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The Illinois Institute for Rural Affairs (IIRA) works to improve the quality of life for rural residents by partnering with public and private agencies on local development and enhancement efforts.

Western Illinois University

Marijuana Tax Revenues: Estimates for Illinois Counties, July 1, 2020 to April 30, 2021

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Introduction

In 2020, adult use marijuana sales in Illinois exceeded $660mil and the state collected more than $175mil in tax revenue[2]; state taxes are deposited in the new Cannabis Regulation Fund and a proportion of the revenue is transferred to the Local Government Distributive Fund to support crime prevention and other initiatives related to the cannabis market[3]. County governments, in addition to state and local retail taxes, can levy an additional 3.75% tax on retailers' gross receipts from sales of adult use cannabis[4].

This paper estimates marijuana tax revenues at the county level[5]. Counties were allowed to collect taxes on recreational marijuana sales starting July 2020. A few counties list their monthly tax revenues from marijuana on their website[6]. Most do not[7]; they file Annual Financial Reports with the state comptroller which has a

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[2] Moore, B. (2021). Higher and Higher Watch now: Recreational pot made $175mil in Illinois tax revenue… *The Pantagraph* (Bloomington, IL), February 21, 2021.
[3] Summary of HB 1438 – The Cannabis Regulation and Tax Act, https://www.illinoispolicy.org/what-you-need-to-know-about-marijuana-legalization-in-illinois/
[4] See Illinois Department of Revenue, informational Bulletin, FY 2021-08, November 2020.
[5] The previous Research Brief, 3(7), highlighted profiles of marijuana users; see http://www.iira.org/wp-content/uploads/2021/05/Market-Demand-for-Marijuana_May7.pdf.
[6] See, for example, https://www.co.adams.il.us/public-records/financial-reports-and-audits.
[7] See, for example, http://mcg.mcdonough.il.us/index.html.

time lag, from data collection to publication. What is needed for policy purposes is an estimate of marijuana sales tax revenues, at the county level, based on use purposes, for example, medical. Since accuracy in measurement depends upon sound conceptualization of the problem to be addressed, we start with a theory of government and taxes and proceed to operationalize relevant concepts in the methods section.

Theory[8]

Human survival is based on need satisfaction, both physiological (for example, hunger) and learned needs (for example, transportation). There are two ways of gaining what one needs: by economic means, work and make things that one needs, and political means or forcible appropriation of the labor of others (theft). In general, if there is opportunity and power, a person would prefer political means of need satisfaction.

To illustrate, consider Table 1; it depicts a scenario (game) where two persons could either make or steal needed products. In row 1 and column 1, both persons work and make seven products each. In row 1 and column 2, person B takes products away from person A, but person A doesn't steal; the reverse is true for row 2 and column 1, person A steals from person B. In row 2 and column 2, both persons steal from each other. The question is about the outcome, which cell is likely to be a valid representation of reality.

Table 1: Game Theory Demonstration of Outcomes, for Economic versus Political Means of Need Satisfaction: Entries are Number of Things (Products) Possessed (Made / Stole) by Each Person

		Person B	
		Make Things / Work	**Take Things / Political**
Person A	**Make Things / Work**	7,7	0,10
	Take Things / Political	10,0	3,3

[8] This section is based on discussions from Oppenheimer, F. (1975). *The State*; Olson, M. (1993). Dictatorship, Democracy, and Development. *American Political Science Review*, 87, 567-576; Usher, D. (1992). *Welfare Economics of Markets, Voting, and Predation*; Hilgard's *Learning Theory*, and John von Neumann. *American Mathematical Soc*.

For a small group and for repeated number of trials, the players would learn that the best outcome for both is not to steal from each other (7 + 7 =14). However, with large numbers, self-interest will dominate and the outcome would be "steal, steal" (3,3). This is why we need law and order (government) to steer the society in the right direction, optimal production in our case.

If we relabel coordinates of Table 1 as "government" and "society" and think of taxes as government appropriating resources from citizens, then optimality in economic development is indicated by the concept of 'minimal state'; in other words, government will encourage "making" over "taking" or theft and will do this by taxing less. However, there are exceptions to this policy. For example, government may impose higher taxes on goods that people may want, but could be harmful for them[9]. Adult use marijuana falls in this category.

