The AndCan™ Index:
2019 Benchmark Revision

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PURPOSE OF INDEX

The 2019 benchmarked *AndCan™ Index* represents consumer demand for legal cannabis products for all 50 states in the United States. The index has been produced by Anderson Economic Group since 2017, using a rigorous methodology based on fundamentals of consumer demand. This is the first benchmark revision since the original publication of the index.

The level of the *AndCan Index* represents aggregate nominal demand for recreational and medical marijuana in the United States. In both the 2017 and 2019 benchmarks, the index is set at a level of 100 for November 2016, and contains data beginning in January 2015.

The original methodology for the index, and the methodology we us in this benchmark revision, estimates demand in states (and portions of states) that have not yet legalized marijuana for medical or recreational use, as well as those in which some such sales are legal. Furthermore, we include states where data are not yet available from government sources, but where some sales are legal.

HISTORY OF THE INDEX

The 2019 benchmarked *AndCan Index* is the product of over four years of research on consumer demand for cannabis products in the United States. In this time, Anderson Economic Group has conducted multiple comprehensive assessments of the cannabis market in the U.S.

Early Research. In November 2015, we issued the first edition of The Market for Legal Cannabis Products in the 50 United States. We published the second edition a year later, following the results of the nine ballot initiatives regarding marijuana legalization in the 2016 election. We presented our methodology at

two conferences in two countries: the Allied Social Science Association Annual Meeting in January 2015 and the National Association of Forensic Economists International Conference in May 2015.

2017 Benchmarked *AndCan Index*. In June 2017, we launched the first iteration of our proprietary monthly *AndCan Index*. The index included realized recreational sales and medical patient data for a limited number of states and relied on estimates of latent demand for the remaining states.

2019 Benchmarked *AndCan Index*. In March 2019, we launched the 2019 benchmarked *AndCan Index*, which included a number of methodological and data improvements. We added data for a number of states that were not included in the original index and updated our methodology to take advantage of the new data.

CONSTRUCTING THE INDEX

Data Sets. The index is constructed from three sets of data:

1. Actual ("observed") sales of both medical and recreational cannabis products in states where these are legal;
2. Estimates of actual sales of both medical and recreational cannabis products in states where these are legal, but where sales data are unavailable; and
3. Estimates of unobserved ("latent") demand in those states and for those categories of products that are not legally sold under state laws.

These data are collected on a regular basis by consultants at Anderson Economic Group. For some states and products, data are available directly from the government agency that taxes or regulates legal sales. In other states and for other products, direct sales data are not available, and sales are estimated by the project staff. For other states and products, the latent (unobserved) demand for the products are estimated.

Measurement, Reporting, and Other Errors; Adjustments. For all data sources, there exists both measurement error and vagaries involving product categories. Furthermore, both government and private agencies occasionally misreport sales or taxes collected on sales, or report using non-standard methods and definitions. We periodically revise the data back several months to correct reporting errors, include the most recent observations, and make adjustments to take into account changes in reporting categories or methods.

Trajectories for Newly-Legalized States. The *AndCan Index* utilizes inputs from state data on medical marijuana patients, medical cannabis product sales, and recreational cannabis product sales. This data is fed into a model that accounts for the number of months since a state's recreational or medical market came online. An initial value/trajectory method is used to estimate medical and recreational sales for states without available data. For states that rely on these estimates of demand, state-by-state adjustments are made for inter-state prices, differing state consumption habits, and product concentration.

FEATURES OF THE 2019 BENCHMARKED ANDCAN INDEX

The 2019 benchmarked *AndCan Index* includes a number of methodological and data improvements.

Methodology. Methodological enhancements include:

- The introduction of an initial value/trajectory method to estimate the number of medical patients there would be in states that have not legalized medical marijuana, as well as for states that have legalized but do not report their data publicly. For states that have legalized medical marijuana but do not report their data publicly, we estimate a trajectory that is unique to each state based on the number of months since the state's market opened as well as the population of that state.

- The introduction of an initial value/trajectory method that estimates average sales per capita across states with existing recreational sales data. For states that have legalized recreational marijuana but do not report their data publicly, we estimate a trajectory that is unique to each state based on the number of months since the state's market opened as well as the population of that state.

- An improvement by which we utilize recreational sales data to estimate medical marijuana demand for states with a legalized medical marijuana market. This is an enhancement on our 2017 methodology because it takes into account the dual effects of having simultaneous legal markets for both medical and recreational marijuana.

