State of Oregon **Research Report**

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THE REVENUE IMPACT OF MARIJUANA LEGALIZATION UNDER MEASURE 91

In the November 2014 general election, voters will decide on ballot Measure 91 entitled the Control, Regulation, and Taxation of Marijuana and Industrial Hemp Act of 2014. This report estimates the revenue that is likely to result from the legalization and taxation of recreational marijuana use in Oregon. The initiative would legalize recreational marijuana purchase and use by individuals age 21 and over. It assigns the responsibility for the regulation and control of marijuana to the Oregon Liquor Control Commission (OLCC). Additionally, members of the public would be able to grow up to four plants at a time, and allowed to give limited amounts of marijuana and marijuana products to other individuals over age 21.

Summary of Revenue Estimates

The Legislative Revenue Office (LRO) estimates that in fiscal year 2017, the revenue from legal marijuana is expected to be $16.0 million with a lower range of $13.1 million and an upper range of $19.4 million. The **net revenue** (after startup and administrative costs) **in fiscal year 2017** is estimated to be **$9.4** million with a **lower range of $6.5** million and an **upper range of $12.8** million. Marijuana sales are expected to accelerate in the 2018 and 2019 fiscal years. For the **2017-19 biennium,** the net revenue (after administrative costs) is estimated to be **$40.9** million.

Legalization of marijuana will convert the current black market for marijuana to a gray market as tax and regulatory compliance are slow to take hold. The legalized regulated market is likely to achieve higher efficiency and more innovation with time and as circumstances improve. These technological advances are likely to exert downward pressure on the legal retail price in the future and drive a shift from the gray market to the legal recreational market. However, changes in federal law enforcement could substantially alter growth of the market in either direction because marijuana remains illegal at the federal level.

Legalization Initiatives

Oregon has a history of marijuana decriminalization. It was the first state to decriminalize cannabis possession in 1973. By 1978 the decriminalization in Oregon was followed by Alaska, California, Colorado, Mississippi, New York, Nebraska, North Carolina, and Ohio. In the second half of the 1990's many states have adopted a medical marijuana program. In 1996, California was the first state to legalize medical marijuana through Proposition 215. Since then, 23 states (including Oregon in 1998) and the District of Columbia have adopted medical marijuana programs. Full-scale legalization of recreational marijuana was first adopted in Washington and Colorado In 2011. Voters in these two states passed ballot measures (Initiative 502 in Washington) (Amendment 64 in Colorado) to legalize recreational marijuana.

Internationally, a number of nations have moved to decriminalize marijuana, but legalization remains relatively rare[1]. In December 2013, Uruguay was the first nation to adopt full legalization. It is the first national government to approve full-scale legalization of the drug. Even the coffee shops in the Netherlands must rely on black market suppliers, as the wholesaling of marijuana remains illegal. The same is true in Portugal 14 years after decriminalization[2].

In Oregon, Measure 91 is being considered by voters in the 2014 election. The measure would legalize recreational marijuana use, personal cultivation of up to 4 plants, and commercial cultivation, processing, and retail sales. Each stage of production would have an associated license, and an individual would be able to carry multiple licenses. At the same time, voters in Washington, D.C. will decide on Initiative 72. The measure would legalize adult possession of up to 2 ounces of cannabis, and allow up to six plants to be grown for personal consumption. The measure would not allow the taxation of cannabis, however, because of current law that bars voters from approving taxation via ballot initiative. Alaska is also voting on Initiative 2 for the legalization of recreational marijuana. The measure establishes a Marijuana Control Board for rulemaking and for marijuana facility restrictions with local government control. It also proposes a marijuana tax, which would be $50 per ounce sold by a marijuana cultivation facility[3].

Federal Government Policy

At the federal level, marijuana remains on the list of Schedule I controlled substances under the Controlled Substances Act. The classification is reserved for substances that have a high level of addictive potential and no accepted medicinal value. In October, 2009, the Obama administration sent a memo to federal prosecutors urging them not to prosecute people who had been distributing medical marijuana in accordance with state law. In August 2013, the United States Department of Justice announced an update to their marijuana policy. The department deferred the right to challenge the legalization laws of Colorado and Washington. A memo drafted by Deputy Attorney General James Cole outlined the priorities for federal enforcement of marijuana prohibition under the Controlled Substances Act. The priorities are as follows:

[1] The Economist: The difference between legalization and decriminalization (6/2014)

[2] http://www.spiegel.de/international/europe/evaluating-drug-decriminalization-in-portugal-12-years-later-a-891060.html

[3] more on Alaska legalization measure at http://guardianlv.com/2014/07/alaska-will-vote-on-the-legalization-of-recreational-marijuana-in-november/#CfRF3ZbO1AkKXtMX.99

- Prevent the distribution of marijuana to minors
- Prevent the revenue from marijuana sale from going to criminal enterprises, gangs, and cartels
- Preventing the distribution of marijuana to other states from states where it is legal
- Preventing state-authorized marijuana activity from being used as a cover or pretext for the trafficking of other illegal drugs or other illegal activity
- Preventing violence and the use of firearms in the cultivation and distribution of marijuana
- Preventing drugged driving and the exacerbation of other adverse health consequences of marijuana use
- Preventing the growing of marijuana on public lands and the attendant public safety and environmental dangers posed by marijuana production on public lands
- Preventing marijuana possession or use on federal property

The memo went on to say that states which enforced their medical and/or recreational marijuana policies to protect against the list of harms above would not attract federal enforcement action. If states failed to control marijuana production, processing, sale, and use in a way consistent with the above guidelines, then federal action could be brought. The memo states that federal authorities still retain the authority to challenge the regulatory structure itself or enforce criminal prosecutions of individuals. As states consider loosening restrictions on recreational or medical marijuana, the likelihood of federal involvement will be reduced if controls can be put in place to prevent negative outcomes.