In summary, taxes on recreational marijuana can be justified using the concepts of government, minimal state, and merit goods. How do Illinois' counties tax adult use marijuana? How could we estimate tax revenues for counties? These questions are addressed next.

Methodology

The focus is on county government. The minimal state and merit goods concepts were operationalized using county tax rates sourced from https://mytax.illinois.gov/_/; for example, Figure 1 shows tax rates for adult use cannabis in McDonough County. Appendix 1 highlights tax rates, for both medical and recreational marijuana, for all counties.

Figure 1: Tax Rate for Recreational Marijuana, McDonough County

Local Government	:	McDonough County
County	:	McDonough
Location Code	:	055 5000 1
Rate as of	:	5/21/2021
Rate Category	:	Sales Taxes (retailers' and service occupation taxes)
Rate Type	:	Adult Use Cannabis
Rate Total	:	11.750%

Rate Breakdown

CD1 County Public Safety	0.750%
CD1 County School Facility Tax	1.000%
County Cannabis Tax	3.750%
State Tax	6.250%

[9] It is called 'merit goods'; see Musgrave, R. A. (1959). *The Theory of Public Finance*.

Marijuana tax revenues were estimated for the geographies for the time period July 1, 2020 – April 30, 2021; estimates were based on micro data from the National Survey on Drug Use and Health, 2019 data[10]. Questions about market information, variables MMLSOZS, MMLSGMS, MMLSLBS, and MMLS10GM, were used to estimate marijuana purchases in the metro and the nonmetro regions. These numbers were weighted by the number of medical marijuana users and recreational marijuana users in the county, and the results multiplied by *county marijuana tax rate* to arrive at estimates of tax revenues. Table 2 shows the operational definitions of variables and illustrates computations, symbolically.

Table 2: Operational Definitions of Variables Used in Estimating Marijuana Tax Revenues for Illinois Counties

Variable	Definition	How Used in Tax Rate Estimation Procedure
MMLSOZS	Amount of marijuana bought last time, ounces; seven levels, with level 1 = 1/8th to 1/4th ounce and level 7 = 10 to LT 16 ounce.	Used in estimating marijuana consumption; the median levels were used as indicators of consumption quantity. For example, level 7 was scored 13.5 ounces.
MMLSGMS	Amount of marijuana bought last time, grams; 1 to <5 grams; 5 to < 10 grams.	Median values were used as estimates of consumption quantity; for example, level 1 = 3 ounces.
MMLSLBS	Amount of marijuana bought last time, pounds; 1 to <2 pounds; 2 to <3 pounds; 3 to <4 pounds; 4 to <5 pounds, and ≥5 pounds.	Median values were employed to denote consumption quantity. The last level, ≥5 pounds, was set to 5.
MMLS10GM	Amount of marijuana bought last time, over 10 grams; the ratio level measure had values 10-99.	Actual values were used in the computation.
$MJUNAC_i$	Marijuana quantity purchased, per medical user and per recreational user of marijuana.	Derived from the four variables above and Table 2 in *Research Brief*, 3(7)[11].
CPOP	County population numbers, 21+ age group; ACS, 2019 five-year estimates.	Data used to estimate total marijuana consumption at the county. $County\ marijuana\ consumption = MJUNAC \times CPOP$.
UPRICE	Price of marijuana in Illinois, per ounce.	Average price obtained from http://budzu.com/prices/usa/illinois and used in the estimation algorithm.
MJTA	County tax rates.	See Appendix 1; actual numbers were used in the estimating equation, $County\ marijuana\ tax\ revenue = MJUNAC_i\ x\ CPOP\ x\ UPRICE \times MJTA$

[10] https://www.samhsa.gov/data/sites/default/files/reports/rpt29395/2019NSDUHMethodsSummDefs/2019NSDUHMethodsSummDefs082120.htm

[11] http://www.iira.org/wp-content/uploads/2021/05/Market-Demand-for-Marijuana_May7.pdf.

Results

Figure 2 shows estimates of tax revenues from medical marijuana sales for nonmetro counties for the period, July 2020 to April 2021. Hardin County had the lowest revenue, $2,436, and Lasalle County posted the highest tax revenue from medical marijuana sales, $64,751.

