Oregon Cannabis Tax Revenue Estimate

July 22, 2014
# Table of Contents

- **Executive Summary** .................................................................................. 3
- **Infographic** ................................................................................................. 4
- **Provisions of Act Affecting Revenue Forecast** ........................................... 5
- **Cost of Production Assumptions** ................................................................. 7
- **Cost and Price Forecast** ............................................................................... 10
- **Market Demand** .......................................................................................... 12
  - Legal Age ...................................................................................................... 12
  - Black Market vs. Grey Market .................................................................... 12
  - Accessibility .................................................................................................. 14
  - Medical Marijuana ...................................................................................... 15
  - Price Elasticity of Demand Effect ................................................................. 16
  - Home Production .......................................................................................... 16
  - Non-Resident Demand .................................................................................. 17
- **Fiscal Revenue Estimate** ............................................................................. 22
Executive Summary

Oregonians are slated to vote on the “Control, Regulation, and Taxation of Marijuana and Industrial Hemp Act” in November 2014. The measure would regulate, tax, and legalize marijuana for adults 21 and older with legal use beginning in July, 2015.

Economists at ECONorthwest conducted an independent study to estimate the amount of money that would be generated in the short term if the Act passes. The money generated in taxes would go to schools, state and local police, and programs for drug treatment, prevention, drug education, and mental health.

The key findings of this analysis are:

- $38.5 million in excise tax revenue would be generated during the first fiscal year of tax receipts;
- $78.7 million in excise tax revenue would be generated during the first full biennium of tax receipts.

The report does not look at the impact on courts, police, and jail operating costs due to legalization.

The forecast is based on a comprehensive methodology that includes the following: the cost of production; price elasticity; the price of marijuana and its retail products; market demand; the short-term demand remaining in the gray market; accessibility of non-medical sales; new market entrants; home production; and non-resident demand.

The “Control, Regulation, and Taxation of Marijuana and Industrial Hemp Act” legalizes the growth, processing, wholesaling, and retailing of marijuana for adult purposes. If enacted, retail sales in Oregon could begin July 1, 2016.

Petitioners for this Act asked ECONorthwest to forecast state government tax revenues that would arise in the first fiscal year of its implementation, presumed to be July 1, 2016 through June 30, 2017 (FY 2017). Similarly, they asked ECONorthwest to estimate tax revenues in the first full biennium, July 1, 2017 to June 30, 2019 (2017-19 biennium). This report summarizes ECONorthwest’s research and forecast.
Oregon + Cannabis
One Year Projected Fiscal Revenue from Cannabis Legislation: FY2017

2014
Untaxed Medical Market

2017
Medical Market (unchanged)
Grey Market (60%)
Legal Market (40%)

108,948 Oregon users
6.75 oz/year

+ 89,065
new Oregon
market entrants
1.06 oz/year

(adjusted for price elasticity, that’s 965,762 ounces)¹

Oregon Residents
965,762 oz
At-Home Growers
31,108 oz
Tourists & Commuters
439,521 oz

= 1,374,175
ounces

(taxed at $28 per ounce)²

$38.5 million*
in fiscal revenue

¹ Demand adjusted upward by 16.4% due to lower prices and demand elasticity.
² $28 per ounce is a blended rate based on estimated consumption of flowers and leaves.
³ Net including licenses and fees. Total includes plant taxes generated by home production costs. To view the full report visit econw.com.
Provisions of Act Affecting Revenue Forecast

The Act has many provisions. However, ECONorthwest considered only those affecting state tax revenue. They are:

The Oregon Liquor Control Commission (“OLCC”) has the powers and duties to carry out the Act, including the ability to set rules and regulations.\(^1\) The OLCC will regulate and can prohibit any advertising.\(^2\)

The OLCC is responsible for granting, refusing, suspending, or canceling licenses for the production, processing, or sale of marijuana and marijuana products.\(^3\) A separate license is required for each step of the supply from grower, to processor, to wholesaler, and finally retailer. A company or individual may hold multiple licenses and in multiple stages of supply.\(^4\)

An excise tax would be imposed on marijuana producers (growers) at the time of first sale or transfer to processors, wholesalers, or retailers, whether by arms length or related party transaction. The taxes apply for marijuana intended for human consumption other than medical marijuana and industrial hemp. The tax rates are $35 per ounce on all marijuana flowers, $10 an ounce on all marijuana leaves, and $5 per immature plant.\(^5\)

The Act recognizes four specific marijuana business types. A marijuana producer license allows one to grow marijuana plants for commercial purposes.