Recreational Marijuana Legalization: The Colorado and Washington Experience

Upon the passage of initiatives to legalize marijuana for recreational use, Colorado and Washington developed regulatory and taxation structures to control the recreational marijuana market. Colorado opened its first retail outlets on January 1, 2014, while Washington followed in July 2014. The states differ in their method of taxation and the ability of individuals to grow their own cannabis. Colorado allows individuals to grow up to six of their own plants, while Washington prohibits personal cultivation. Both have licensed retail outlets that can sell to the general public provided that they are 21 years of age or older.

At first, Colorado extended the opportunity to receive licenses to sell recreational marijuana to medical marijuana businesses[i] in good standing. Many of the retail outlets in Colorado have marijuana available for both medical customers and recreational customers. In July 2014, regulating authorities extended the opportunity for non-medical entities to apply for a license. After state and local business licenses are approved, these additional stores would likely open in late 2014. Prices for an ounce of recreational marijuana in Colorado hover around $400 per ounce for the highest grade, and can dip as low as $180 per ounce for less potent strains. These prices will likely decline somewhat with the addition of new licensed businesses. The price may also be reduced by new discoveries of higher yield strains or improved growing techniques.

In Colorado, the taxation structure of Amendment 64 imposes a 15 percent excise tax at the wholesale level. The Colorado Department of Revenue determines the wholesale price for taxation purposes two times a year. The rate for July 1, 2014 to December 31 2014 is $1,876 per pound, or $117.25 per ounce. The wholesale tax for this period is $17.59 per ounce. In addition to this tax, there is a 10 percent sales tax that is particularly for recreational marijuana, and a 2.9% statewide sales tax. Local jurisdictions may also have their own sales taxes. Revenue collected for the first five months of implementation is shown below.

Exhibit 1

Colorado Marijuana Taxes, Licenses, and Fees Transfers and Distribution $Millions					
	Jan-14	Feb-14	Mar-14	Apr-14	May-14
Retail Marijuana Sales Tax (2.9%) Transfer to Marijuana Cash Fund	0.42	0.44	0.57	0.64	0.64
Retail Marijuana Sales Tax (10%)	1.40	1.43	1.90	2.22	2.07
Retail Marijuana Excise Tax (15% on Wholesale)	0.20	0.34	0.61	0.73	1.14
Retail Marijuana Licenses and Fees	0.10	0.10	0.11	0.14	0.07
Total Recreational Marijuana Transfers and Distributions	2.11	2.32	3.19	3.73	3.92

Source: Colorado Department of Revenue, Office of Research and Analysis

The first recreational marijuana stores opened in Washington during July, 2014. To date, the state has issued 24 retail store licenses. Supply has been somewhat limited at first and retail prices have been around $700/ounce. Washington's tax structure is applied as a percentage of the value of the product. The state charges a tax of 25 percent at the grower level, 25 percent at the processor level, and 25 percent at the retail level. As prices change in the market, the amount of taxes collected will change as well. Retail sales are also subject to the statewide sales tax of 6.5 percent as well as any local sales taxes. As of June, revenue estimates were $51.2 million for the 2015-17 biennium with an increase in subsequent years as more retailers and growers are licensed.

Costs are influenced by the markups and taxes at the various levels of distribution of recreational marijuana. Additionally, Internal Revenue Code 280 E prohibits tax deductions for any business involved in the trafficking of controlled substances. This drives up the costs marijuana businesses will face relative to the gray market or other agricultural or retail firms. The price level can influence the amount of marijuana sold and also the tax revenue. Consumers respond to lower prices by consuming more of a product, and higher prices by consuming less. The existing black market in marijuana has the potential to turn into a gray market that would allow the consumers to choose where they purchase the product based on the relative price of the gray market product to the legalized product. These price changes can affect the amount of tax revenue that is collected on a given volume of marijuana.

Oregon Medical Marijuana Program

The Oregon Medical Marijuana Program (OMMP) began in 1998. It is entirely funded by registry fees for patients, caregivers, and grow sites. The cost for a patient registry is $200, with a discount to $60 for patients receiving food stamp benefits, $50 for residents enrolled in the Oregon Health Plan, and $20 for patients receiving Social Security benefits. Patients with any of the following conditions can be eligible for medical marijuana after certification by a physician: Alzheimer's disease, cachexia, cancer, glaucoma, HIV/AIDS, nausea, Post Traumatic Stress Disorder (PTSD), severe pain, seizures, persistent muscle spasms, and multiple sclerosis. In 2014, medical marijuana patients numbered 66,922, while 32,796 caregivers were registered to purchase marijuana for homebound patients. Doctors who treated OMMP patients numbered at 1,604. The registry fees have covered the cost of the program and have occasionally produced a surplus that was used to fund other budgetary needs. Medical marijuana users are assumed to continue in that program which effectively offers them a preferable price and access conditions. Their numbers are deducted from the total number of users in later steps.

