79.2	37.60%	\$ 1.931	\$ 1.702
3	Top 20%	1 to 82	\$ 117.0	55.52%	\$ 1.426	\$ 1.204
4	Top 30%	1 to 122	\$ 142.5	67.63%	\$ 1.168	\$ 0.895
5	Top 40%	1 to 163	\$ 162.3	77.74%	\$ 0.995	\$ 0.756

Source: DC Lottery data, Spectrum Gaming Group

Figure 14 below shows the same top four deciles by average and median Lottery sales and shows these top 163 retailers sell an average \$0.995 million in Lottery sales on an annual basis, almost double the average (\$0.516m) of the entire universe of 408 retailers, thereby underpinning their likely potential to maximize sports-betting revenues.

Figure 14: Average and median lottery sales by retailer segment



Source: DC Lottery data, Spectrum Gaming Group

Appendix IV: Proposed Organizational Matrix

The following shows the proposed organizational matrix for the launch and initial management of sports betting by the DC Lottery, based on organizational structures adopted in developed sports-betting markets elsewhere. The indicative salary-range estimates have been produced from prevailing levels in Europe (Gibraltar and Malta) where similar industry roles exist, and which have then been indexed to reflect the cost of living in Washington DC, as at October 2018.

Figure 15: Proposed organizational matrix for DC Lottery sports betting

Level	Job Title	Key Function/Channel Priority	Reports to:	Dir Reports	Role/Responsibilities	Key External Relationships	Indicative Salary (L2)
1	Product Head, Sports Betting (PH, SB)	Leadership, Product Champion, all channels	Exec Dir	5	Bus Plan, P+L responsibility	SB Supplier	\$119k - \$142k
2	Channel Manager, Sports Betting	Existing Retail POS channel	PH, SB	0	Channel Development, Channel Ops	SB Supplier, Retailers	\$91k - \$112K
2	Channel Manager, Sports Betting	New Retail POS channel	PH, SB	0	Channel Development, Channel Ops	SB Supplier, Retailers	\$91k - \$112K
2	Channel Manager, Sports Betting	Digital/Mobile channel	PH, SB	0	Channel Development, Channel Ops	SB Supplier, Ad Agencies	\$91k - \$112K
2	Product/Promotions Manager, Sports Betting	All channels	PH, SB	0	Product Development, Promotions	SB Supplier, Ad Agencies	\$106k - \$130k
2	Analyst, Sports Betting	All channels	PH, SB	0	Reporting, Bus Plan Variance Analysis	SB Supplier, Bus Intel Provider	\$76k - \$93k
Total Headcount: 6					Total Gross Annual Salary Range		\$574k - \$701k
					Average Gross Annual Salary Range		\$96k - \$117k

Source: Spectrum Gaming Group

About This Report

This report was prepared by Spectrum Gaming Group, an independent research and professional services firm founded in 1993 that serves private- and public-sector clients worldwide. Our principals have backgrounds in operations, economic analysis, law enforcement, regulation and journalism. Spectrum holds no beneficial interest in any casino operating companies or gaming equipment manufacturers or suppliers. We employ only senior-level executives and associates who have earned reputations for honesty, integrity and the highest standards of professional conduct. Our work is never influenced by the interests of past or potentially future clients.

Each Spectrum project is customized to our client's specific requirements and developed from the ground up. Our findings, conclusions and recommendations are based solely on our research, analysis and experience. Our mandate is not to tell clients what they want to hear; we tell them what they need to know. We will not accept, and have never accepted, engagements that seek a preferred result.

Our public-sector clients in 47 countries on six continents have included government entities of all types, numerous gaming companies (national and international) of all sizes, both public and private. In addition, our principals have testified or presented before the following governmental bodies:

- British Columbia Lottery Corporation
- California Assembly Governmental Organization Committee
- Connecticut Public Safety and Security Committee
- Florida House Select Committee on Gaming
- Florida Senate Gaming Committee
- Georgia House Study Committee on the Preservation of the HOPE Scholarship Program
- Georgia Joint Committee on Economic Development and Tourism
- Illinois Gaming Board
- Illinois House Executive Committee
- Indiana Gaming Study Commission
- Indiana Horse Racing Commission
- International Tribunal, The Hague
- Iowa Racing and Gaming Commission
- Louisiana House and Senate Joint Criminal Justice Committee
- Massachusetts Gaming Commission
- Massachusetts Joint Committee on Bonding, Capital Expenditures, and State Assets
- Michigan Senate Regulatory Reform Committee
- National Gambling Impact Study Commission
- New Hampshire Gaming Study Commission
- New Jersey Assembly Regulatory Oversight and Gaming Committee
- New Jersey Assembly Tourism and Gaming Committee
- New Jersey Senate Legislative Oversight Committee
- New Jersey Senate Wagering, Tourism & Historic Preservation Committee

- New York Senate Racing, Gaming and Wagering Committee
- New York State Economic Development Council
- Ohio House Economic Development Committee
- Ohio Senate Oversight Committee
- Pennsylvania Gaming Control Board
- Pennsylvania House Gaming Oversight Committee
- Puerto Rico Racing Board
- US House Congressional Gaming Caucus
- US Senate Indian Affairs Committee
- US Senate Permanent Subcommittee on Investigations
- US Senate Select Committee on Indian Gaming
- US Senate Subcommittee on Organized Crime
- Washington State Gambling Commission
- West Virginia Joint Standing Committee on Finance
- World Bank, Washington, DC

Disclaimer

Spectrum Gaming Group has made every reasonable effort to ensure that the data and information contained in this study reflect the most accurate and timely information possible. The data are believed to be generally reliable. This study is based on estimates, assumptions, and other information developed by Spectrum from its independent research effort, general knowledge of the gaming industry, and consultations with the Client and its representatives. Spectrum shall not be responsible for any inaccuracies in reporting by the Client or its agents and representatives, or any other data source used in preparing or presenting this study. The data presented in this study were collected through the cover date of this report. Spectrum has not undertaken any effort to update this information since this time.

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