**Data.** Data improvements include:

- Medical patient data for six new states to complement the existing data for seven states, including Minnesota, Montana, New Hampshire, Connecticut, New York, and Rhode Island.

- The incorporation of actual state sales data for two additional recreational states and two additional medical states: Nevada, Massachusetts, Illinois, and Maryland.

- Monthly updates to our price index, which adds variability in consumer demand for cannabis products based on the price of marijuana in each state.

- Annual updates to our alcohol expenditures index.

COMPARISON OF THE 2017 ANDCAN INDEX WITH 2019 BENCHMARKED ANDCAN INDEX

We expect that a new benchmark, especially one with both data and methodology improvements, will produce a slightly different index. This is the case for the 2019 benchmark AndCan Index compared with the 2017 benchmark:

- The overall indication of the index, using both benchmarks, is quite consistent. Both indicate that demand for legal cannabis products has grown consistently during the years 2017-2019. See Figure 1 below.

- Under both benchmarks, growth has outpaced general consumer expenditures.

- However, the 2019 benchmark *AndCan Index* indicates that consumer demand for cannabis products grew about 9.3% faster since November 2016 than the 2017 benchmark index.

- Growth in the 2019 benchmark index outpaced that of the 2017 index for the last seven months.

FIGURE 1. Comparison of the 2017 and 2019 Benchmarked *AndCan Index*
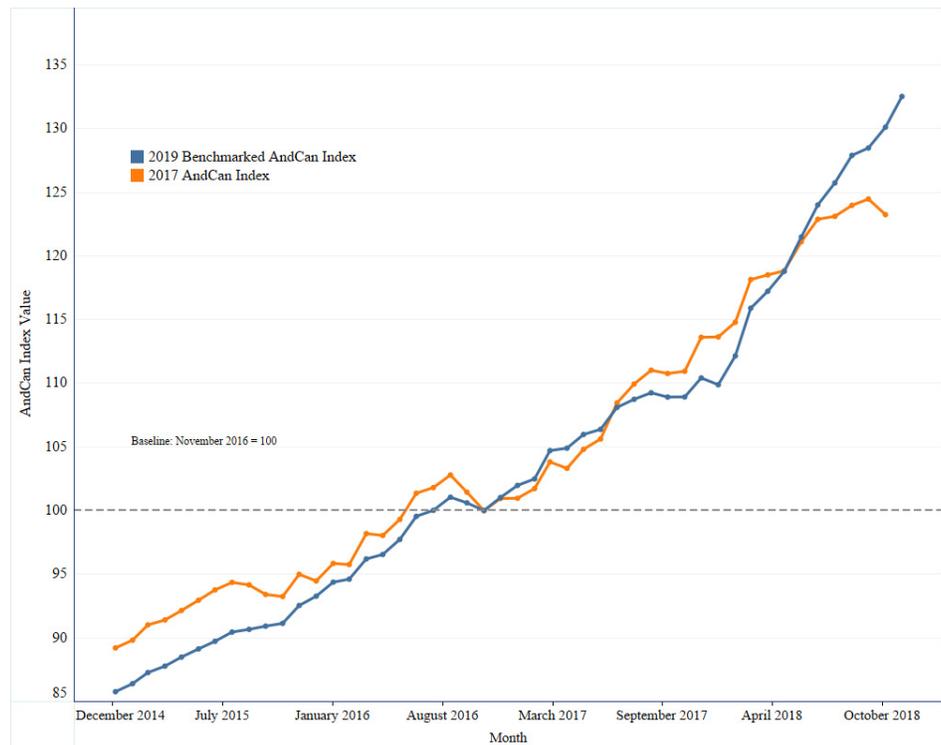
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Prohibited Uses. No derivative works (such as compiling the index and re-presenting it) are allowed.

Licensed Use of State-level Component Data. Anderson Economic Group generates estimates for state-level data using its professional judgement, available data, and methods that it considers proprietary. These state-level component data are available for license to organizations that seek a comprehensive dataset on estimated medical and recreational consumer demand for cannabis products in the United States. Use of these data requires payment of a license fee and an agreement to not re-distribute the data.

- For more information, contact Brandon Betz, Senior Analyst, at bbetz@andersoneconomicgroup.com.