Oregon Recreational Marijuana (Measure 91) Revenue Estimates

Oregon recreational marijuana under Measure 91 will be taxed ($35 per ounce of flowers and $10 for leaves) at the producer level. This section describes the steps taken to estimate the market size and revenue impact of taxation. In order to estimate the revenue resulting from that tax, it is necessary to develop an estimate of the size of the legal market (ounces sold and taxed.)

The general methodology in this research would progress in the following steps:

- Estimate the number of current users.
- Adjusted to the Oregon current population estimates of age groups over 21
- Reduce the number of users by the medical participants (OMMP) and the self-growers.
- Estimate the rates of consumption to calculate the overall volume of ounces used (potential local market). Once that number is determined, the amount of use by the different categories will be applied.
- Estimate the price which will determine how much the black market competes with the legal market. The price will be determined by the costs and markups that the new structure will impose on the product. Experience from other regulated markets, models built by Washington[ii], and experience in Washington and Colorado confirms that the regulated market imposes more costs than what is facing the illicit product.
- Estimate the size of the legal market which is established by the price elasticity.
- Add new (induced) users and the tourist/commuter users (naturally new users and tourists will only utilize the legal market).
- Estimate the base year revenue with all the above assumption.
- Finally the revenue will be estimated and adjusted to reflect startup difficulties and agency costs, particularly in the first fiscal year 2017 and then the 17-19 biennium.

As a measure of sensitivity the projection will be extend for later years to examine different scenarios.

User Estimates

To derive estimates of how many people in Oregon use marijuana, we utilized the National Survey on Drug Use and Health for 2010-2011. The Substance Abuse and Mental Health Services Administration (SAMHSA) has been publishing state estimates of the prevalence of marijuana use (both percentages and estimated counts.) In 2013, SAMHSA developed a more accurate model (Model-Based Prevalence Estimates[4]) for the 2012 data. The data are summarized in Table 1.

[4] For further information on the revised model, see the NSDUH short report titled *Revised Estimates of Mental Illness from the National Survey on Drug Use and Health* at http://samhsa.gov/data/default.aspx. For the further details on the revised weight and predictors used for these 2010-2011 SMI and AMI small area estimates, see the "2010-2011 NSDUH: Guide to State Tables and Summary of Small Area Estimation Methodology" at http://www.samhsa.gov/data/NSDUH/2k11State/NSDUHsae2011/Index.aspx.

Table 1

Estimates of below 18 Users as percentage of population		12 or Older Estimate	12 or Older 95% CI (Lower)	12 or Older 95% CI (Upper)	12-17 Estimate	12-17 95% CI (Lower)	12-17 95% CI (Upper)
Last Month	1 Oregon	10.98	9.31	12.90	10.26	8.45	12.40
	U.S.	6.94	6.71	7.17	7.64	7.30	8.00
Past Year	2 Oregon	16.01	14.05	18.20	18.63	16.21	21.32
	U.S.	11.55	11.25	11.86	14.13	13.66	14.60
Estimates of over 18 Users as percentage of population		**18-25 Estimate**	**18-25 95% CI (Lower)**	**18-25 95% CI (Upper)**	**26 or Older Estimate**	**26 or Older 95% CI (Lower)**	**26 or Older 95% CI (Upper)**
Last Month	1 Oregon	25.35	22.14	28.87	8.73	6.88	11.00
	U.S.	18.78	18.22	19.35	4.80	4.54	5.07
Past Year	2 Oregon	39.19	35.26	43.27	11.96	9.82	14.50
	U.S.	30.38	29.67	31.09	7.95	7.62	8.30

NOTE: State and census region estimates, along with the 95 percent Bayesian confidence (credible) intervals, are based on a survey-weighted hierarchical Bayes estimation approach and generated by Markov Chain Monte Carlo techniques. For the "Total U.S." row, design-based (direct) estimates and corresponding 95 percent confidence intervals are given. The top group, denoted by 1, signifies *Marijuana Use in the Past Month*, by Age Group and State: Percentages, Annual Averages Based on 2010 and 2011 NSDUHs. The second group, denoted by 2, signifies *Marijuana Use in the Past Year*, by Age Group and State: Percentages, Annual Averages Based on 2010 and 2011 NSDUHs.

In order to align with the Oregon population estimates it was necessary to adjust those age group categories using Portland State University (PSU)[5] 2013 estimates. It is also important as well to isolate the age groups identified to be below 21, the legal age of consumption. The users from age groups below 21 were assumed not to be involved in the regulated market and their statistics are omitted from this point on.

Table 2

Oregon	All Ages	21 to 25	% of Total	% of > 21	26 and Over	% of Total	% of > 21	21 and Over
Population	3,919,020	256,773	6.6%	8.9%	2,641,939	67.4%	91.1%	2,898,712

Population statistics show the 21-24 category and 25-29 category, which required an adjustment to create the 21-25 and 26 and over categories.

Using the two tables above, an estimate for the number of users by age group can be easily developed, while using the confidence intervals developed previously (table 1) to indicate a lower and upper range for these estimates.