A marijuana processor license allows for the purchase or transfer of marijuana grown in Oregon to be made into sellable products, which include extracts used for vaporization (inhaling a concentrated form without burning plant material) and for making “edibles,” which are marijuana-infused foods and beverages.

A wholesale license allows for the purchasing of marijuana and marijuana products from Oregon for subsequent sale to another licensee in Oregon other than a consumer.

\(^1\) Control, Regulation, and Taxation of Marijuana and Industrial Hemp Act. §7(1) through (5).
\(^2\) Ibid. §7(2)(g).
\(^3\) Ibid. §7(2)(b).
\(^4\) Ibid. §24.
\(^5\) Ibid. §33.
A retail license permits one to sell marijuana and marijuana products from Oregon to consumers 21 years of age and older.\(^6\)

Adult citizens are allowed to grow as many as four marijuana plants for non-commercial purposes without having a license or paying excise taxes.\(^7\) A citizen may buy immature plants from a licensed marijuana producer, and would pay a $5 excise tax per plant. A citizen may grow plants from seed without incurring any taxation.

The Act defines marijuana flowers as “the flowers of the plant Cannabis family Moraceae.”\(^8\) It defines leaves as “the leaves of the plant Cannabis family Moraceae.”\(^9\) Flowers and leaves are taxed. Other parts of marijuana plants, including seeds, are not taxed.

The Act prohibits marijuana importation to Oregon and exportation from Oregon. Doing so for commercial purposes is a Class C felony. For non-commercial purposes, it is a Class A misdemeanor.

The Act does not amend or affect in any way the Oregon Medical Marijuana Act. The taxes this act imposes would not apply to medical marijuana unless the Oregon Legislature changes the currently proposed approach.\(^10\)

\(^{6}\) Ibid. §§5(17), (18), (20), and (21).
\(^{7}\) Ibid. §6(1)(a).
\(^{8}\) Ibid. §5(14)(a).
\(^{9}\) Ibid. §5(16)(a).
\(^{10}\) Ibid. §4(7) and §6(1)(2)(a) and (b).
Cost of Production Assumptions

This analysis is a short-term forecast. A three-year period is too soon for a market to mature. Perhaps ten years would be enough time for the outcomes of private investments in brands and productive capacity to become realized, for Oregon and other states to adjust rules and laws, and for the stabilization of consumer attitudes. However, of interest here is the question of tax revenue in the short run, not an analysis of the long-term cost. The analysis that follows will estimate the taxes collected by the State of Oregon in FY 2017 and the subsequent 2017-2019 biennium.

ECONorthwest made the following assumptions regarding the marijuana market assuming the Act is enacted.

For simplicity, the analysis excludes any inflation. Given the short time horizon, this assumption has minimal effects.

The Act taxes leaves and flowers of what we presume would be dry sinsemilla (seedless) marijuana for human consumption. The ratio of dry leaves to flowers on plants is about 30:26, based on published research from 1992.\(^{11}\) However, leaves growing from stems other than on pistillate inflorescences (female flower heads) are largely unmarketable due to their low active ingredient content. The $10 tax on leaves further discourages their sale. Marketable leaf material is mostly leaf trim removed from around flowers. In practice, Oregon growers produce, by weight, 28 percent useable leaf trim and 72 percent useable flowers.\(^{12}\) Therefore, the average tax of marijuana sold by producers would be $28.00 per ounce or 98.8¢ per gram.

Approximately 80 percent of Oregon marijuana is grown outdoors and 20 percent indoors.\(^{13}\) We assume this ratio would continue in the first three years of non-medical use legalization.

This analysis assumes that once legal, the 28:72 ratio currently observed would prevail. We recognize there has been extensive scientific and grower research into developing higher yield products and presumably a higher ratio of flowers to leaves.\(^{14}\) Furthermore, there is


\(^{13}\) Ibid.

flexibility in the mix of leaves to flowers resulting from differences in the intensity growers utilize while trimming a pistillate inflorescence.\textsuperscript{15}

The taxes, according to the Act, are levied on growers at the point of first sale or transfer to processors or distributors. For the sake of this analysis, we assume the tax incidence falls completely on the consumer as part of the retail price. That is, the final retail price fully reflects the taxes paid by growers.