LIMITATIONS

The *AndCan Index,* like all economic indicators, is based on data that is subject to measurement error, reporting vagaries, definition changes, and incompleteness. Furthermore, the cannabis market is subject to considerably more uncertainty, including conflict of laws, rapidly changing market conditions, nonstandard definitions, and product evolution, than the market for most consumer products. Finally, our methodology requires professional judgement, including educated guesses and substantial adjustments, for which there is often no clear standard or known correct answer.

While we strive to follow a specific methodology to produce the index and related data products, we acknowledge that no such methodology can provide precise indications for every market condition and in every time period. Therefore, we offer no warranty that the data in this index or any related product will be accurate, precise, or useful. We explicitly disclaim the use of the index for the purposes of investment advice.

ABOUT ANDERSON ECONOMIC GROUP

Founded in 1996, Anderson Economic Group is a boutique research and consulting firm, with offices in East Lansing, Michigan, and Chicago, Illinois. Anderson Economic Group consultants have particular expertise in public policy, taxation, and market analyses. Relevant Anderson Economic Group publications and projects include:

- *Tax Note: Tax Revenues from Legalizing Recreational Marijuana Under Michigan's Proposal 18-1* published in October 2018.

- Multiple editions of the Anderson Economic Group *Business Tax Burden™* studies, covering all 50 states.

- The monthly *AndCan Index*, published since 2017.

- *The Market for Legal Cannabis Products in the 50 United States*, published in 2015 and 2016.

- Numerous market and valuation analyses involving beer, wine, and spirits suppliers and wholesalers in multiple US states, and in some other countries.

- Numerous franchise industry analyses, including nearly every major automobile and motorcycle brand sold in the United States.

For more information about Anderson Economic Group, please visit our website at https://www.AndersonEconomicGroup.com.

ABOUT THE AUTHOR

Brandon Betz. Mr. Betz is a Senior Analyst with Anderson Economic Group, working in the Public Policy and Economic Analysis practice area. His work focuses on cost-benefit, economic impact, and fiscal impact analysis.

Mr. Betz has performed a number of cannabis related analyses for Anderson Economic Group. This work includes studies on the tax revenue impacts of legalizing recreational marijuana in Michigan as well as the monthly publication of the *AndCan Index*.

Mr. Betz holds a Master's degree in Economics with a specialization in public economics from Syracuse University and a Bachelor's degree in Economics with a minor in Mathematics from Brigham Young University.

ACKNOWLEDGEMENTS

Patrick L. Anderson. Patrick L. Anderson is the Principal & CEO of Anderson Economic Group.

Mr. Anderson was the original author of *The Market for Legal Cannabis Products in the 50 United States*, which was based on the methodology behind the 2015 and 2016 presentations listed in "History of the Index" on page 1. His contributions to and expertise on the literature on consumer demand for cannabis products has been essential to developing the *AndCan Index* to the form that it is today.

Mr. Anderson is a graduate of the University of Michigan, where he earned a Master of Public Policy degree and a Bachelor of Arts degree in political science. He is a member of the National Association for Business Economics and the National Association of Forensic Economists. The Michigan Chamber of Commerce awarded Mr. Anderson its 2006 Leadership Michigan Distinguished Alumni award for his civic and professional accomplishments. The University of Michigan Ford School of Public Policy awarded him its Neil Staebler Award for civic participation in 2014.

Traci Giroux. Ms. Giroux was the project manager for the *AndCan Index* in 2017 and 2018, and contributed many ideas and work for the updated methodology and data improvements seen in the 2019 benchmark.

Kenan Cosguner. Mr. Cosguner is the 2019 project manager for the *AndCan Index*. Much of Kenan's work is behind the scenes ensuring that the index is properly updated and consistent with expectations. His leadership has been integral to the success of the benchmarking process.

Mr. Cosguner is the firm's financial controller and a Consultant working in the firm's Strategy & Business Valuation practice area. His work includes financial and industrial data analysis, equity research, and valuation. He specializes in beverage, food and non-food retail, automotive, and franchise businesses.

Mr. Cosguner holds an MBA degree with concentrations in Accounting and Finance from the Eli Broad Graduate School of Management at Michigan State University, and a BS degree in industrial engineering from Bilkent University in Ankara, Turkey. He has been a Chartered Financial Analyst (CFA charterholder) since 2001.