[5] Population Research Center, PSU, Population Estimates by Age and Sex for Oregon July 1, 2013

Table 3

		21-25 Estimate	21-25 95% CI (Lower)	21-25 95% CI (Upper)		26 or Older Estimate	26 or Older 95% CI (Lower)	26 or Older 95% CI (Upper)
Population		256,773				2,641,939		
Last Month Users		65,103	56,843	74,118		230,528	181,835	290,719
Past Year Users		100,625	90,527	111,096		316,096	259,438	383,139
Additional Month (13) Percentage		39%	39%	40%		42%	41%	43%

The additional month percentage (13th month) in table 3, is only shown as an indication of use patterns. It can be thought of as a rough measure of the ratio of people who reported using in an additional month of the year to people who reported using in the last year and it comes to an average of 40%.

Medical users are known to number 66,922[6] and are distributed between the age groups: 5,928 are assumed to be of the 21 to 25 age group while the rest are in the 26 and older group. Medical marijuana users are likely to have preferable price and access conditions through the OMMP program, which will entice them to continue in that program.

Users who grow their own are observed by Crawford[7] at an 8% level. This is a reasonable level to continue in the new legalized structure. It is also reasonable in relation to a high-price product and the allowance present in the initiative for selling plants which encourages growers to continue their horticultural practice. The growers' assumption will result in a reduction of the number of users who will potentially purchase from licensed retail outlets by 27,984. That number is also distributed according to the age groups. 7,576 of those aged 21-25 are assumed to grow their own and the rest of the home growers are allocated to the 26 and older age group.

Consumption (Use) Rates

The use rates utilized much of the information from the study conducted by Crawford[iii]. The survey utilized in the study was parsed out to identify different levels of consumption for various categories of users: Super users and regular users (table 4)

Table 4

	21-25 Estimate	21-25 95% CI (Lower)	21-25 95% CI (Upper)		26 or Older Estimate	26 or Older 95% CI (Lower)	26 or Older 95% CI (Upper)
Super Users	5,590	5,029	6,172		17,561	14,413	21,286
Regular Users	81,531	72,802	90,583		217,133	168,155	275,088

The Heavy (Super) Users: This group consisted of the everyday heavy users (mostly men) at an average of 2.25 ounces in a month (27 ounce/year).

[6] Medical user statistics (OHA)

[7] Seth Crawford research, OSU **Oregon's Informal Marijuana Economy, 2014**

The Regular (Occasional) Users: This category showed men to use an average of 11.8 grams, while women are found to use slightly less at 11.1 grams. 40% are calculated to have used all 12 months (from the earlier statistics) of the year, and 60% are assumed to use for 8 months of the year.
The New (Induced) Users: New users induced by legalization are assumed to be 3.9% of the total using one month increase use for the occasional users. This is equivalent to 72,818 ounces per year. These users are assumed to be attracted by a reduced social stigma, increased availability, and the elimination of fines for possession.

Adding the usage rate of the new users to the occasional user rate will result in an average of 9.8 grams a month (4.145 ounces/year). The resulting consumption estimated results are shown in Table 5.

Table 5

Consumption in ounces	21-25 Estimate	21-25 95% CI (Lower)	21-25 95% CI (Upper)		26 or Older Estimate	26 or Older 95% CI (Lower)	26 or Older 95% CI (Upper)
Super Users	150,937	135,790	166,645		474,145	389,156	574,709
Regular Users (+Induced)	337,931	301,751	375,451		899,982	696,974	1,140,195
Total Use	488,869	437,541	542,095		1,374,127	1,086,131	1,714,905

Prices in a Regulated Market

The regulated market is segmented vertically into three types of businesses: producers, processors, and retailers. This segmentation could be combined or vertically integrated. However, in order to guard for compliance with the department of Justice Memo, and based on work by BOTC Analysis Corporation[iv] for the state of Washington, it's likely that each business will have a cost structure that will be manifested in a markup to the price received from the previous level. The markup will cover each of the businesses costs and profits. Usually the markup in various other businesses represents different costs based on the type of business and products sold. Different industries impose varying markups to the product being transacted (from 60% to more than 120%). OLCC currently marks up liquor at around 110%. This research used the following schedule to approximate markup: although many permutations of markup percentages were examined.

Schedule 2

with 20% Fed tax 280E implication included elsewhere	
As % of price	Cost Category
6.80%	Federal Corporation Tax Rate at around 34%
33.3%	Costs of Labor (Compensation, Social Security, Unemployment, Insurance, and Other labor costs)
15.5%	Cost of doing Business (Insurances, Security, Transport, Finance, Rent, Inventory)
7.5%	Fees (Lab, Regulation, Certification, Other)
20.0%	Net Profit
1.80%	State Taxes @ 9%
84.9%	Total

This research used the markup for only the processer and retailer businesses. Producers' prices in a regulated market were assumed to start at the current rate for medical supplies. Few additions were considered at different levels to reach a reasonable estimate of what the price of legalized cannabis will be. As will be described in the coming sections, this research reached the conclusion that the regulated legal price is likely to fall within $330 to $340 an ounce.