The price of marijuana affects the quantities sold and the measure of that relationship is called the price elasticity of demand. Research shows that the price elasticity of demand for marijuana is -0.54.\textsuperscript{16} ECONorthwest used this value in its draft analysis, as it was similar to work done for Colorado.\textsuperscript{17} However, an internal review by Dr. Randall Pozdena found that this was a compensated elasticity and that uncompensated price elasticity was more appropriate. This final analysis uses a -0.84 uncompensated price elasticity based on other peer reviewed academic research.\textsuperscript{18} By definition, this price elasticity of demand tells us that for every one percent decrease in the retail price, consumers will buy 0.84 percent more ounces of marijuana.

The current average price of dried flower is $198 an ounce.\textsuperscript{19} However, prices are seasonal. Early summer is characterized by high prices. The market is lowest when production peaks later in the year. Dr. Seth Crawford of Oregon State University, who conducted surveys of the Oregon markets, estimated that the annual average price was $177. For the purposes of this analysis, ECONorthwest assumes the 2014 average price will be $180.

Marijuana businesses cannot deduct normal and ordinary business expenses when calculating federal taxable income.\textsuperscript{20} This is the result of a law passed by the U.S. Congress in 1982 penalizing businesses selling controlled substances. ECONorthwest made adjustments for this peculiar tax treatment, known as 290 E, so that our cost of production estimate fairly reflects what would happen once marijuana is legal in Oregon. We note, however, that through diversifying product mixes and allocating operating costs to the cost of goods sold, accountants may, in some cases, reduce the impact of 280 E.

\textsuperscript{15} Oglesby, P. “Can the bud trim line hold?” http://newrevenue.org/2014/05/12/can-the-bud-trim-line-hold/
\textsuperscript{17} Stiffler, C. “Amendment 64 would produce $60 million in new revenue and savings for Colorado.” Colorado Center on Law & Policy. August 16, 2012.
\textsuperscript{19} Street value as reported on June 4, 2014 from over 3,400 transactions on the crowd source website http://www.priceofweed.com/
\textsuperscript{20} 26 USC §280 E. See: http://www.law.cornell.edu/uscode/text/26/280E
From IRS data for the 2011 tax year, ECONorthwest determined that health and personal care retailers paid federal income taxes equal to 1.52 percent of their retail sales. Had they not deducted normal and ordinary business expenses, as marijuana retailers would be prohibited from doing, the effective tax would have been 9.69 percent of sales or 8.17 percent greater. We applied this difference to the pre-tax retail price (net of the farm gate cost, which is tax deductible) to account for the extraordinary tax penalty on marijuana retailers.

Since the difference was charged over the retail minus farm price, the effect of this adjustment does capture the onerous tax treatment that would apply to processors and wholesalers.

For growers, we applied a similar analysis using 2011 IRS data on agricultural production. We determined that marijuana growers would have to pay 17.09 percent in federal income taxes on farm sales, but for the law, compared to 1.43 percent, which they would pay had they been able to deduct business expenses. We applied the difference of 15.67 percent to the pre-tax farm gate price.

Cost and Price Forecast

The Act makes marijuana cultivation legal under Oregon law. Presumably, existing growers and new entrants into the market will be free to compete directly, cultivate without fear of state and local prosecution, and find access to inputs of production that would effectively lower retail prices from where they are currently.

ECONorthwest believes the retail price of marijuana products sold in Oregon would fall 19.5 percent from $180 to $145 an ounce (see Table 1). That price assumes 20 percent of the production during the first three years of the Act would come from indoor grow facilities and 80 percent from field cultivation. Beyond three years, prices may fall further as economies of scale, improvements in productive capacity, and wider acceptance occur.

Current marijuana cultivation and processing methods are inefficient due its historically black-market status. Legalization changes the landscape. It allows open innovation. Advances in genetics and growing practices will take hold. Costs, and consequently market prices, will fall.

New York Times economic policy reporter Annie Lowrey wrote, “The plant is cheap and easy to grow and not complicated to process. Left to the whims of the open market—meaning ignoring taxes and regulations—the price of a joint could fall to the level of a tea bag or a packet of sugar.” ECONorthwest believes this is an extreme expectation, but nonetheless costs and prices will fall. Peter Adams, the executive director of the Rockies Venture Club, an investment group researching the cannabis industry, believes prices will inevitably plunge.22

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Table 1: Estimated Retail Price of Oregon Grown Marijuana, 2016 – 2019