Figure 2: Medical Marijuana Tax Revenues: Nonmetro Counties

```
                           count                mean                   std     min  \
Tax Revenue_Medical Use     63.0 14,147.36507936508 10,650.891598755397 2,436.0

                             10%     25%      50%      75%                90%  \
Tax Revenue_Medical Use 3,856.0 7,823.5 10,587.0 19,847.5 26,044.00000000002

                             max  total data_type  missing
Tax Revenue_Medical Use 64,751.0     63     int64        0
2436
    ¡
  0 | 2333344444
    | 56677888888889999
  1 | 0000111233334
    | 7778
  2 | 000001112233
    | 7
  3 | 00039
    |
  4 |
    |
  5 |
    |
  6 |
    | 5
    !
64751
Key:
6|5 => 6.5x10000 = 65000.0
```

For recreational marijuana, tax information was available for 46% or 29 of the 63 rural counties[12]. Since recreational marijuana is taxed almost four times more than medical marijuana, tax receipts are expected to be higher for adult use marijuana. This belief is confirmed by empirical analysis, see Figure 3. The median tax receipts for recreational marijuana is slightly more than $34,000, three times more than the average medical marijuana taxes. Gallatin County benefitted the least from marijuana tax revenues, taxes averaged less than $1,000 per month.

[12] Data sourced from https://mytax.illinois.gov/_/.

Figure 3: Recreational Marijuana Tax Revenues: Nonmetro Counties

```
                                count                 mean                  std  \
Tax Revenue_Non_Medical Use      29.0 35,438.44827586207 23,474.133715320124

                                  min                  10%      25%      50%  \
Tax Revenue_Non_Medical Use 6,231.0 8,315.800000000001 18,147.0 34,094.0

                                  75%                  90%       max  total  \
Tax Revenue_Non_Medical Use 43,367.0 61,710.99999999999 104,935.0     63

                               data_type  missing
Tax Revenue_Non_Medical Use      float64       34
6231.0
    ¡
  0 | 67889
  1 | 348
  2 | 01379
  3 | 346
  4 | 0012335
  5 | 4
  6 | 016
  7 | 8
  8 |
  9 |
 10 | 5
    !
104935.0
Key:
10|5 => 10.5x10000 = 105000.0
```

Among metro counties, Cook County gained the most tax revenues, about $16mil. Stark County benefitted the least from marijuana taxes, the county gained $12,903 in marijuana taxes for the 10-month period. Appendix 2 shows tax revenue estimates for both the metro and the nonmetro counties.

Summary and Conclusion

This paper estimates marijuana tax revenues for Illinois counties for the period July 1, 2020 to April 30, 2021. Tax rates for marijuana varied by use type; 1% (median) for medical marijuana and 3.75% (median) for recreational marijuana (Appendix 1). Data from the National Survey on Drug Use, 2019, were used to estimate quantity purchased by the population in both the metro and the nonmetro regions. Symbolically, marijuana tax revenue for county *i* was estimated using the expression:

$$TaxRev_{county} = QPurch_{Med.} \times Price\ per\ Gram \times Tax\ Rate_{Rec.}$$

The variable, “QPurch.” (Quantity purchased) had two multipliers, “10” to indicate marijuana use once a month and

"200" to indicate marijuana use at least 20 times during a month. Results of data analysis suggest that counties gained the most taxes from recreational marijuana sales (Appendix 2). It is essential to note that our estimates are lower limits; for example, state appropriations to counties from state taxes on marijuana are not included.

Extant research on marijuana use suggests that complementarity exists among recreational marijuana use, food sales, and alcohol consumption[13]. This paper is an initial step in analyzing the economic impacts of legalized marijuana sales at the county level.

[13] See for example, Wen, H., Hockenberry, J. M., & Cummings, J. R. (2015). The effect of medical marijuana laws on adolescent and adult use of marijuana, alcohol, and other substances. *Journal of health economics*, *42*, 64-80.