Price Estimate Models

Current producer's costs based on a paper by the Rand Corporation[v] and other research finds the cost of producing a gram of marijuana at $2 ($50 per ounce.) This price is consistent with the cost of the Oregon Medical Marijuana Program. The model is created by starting with this baseline price and stepping through the different levels of the business layers. The model will give us a reasonable estimate of what the price of the regulated legal marijuana is likely to be.

According to the white paper on legalized cannabis in Washington State[vi], the federal tax code, strictly applied, could actually prevent the viable existence of any legal cannabis business. It is assumed here however, that some means of compliance will exist and still allow for the businesses to somewhat comply with the IRC. In that regard, it is assumed that the inability to deduct cost of goods under IRC section 280E will impose about 20 to 25% additional costs to the businesses. The first combination in Table 6 assumes the cost passed to the processor to only include the producer cost and the tax added, while the IRC 280 E implication will be added only to the retailer price at the end of the process.

Table 6

	Cost OMMP	Tax	Producer's Cost	Markup Processor	Markup Retailer	Federal Tax 280E Implication
				100%	100%	20%
Price	$50.0	$28.0	$78.0	$156.0	$312.0	$374.4
				89%	89%	20%
Price	$50.0	$28.0	$78.0	$147.0	$277.9	$333.5
				88%	88%	20%
Price	$50.0	$28.0	$78.0	$146.6	$275.7	$330.8
				85%	85%	20%
Price	$50.0	$28.0	$78.0	$144.2	$266.7	$320.0
				75%	85%	20%
Price	$50.0	$28.0	$78.0	$136.5	$252.5	$303.0
				65%	80%	20%
Price	$50.0	$28.0	$78.0	$128.7	$231.7	$278.0

The second combination illustrated in Table 7 assumes the cost passed to the processor includes the producer cost, the tax added, and the IRC 280 E implication at 20% of the producer price at the beginning of the process. Moreover, this scenario assumes that the commercial producers add 20% profit, which is not the case for the medical producers (who can only recover cost) under the current medical producers' requirements.

Table 7

	Cost OMMP	Tax	Producer's Cost	Federal Tax 280E Implication	Producer Profit @ 20%	Markup Processor	Markup Retailer
				@ 20%	20%	100%	100%
Price	$50.0	$28.0	$78.0	$93.6	$112.3	$224.6	$449.3
						89%	89%
Price	$50.0	$28.0	$78.0	$93.6	$112.3	$211.7	$400.2
						88%	88%
Price	$50.0	$28.0	$78.0	$93.6	$112.3	$211.2	$397.0
						85%	85%
Price	$50.0	$28.0	$78.0	$93.6	$112.3	$207.7	$384.0
						75%	85%
Price	$50.0	$28.0	$78.0	$93.6	$112.3	$196.6	$363.6
						65%	85%
Price	$50.0	$28.0	$78.0	$93.6	$112.3	$185.3	$333.6

The third combination shown in Table 8 assumes the cost passed to the processor includes the producer cost, the tax added, and 1.5% collection costs for administering the tax as a service fee. Moreover, this scenario assumes that the IRC 280 E implication will be considered at two stages of the process, which adds 10% at the processor level and 20% to the retailer price.

Table 8

	Cost OMMP	Tax	Producer's Cost	Collection Cost 1.5%	Markup Processor	Federal Tax 280E Implication	Markup Retailer	Federal Tax 280E Implication
					100%	10%	100%	20%
Price	$50.0	$28.0	$78.0	$79.2	$158.3	$174.2	$348.3	$418.0
					89%	10%	89%	20%
Price	$50.0	$28.0	$78.0	$79.2	$149.2	$164.2	$310.3	$372.3
					88%	10%	88%	20%
Price	$50.0	$28.0	$78.0	$79.2	$148.8	$163.7	$307.8	$369.4
					84.9%	10%	84.9%	20%
Price	$50.0	$28.0	$78.0	$79.2	$146.4	$161.0	$297.7	$357.3
					75.0%	10%	85.0%	20%
Price	$50.0	$28.0	$78.0	$79.2	$138.5	$152.4	$281.9	$338.3
					65.0%	10%	80.0%	20%
Price	$50.0	$28.0	$78.0	$79.2	$130.6	$143.7	$258.6	$310.4

The fourth combination in Table 9 assumes the cost passed to the processer includes the producer cost, the tax added, 20% commercial profit, and 1.5% collection costs for administering the tax as a service fee. Moreover, this scenario assumes that the IRC 280 E implication will be considered at two stages of the process, which adds 10% at the processer level and 20% to the retailer price.

Table 9

	Cost OMMP	Tax	Producer's Cost	Profit at 20% Collection Cost	Markup Processor	Federal Tax 280E Implication	Markup Retailer	Federal Tax 280E Implication
				21.5%	100%	10%	100%	20%
Price	$50.0	$28.0	$78.0	$94.8	$189.5	$208.5	$417.0	$500.4
					89%	10%	89%	20%
Price	$50.0	$28.0	$78.0	$94.8	$178.6	$196.5	$371.4	$445.7
					88%	10%	88%	20%
Price	$50.0	$28.0	$78.0	$94.8	$178.2	$196.0	$368.5	$442.1
					84.9%	10%	84.9%	20%
Price	$50.0	$28.0	$78.0	$94.8	$175.2	$192.8	$356.4	$427.7
					75.0%	10%	85.0%	20%
Price	$50.0	$28.0	$78.0	$94.8	$165.8	$182.4	$337.5	$405.0
					65.0%	10%	80.0%	20%
Price	$50.0	$28.0	$78.0	$94.8	$156.4	$172.0	$309.6	$371.5