<table>
<thead>
<tr>
<th></th>
<th>10,000 SF indoor facility</th>
<th>1/4 acre outdoor facility (farm)</th>
<th>Average of cultivation methods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Investment</strong></td>
<td>$659,852</td>
<td>$117,254</td>
<td>$225,774</td>
</tr>
<tr>
<td><strong>Annual Operating Costs</strong></td>
<td>645,671</td>
<td>148,771</td>
<td>248,151</td>
</tr>
<tr>
<td><strong>Ounces Produced</strong></td>
<td>20,371</td>
<td>11,680</td>
<td>13,418</td>
</tr>
<tr>
<td><strong>Average Cost per Ounce:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital @ 25% return over 7 years</td>
<td>$10.25</td>
<td>$3.18</td>
<td>$5.32</td>
</tr>
<tr>
<td>IRS 280E income tax burden</td>
<td></td>
<td></td>
<td>$3.73</td>
</tr>
<tr>
<td>Operating costs</td>
<td>31.70</td>
<td>12.74</td>
<td>18.49</td>
</tr>
<tr>
<td><strong>Net farm gate price</strong></td>
<td>$41.94</td>
<td>$15.91</td>
<td>$27.55</td>
</tr>
<tr>
<td><strong>Farm value share</strong></td>
<td></td>
<td></td>
<td>26%</td>
</tr>
<tr>
<td><strong>Retail price before tax</strong></td>
<td></td>
<td></td>
<td>$105.95</td>
</tr>
<tr>
<td>IRS 280E income tax burden</td>
<td></td>
<td></td>
<td>10.94</td>
</tr>
<tr>
<td>Average tax rate under Act</td>
<td></td>
<td></td>
<td>28.00</td>
</tr>
<tr>
<td><strong>Net retail price</strong></td>
<td></td>
<td></td>
<td>$144.89</td>
</tr>
</tbody>
</table>


The retail price analysis in Table 1 is based upon investment, annual operating cost, and output from a paper presented to the Washington State Liquor Control Board for their rulemaking process on legalizing non-medical marijuana. The paper ascribes the cost of land and buildings to operations by being rented, not purchased.

ECONorthwest assumes growers would seek a 25 percent rate of return for a seven-year average life of their fixed assets. The U.S. Department of Agriculture reports an average farm value to retail consumer price of 26 percent for dairy products, fresh fruits, fresh vegetables, and processed fruits and vegetables. We presume a similar ratio for marijuana farm products, although one could argue margins would be less for marijuana because it is a high-value, but low-weight product. However, in the absence of observational data, we chose to use the USDA reported margin. Finally, we also assume marijuana business expenses would be federally taxable under 280 E.
Market Demand

The quantities of marijuana sold into the legal market will determine how much Oregon collects in taxes. To calculate demand, we determine what portion of the population will move from current black market into the new legal adult-use market. We then estimate any new additional demand from tourists, commuters, and Oregon residents who enter (and re-enter) the market due to the now legal status and ease of access that creates. Furthermore, we estimate the effects of price changes on demand and of legalizing the growing of plants at home.

Legal Age

Presently, all marijuana in Oregon is sold in a black market or through medical marijuana licenses. Dr. Seth Crawford, of Oregon State University, estimates that in 2013 there were 316,336 non-medical users residing in Oregon. This includes individuals 18, 19, and 20 years of age. ECONorthwest subtracted those aged 18-20 using U.S. Census data. The result is that in mid-2013, there were an estimated 259,253 non-medical marijuana users living in Oregon. Average annual consumption of those consumers was 6.75 ounces, albeit skewed by a small percentage of heavy users mixed in with many light or infrequent users.

The adult population in Oregon grew at about a 1.3 percent compound annual rate between Census years 2000 and 2010. Applying that rate to the 2013 marijuana consumer count, we arrive at estimated averages of 272,370, 276,236, and 280,157 resident consumers in fiscal years 2017, 2018, and 2019, respectively.

Black Market vs. Grey Market

Under the proposed Act, the purchase, growing, and consumption of marijuana for non-medical purposes would be legal provided that the appropriate taxes are paid. Based on these provisions, individuals who grow, distribute, or purchase marijuana without paying the appropriate taxes would be evading taxes, which moves the transaction into a grey market, rather than a black market. Although law enforcement and other legal risks may compel

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26 Ibid.
28 Fiscal year consumers are based on beginning and ending day averages for each fiscal year starting July 1.
suppliers to leave the grey market, ECONorthwest believes it will persist, albeit diminish over time.

The first reason for the grey market capturing a large portion of transactions is purely based on price—if a grower can produce marijuana for less than the prevailing market price including the imposed tax, they could choose to evade taxes and undercut the market.