Appendix 1: Cannabis Tax Rates, as at May 18, 2021; Unit = %

County	Medical Cannabis	Adult Use Cannabis	County Cannabis Tax
Adams	1	10.25	3.75
Alexander	1	10	3.75
Bond	1	11	3.75
Boone	1	7.75	
Brown	1	11.25	3.75
Bureau	1	11	3.75
Calhoun	1	8	
Carroll	1	10.25	3.75
Cass	1	12	3.75
Champaign	1	11.25	3.75
Christian	1	11	3.75
Clark	1	7.25	
Clay	1	6.75	
Clinton	1	6.25	
Coles	1	7.25	
Cook	2.25	12	3
Crawford	1	10	3.75
Cumberland	1	11	3.75
DeKalb	1	10	3.75
DeWitt	1	10	3.75
Douglas	1	7.25	
DuPage	1.75	7	
Edgar	1	8.25	
Edwards	1	11	3.75
Effingham	1	6.5	
Fayette	1	7.25	
Ford	1	10	3.75
Franklin	1	8.25	
Franklin	1	8.25	
Fulton	1	11.5	3.75
Gallatin	1	11	3.75
Greene	1	7.25	
Grundy	1	6.25	
Hamilton	1	8.25	
Hancock	1	6.25	
Hardin	1	8.25	
Henry	1	11.5	3.75
Iroquois	1	10.25	3.75
Jackson	1	8.75	1.5
Jasper	1	7.25	
Jefferson	1	10.5	3.75
Jersey	1	8	
Jo Daviess	1	11	3.75
Johnson	1	7.75	
Kane	1	7	

Kankakee	1	10	3.75
Kendall	1	11	3.75
Knox	1	11.5	3.75
La Salle	1	9.5	3
Lake	1	10.75	3.75
Lawrence	1	11	3.75
Lee	1	11.5	3.75
Livingston	1	11	3.75
Logan	1	8.25	
Macon	1	7.75	
Macoupin	1	11	3.75
Madison	1	6.6	
Madison	1.25	6.85	
Marion	1	7.5	
Marshall	1	10	3.75
Mason	1	7.25	
Massac	1	6.25	
McDonough	1	11.75	3.75
McHenry	1	10.75	3.75
McLean	1	10	3.75
Menard	1	8.25	
Mercer	1	7.25	
Monroe	1	7.5	
Montgomery	1	11	3.75
Morgan	1	11	3.75
Moultrie	1	6.75	
Ogle	1	10	3.75
Peoria	1	11	3.75
Perry	1	7.75	
Piatt	1	7.25	
Pike	1	7.75	
Pope	1	6.25	
Pulaski	1	6.25	
Putnam	1	10	3.75
Randolph	1	7.25	
Richland	1	7.75	
Rock Island	1	11	3.75
Saline	1	11.75	3.75
Sangamon	1	11	3.75
Schuyler	1	7.25	
Scott	1	7.25	
Shelby	1	7.25	
Stark	1	11.25	3.75
Stephenson	1	10.5	3.75
Tazewell	1	10.5	3.75
Union	1	12.25	3.75
Vermilion	1	10.25	3.75
Wabash	1	7.25	
Warren	1	7.25	

Washington	1	6.25	
Wayne	1	7	
White	1	7.25	
Whiteside	1	11	3.75
Will	1	10.75	3.75
Williamson	1	11	3.75
Winnebago	1	11.5	3.75
Woodford	1	12	3.75

Appendix 2: Tax Revenue Estimates, July 1, 2020 to April 30, 2021

Nonmetro, unit $

County	Tax Revenue_Medical Use	Tax Revenue_Non_Medical Use	Total Tax
Adams	38733	78464	117197
Brown	4188	8484	12672
Bureau	19727	39961	59688
Carroll	8958	18147	27105
Cass	7115	14414	21529
Christian	19951	40415	60366
Clark	9100	NA	9100
Clay	7861	NA	7861
Coles	30017	NA	30017
Crawford	11554	23405	34959
Cumberland	6360	12883	19243
Douglas	11021	NA	11021
Edgar	10587	NA	10587
Edwards	3773	7643	11417
Effingham	19685	NA	19685
Fayette	12963	NA	12963
Franklin	22936	NA	22936
Franklin	22936	NA	22936
Fulton	21260	43067	64327
Gallatin	3076	6231	9307
Greene	7863	NA	7863
Hamilton	4831	NA	4831
Hancock	10795	NA	10795
Hardin	2436	NA	2436
Henderson	4249	8607	12855
Iroquois	16520	33466	49986
Jasper	5593	NA	5593
Jefferson	22383	45343	67726
Jo Daviess	13368	27081	40449
Johnson	7786	NA	7786
Knox	29882	60534	90416
LaSalle	64751	104935	169686
Lawrence	10004	20266	30270
Lee	20888	42314	63202
Livingston	21408	43367	64774