To further compare the price in the regulated market, we look at the regulated markets in Colorado and Washington. The prices are about $400 and $700 respectively. Removing an approximate measure of the taxes in the regimes of those two states and adding an amount similar to the tax proposed by M-91 will get a price of about $323 to $455. In a similar comparison, the prices in Oregon medical marijuana dispensaries average about $200. That medical price is supposed to reflect compensation for the costs of growing on behalf of the medical patients and

not meant to include profits. If we add profits of a commercial operation, federal and state corporate taxes, and an allowance for IRC 280 E, we can easily reach the $330 to $340 range.

Elasticity of Demand and the Gray Market

Elasticity is the measure by which demand responds inversely to percentage changes in price. The Rand Corporation assumed -0.54 as price elasticity of demand for marijuana. Elasticity as estimated by different sources ranged from -0.5 to -0.85, as a percentage decline in quantity demanded in response to a 1% increase in price. However, it seems that most work starts with elasticity higher than that of tobacco. Thus, if the elasticity of tobacco in Oregon is measured at 0.6% then it is reasonable to assume that marijuana (with its higher price) has a slightly higher elasticity (between -0.7 and -0.75%).

Elasticity of a product emerging from the black market is likely to work in a discrete fashion to signal movement in and out of the legal to the gray market. In other words, the quantity of demand in Oregon (in a closed market) is likely to stay the same, but the source of the supply will be determined by the difference in price. That proportion between the two markets will be dependent on the difference in price. Thus, the elasticity will determine the size of each market. If the legal market is able to provide a supply at an advantageous (consumer) price and equal or better quality than that of the gray market, then the gray markets will quickly become unprofitable and will be squeezed out[vii]. The illicit price however, is likely to start aligning around a mean in a tighter arrangement as a response to (can't impose higher prices) competition from the legal market. Table 10 shows what the gray market size will be under the assumptions of various elasticities and a range of future regulated prices. It is instructive to note that under high prices and high elasticities the (closed) Oregon market will be dominated by the gray market. Assuming the elasticity of marijuana is somewhere between 0.7 and 0.75, and averaging the middle values of the different scenarios results in an initial gray market size of about 65.7%.

Table 10

Assumed Gray Market Price: $177/oz.							
Elasticity	**Price**	**$321**	**$332**	**$338**	**$342**	**$347**	**$411**
-0.5		40.7%	43.8%	45.3%	46.7%	48.0%	66.1%
-0.55		44.7%	48.2%	49.9%	51.4%	52.8%	72.7%
-0.6		48.8%	52.5%	54.4%	56.1%	57.6%	79.3%
-0.65		52.9%	56.9%	58.9%	60.7%	62.4%	85.9%
-0.7		56.9%	61.3%	63.5%	65.4%	67.2%	92.5%
-0.725		59.0%	63.5%	65.7%	67.7%	69.6%	95.8%
-0.75		61.0%	65.7%	68.0%	70.1%	72.0%	99.2%
-0.8		65.1%	70.1%	72.5%	74.8%	76.8%	105.8%
-0.85		69.2%	74.4%	77.1%	79.4%	81.6%	112.4%

Revenue Estimates for the Base Year

The estimate of revenue starts with a base year estimate. A base year is an analysis unit where we assume all elements are working under constant assumptions. Applying all the assumptions introduced in the previous sections while using the 95% confidence intervals (Tables 2-5) to signify the lower and upper range for the estimate. Thereafter, adjustments for the initial start year

and subsequent years will be introduced to allow for possible changes and variation of the assumptions in the base.

Thus, we determined the quantity demanded in the base year to be about 1.8 million ounces (see Table 5). Then, we assume the gray market, at $177 per ounce, to satisfy 65.7% of the current demand. The blended tax rate is assumed to be $28 per ounce ($35 flowers and $10 leaf) with 72:28 flowers to leaf ratio.

Increased consumption due to tourism and commuters is estimated at 19.6%. This is derived from the reported 42% tourist traffic in Colorado proportioned to the number of surrounding states with medical marijuana programs.

Including all these assumptions, results in a base year estimate of $21.4 million with a lower range of $17.5 million and an upper range of $21.7 million (Table 11).

Table 11

Base Year Revenue			Estimate In $$	Lower Range	Upper Range
Ounces Demanded	in ounces		1,862,996	1,523,672	2,257,000
Regulated Market at 34.3 %	Tax rate @ $28		17,877,180	14,621,054	21,658,017
With Tourism and Commuters	Increase 19.6%		21,381,107	17,486,781	25,902,988

Revenue Estimates for Fiscal Year 2017

The revenue for FY 2017 is assumed to be 70% of the base year. This is due to normal and usual startup difficulties in any new program. These difficulties stem from developing rules and regulations, newly legalized product, and unknown numbers of participants with developing and varying level of compliance. An increase of 5% (1.5% annually) will accrue within the 3 years since the base year, mostly due to annual population growth.

The measure specifies that the Oregon Liquor Control Commission (OLCC) will be the agency responsible for regulation and enforcement. That will require the OLCC to spend about $7.14 million in startup and administration costs. The OLCC will also collect application fees and apply them toward the costs of regulation. The resulting net revenue in Fiscal Year 2017 **is $9.4** million with **a lower range of** $**6.5 million and an upper range of $12.8 million.**

The measure requires net revenue to be distributed in percentages to different uses. The Common School Fund receives 40%, 20% goes to mental health and addiction, the State Police gets 15% and 10 % each to cities and counties, while the last 5% goes to the Oregon Health Authority.

Table 12

FY 2017 Revenue expectation		Estimate	Lower Range	Upper Range
Annual Base Revenue		$21,381,107	$17,486,781	$25,902,988
Fiscal Year 2017 Revenue and distributions				
Revenue Expected (@70%) due to program startup and other unforeseen difficulties adding 1.5 % average annual pop growth (3 years) (Gross Revenue)	75% of annual Base	**$16,035,830**	**$13,115,086**	**$19,427,241**
OLCC start up and Administration Costs		$(7,074,934)	$(7,074,934)	$(7,074,934)
License and Application Fee Revenue		$424,800	$424,800	$424,800
Net Revenue		**$9,385,696**	**$6,464,952**	**$12,777,107**
Distributions				
Common School Fund	40%	$3,754,279	$2,585,981	$5,110,843
Mental Health Alcoholism and Drug Services Account	20%	$1,877,139	$1,292,990	$2,555,421
State Police Account	15%	$1,407,854	$969,743	$1,916,566
Cities	10%	$938,570	$646,495	$1,277,711
Counties	10%	$938,570	$646,495	$1,277,711
Oregon Health Authority	5%	$469,285	$323,248	$638,855

Revenue Estimates for the 2017-19 Biennium

The revenue for fiscal years 2018 and 2019 are expected to accelerate by about 6% and 5.5% respectively as efficiencies and improvements take hold to a net annual average of $20.5 million.