Appendix 2: Tax Revenue Estimates, July 1, 2020 to April 30, 2021

Nonmetro, unit $

County	Tax Revenue_Medical Use	Tax Revenue_Non_Medical Use	Total Tax
Adams	38733	78464	117197
Brown	4188	8484	12672
Bureau	19727	39961	59688
Carroll	8958	18147	27105
Cass	7115	14414	21529
Christian	19951	40415	60366
Clark	9100	NA	9100
Clay	7861	NA	7861
Coles	30017	NA	30017
Crawford	11554	23405	34959
Cumberland	6360	12883	19243
Douglas	11021	NA	11021
Edgar	10587	NA	10587
Edwards	3773	7643	11417
Effingham	19685	NA	19685
Fayette	12963	NA	12963
Franklin	22936	NA	22936
Franklin	22936	NA	22936
Fulton	21260	43067	64327
Gallatin	3076	6231	9307
Greene	7863	NA	7863
Hamilton	4831	NA	4831
Hancock	10795	NA	10795
Hardin	2436	NA	2436
Henderson	4249	8607	12855
Iroquois	16520	33466	49986
Jasper	5593	NA	5593
Jefferson	22383	45343	67726
Jo Daviess	13368	27081	40449
Johnson	7786	NA	7786
Knox	29882	60534	90416
LaSalle	64751	104935	169686
Lawrence	10004	20266	30270
Lee	20888	42314	63202
Livingston	21408	43367	64774

Logan	17365	NA	17365
Marion	22092	NA	22092
Mason	8263	NA	8263
Massac	8401	NA	8401
McDonough	16830	34094	50924
Montgomery	17556	35564	53120
Morgan	20451	41428	61879
Moultrie	8350	NA	8350
Ogle	29745	60257	90002
Perry	13059	NA	13059
Pike	9185	NA	9185
Pope	2715	NA	2715
Pulaski	3216	NA	3216
Putnam	3520	7131	10651
Randolph	19744	NA	19744
Richland	9178	NA	9178
Saline	14271	28910	43181
Schuyler	4273	NA	4273
Scott	2989	NA	2989
Shelby	12997	NA	12997
Stephenson	26821	54332	81153
Union	10146	20553	30699
Wabash	6858	NA	6858
Warren	9590	NA	9590
Washington	8406	NA	8406
Wayne	9626	NA	9626
White	8292	NA	8292
Whiteside	32787	66419	99206
TOTAL	$891284	$1027715	$1918998

Appendix 2, Cont'd.

Metro, Unit $

County	Tax Revenue_Medical Use	Tax Revenue_Non_Medical Use	Total Tax
Alexander	5110	9268	14378
Bond	14002	25398	39400
Boone	42149	NA	NA
Calhoun	4055	NA	NA
Champaign	164332	298075	462407
Clinton	31766	NA	NA
Cook	9690014	6249347	15939361
DeKalb	81119	147139	228258
DeWitt	13288	24103	37391
DuPage	1330696	NA	NA
Ford	10950	19861	30811
Grundy	40283	NA	NA
Henry	40652	73737	114389
Jackson	46871	34007	80877
Jersey	18052	NA	NA
Kane	415383	NA	NA
Kankakee	88581	160673	249253
Kendall	94187	170841	265027
Lake	554599	1005963	1560561
Macon	86723	NA	NA
Macoupin	38070	69054	107124
Madison	219657	NA	NA
Madison	274571	NA	NA
Marshall	9871	17904	27775
McHenry	248767	451228	699996
McLean	133753	242609	376362
Menard	10346	NA	NA
Mercer	13071	NA	NA
Monroe	28460	NA	NA
Peoria	146944	266535	413479
Piatt	13570	NA	NA
Rock Island	117914	213880	331794
Sangamon	162657	295037	457694
St. Clair	213544	387339	600883
Stark	4586	8317	12903
Tazewell	110350	200158	310508

Vermilion	62705	113738	176442
Will	541916	982958	1524874
Williamson	55966	101515	157481
Winnebago	231844	420532	652376
Woodford	30899	56046	86944
Total	$15442273	$12045262	$27487530