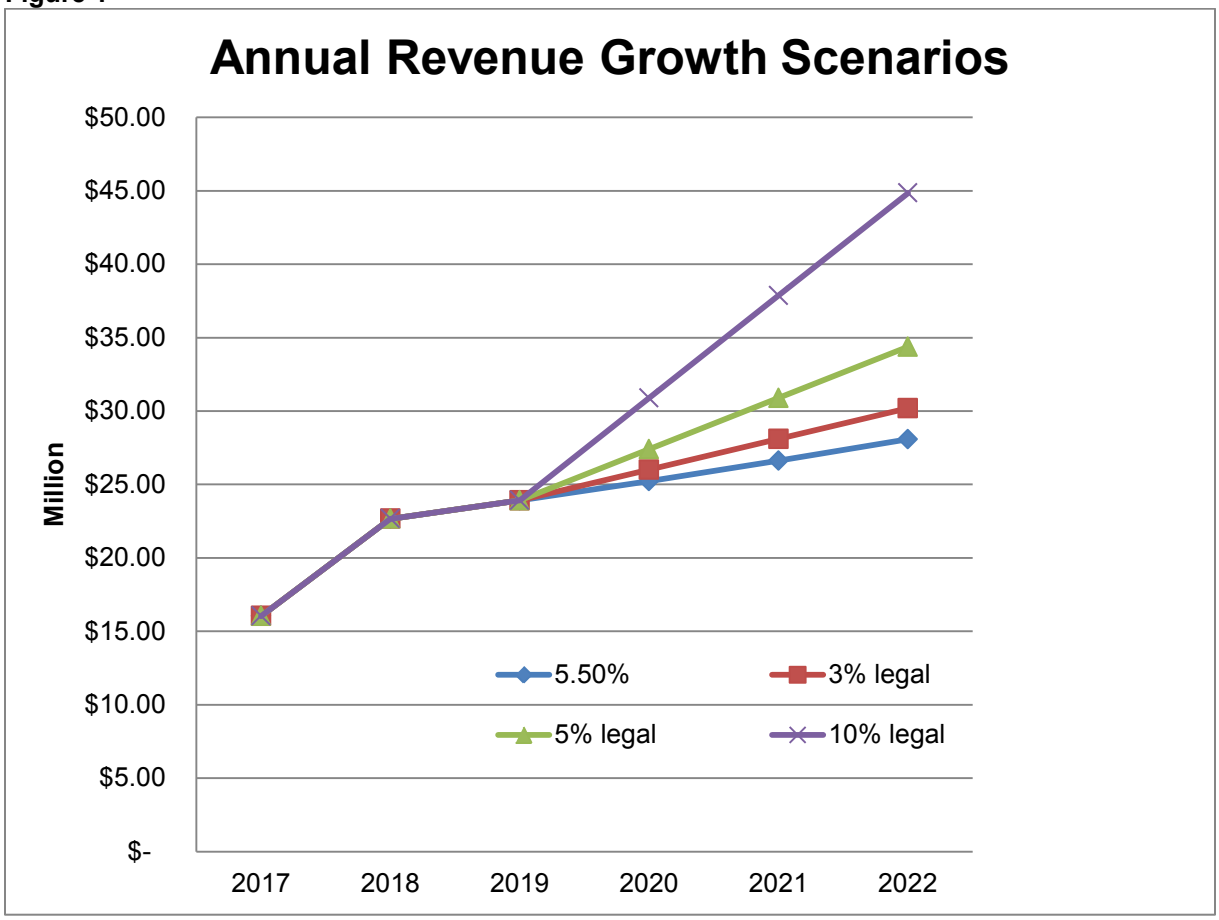
Table 13

		FY 2018	FY 2019	BN 17-19
Gross Revenue		$22,663,973	$23,910,492	$46,574,466
OLCC Costs		$(3,162,209)	$(3,291,278)	$(6,453,487)
License Fees				
Annual		$360,000	$360,000	$720,000
App Fees		$45,000	$45,000	$90,000
Net Revenue		**$19,906,765**	**$21,024,214**	**$40,930,979**
Distribution				
Common School Fund		$7,962,706	$8,409,685	$16,372,391
Mental Health Alcoholism and Drug Services Account		$3,981,353	$4,204,843	$8,186,196
State Police Account		$2,986,015	$3,153,632	$6,139,647
Cities		$1,990,676	$2,102,421	$4,093,098
Counties		$1,990,676	$2,102,421	$4,093,098
Oregon Health Authority		$995,338	$1,051,211	$2,046,549

Long-Range Revenue Scenarios

The Regulated legalized market is likely to achieve higher efficiency and more innovation which is likely to exert downward pressure on future price and consequently on the gray markets[viii]. The chart below shows several of these possibilities. They include an annual growth of 5.5 in the legal market, a 3% annual increase in market share for the regulated market (reduction in gray market), a higher level of 5% annual growth in the regulated market, and 10% annual expansion of the legal market.

Figure 1



Potential market size in Oregon however, depends on institutional changes, particularly at the federal level. If these changes occur relatively smoothly, the market could grow substantially from the initial estimates. On the other hand, if these changes occur only slowly or not at all, growth of the market will be far more limited.

It is important to note that legalization is potentially beneficial in changing the costs related to enforcement of the current illegal climate. Regulation and enforcement costs and priorities will also likely to be different under a new regulated environment. This research did attempt to look into the cost side of legalization and only concentrated on the revenue and taxation aspect.

Results and Conclusions

LRO estimates that in the base year of the analysis, the revenue is expected to be $21.4 million with a lower range of $17.5 million and an upper range of $25.9 million.

- The revenue for FY 2017 is assumed at 75% of the base year, due to normal and usual startup difficulties in a new program. The net revenue (after startup and other administrative costs) in Fiscal Year 2017 is **$9.4 million** with a lower range of $6.5 million and an upper range of $12.8 million.
- As the system improves and the new regime becomes more established, growth will accelerate by 6 % in fiscal year 2018 ($19.9 million) and 5.5% in fiscal year 2019 ($21million). The net revenue in the **17-19 biennium is $40.9 million**.
- Total users are estimated to be 416,721. Of those 100,625 are in the 21-25 age group, and 316,096 are 26 and older.
- Medical Marijuana users are 66,922 of total, and Users who grow their own are 8%, the same percentage that grows currently, that comes to 27,984 Oregonian. That leaves 321,815 users as the base for the market.
- Users align into two subcategories: Heavy (super) users which number 23,151 and regular (occasional) users numbering 298,664. Heavy users are found to consume 27 ounces per year, while occasional users are estimated to consume 4.14 ounces per year (which includes 3.9% increase in consumption as a result of legalization).
- The total consumption for the 21 and over age group is 1,862,996 ounces per year.
- The blended tax rate is $28 per ounce ($35 flowers, and $10 leaf) with 72:28 flowers to leaf ratio.
- The new market is organized into three vertically segmented businesses, producers, processers and retailers. Assuming the initial costs of production equivalent to current medical production, then marking up for state and federal Taxes (including IRC 280E), the cost of doing business (labor costs including employment taxes and insurance, fees, business insurance, utilities, security, and capital investment with reasonable profit) at each level of these three business, will push consumer prices to a range of $330 to $340 per ounce.
- Current average price of illegal (black market) marijuana ($177 per ounce) will carry to a grey market. The emerging legal market price is likely to reduce the gray market price variability in the short term and cluster it more around the $177 mean.
- With elasticity of around -0.7 to -0.75 (slightly higher than the elasticity of Tobacco at -0.6) will create a grey market of about 66% of estimated consumption. This is consistent with price differential and profit potential.
- Grey markets exist primarily due to price differentials. The closer the prices between the legal and illicit, the smaller the size of that gray market. In this case, the black market existed first and it is convenient for the consumer to continue buying at the lower price while the shadow seller makes profit. The illicit suppliers don't have to comply with taxation and regulations as well as all the requirements of the legal business, nor to the segmentation of the legal supply structure. All these costs are a potential margin for the gray market profit.
- Increased consumption due to tourism and commuters is estimated at 19.6%.
- The legalized market is likely to achieve higher efficiency and more innovation which is likely to exert downward pressure on future price and consequently on the gray markets. Different scenarios of growth show anywhere from $27 to $45 million annually.
- Potential market size in Oregon depends on institutional changes, particularly at the federal level. If these changes occur relatively smoothly, the market could grow substantially from these initial estimates. However, if these changes occur only slowly or not at all, growth of the market will be far more limited.

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