The second reason is accessibility in the first few years of legalization. Although the act is written in a way to incentivize distribution in all areas of the state, the emergence of stores in rural areas may be slow. We may see this in suburban areas too. In Colorado, far fewer stores than expected have opened in suburbs, as communities resisted expansion.29

Perhaps most important, social ties will impact buyer behavior. Rather than purchasing from a licensed seller, a previous black market consumer may continue to obtain their product in the same manner as before without paying the levied taxes. Their primary motivation is their trust and social connection with their suppliers. Social ties are important to consumers.

In order to inform the magnitude of the emergence of the grey market, evidence from the current supply chain for the Oregon black market was analyzed. Based on survey research from Dr. Seth Crawford at Oregon State University, the following supply chain relationships are estimated for the Oregon market:

- 55% -- from non-grower friends
- 29% -- directly from growers
- 22% -- produce some themselves
- 8% -- entirely self-sufficient growers
- 8% -- from dispensaries

The sum of these percentages exceeds 100 because they are not mutually exclusive. Dr. Crawford’s research found that 42 percent of users obtain their product from multiple sources.

Based on the supply chain data, we assume the short-run persistence of a grey market will significantly reduce the percentage of legal sales and tax collections. We expect the grey market will retain 60 percent of the previous black market sales in the first three years of legalization. The grey market will steadily decrease over time as social ties weaken and the cost of production by legal sources falls.

Taking the 2013 estimate of 259,253 black market users aged 21 and over, derived from survey data provided by Dr. Crawford, adding the compound growth rate of that population, and

29 Aguillar, J. “Far fewer pot shops roll out in Denver’s suburbs.” Denver Post, June 1, 2014.
assuming 60 percent continue buying in what would become a grey market, we arrive at a forecast. Current non-medical users that would buy in the legal, taxed market would average 108,948, 110,494, and 112,063 in fiscal years 2017, 2018, and 2019, respectively. In addition to these consumers, others will buy taxable Oregon marijuana.

**Accessibility**

When marijuana is legalized for non-medical sale, access becomes easier. Legalization makes buying marijuana more convenient and less costly to consumers, in terms of time and effort, so demand rises. Marketing and advertising stimulate sales. Economic research supports this phenomenon and it has been measured for restricted access products, such as alcoholic beverages—better access yields higher demand.\(^{30}\)

ECONorthwest estimated the accessibility effect by comparing an open market situation, in which product is widely available, to the current black market. The most recent data (2005) on marijuana access is from the U.S. Department of Health and Human Services. Their National Survey on Drug Use and Health reports on the percentage of population by age that says marijuana is “fairly easy” or “very easy” to get.\(^{31}\)

Using the survey, ECONorthwest determined that among adults 21 and older, about 57.6 percent find procuring marijuana easy. If we apply that ratio to Oregon in 2013, out of about 2.90 million adults over 21 approximately 1.67 million had easy access, while 1.23 million did not. There are differences in access in Oregon versus the nation. However, survey data specific to Oregon in 2013 were unavailable and ECONorthwest chose not to speculate.

We assume the 1.23 million that do not have easy access are not current consumers. Among them are those that are drug tested by employers. About 681,000 employees in Oregon are subject to drug testing on the job.\(^{32}\) About 546,400 are not drug tested and do not find marijuana easy to get. The act as currently written leaves in place all drug free work rules. At issue is how much would be consumed by this population once adult use marijuana becomes widely accessible.

Estimating this requires making certain assumptions about behavior. Many residents that have trouble finding marijuana are those that never seek it. They are disinclined or actively disinterested in cannabis. Others may have tried it in the past and disliked it. Some have


personal objections. But others used it in the past and would use it again, albeit moderately, if it were legal and easy to buy.

An estimated 15.5 percent of those with easy access in Oregon are current non-medical users \(i.e., 259,253,\) from Page 12, out of 1.69 million. Of the 1.23 million others, 0.68 million are unlikely to consume because of employment considerations, but some of the remaining 546,400 may buy it once it is accessible and legal. They would become market entrants composed mostly of people that consumed marijuana at some point in their lives, but are not current users. There will also be some new users.

ECONorthwest assumes 15.5 percent of the 546,400 would enter the market. That is an average of 89,065, 90,329, and 91,661 in fiscal years 2017, 2018, and 2019, respectively.

Current nonusers that come back into the market once it becomes legal, or those that are new to using marijuana entirely, are apt to be light or infrequent consumers. Survey data indicates they would buy about 1.06 ounces a year.\(^{33}\) This is the average use in Oregon by current light and infrequent consumers. Thus, in FY 2017, market entrants would buy 94,415 ounces. This represents about an 11.4 percent addition to legal-market Oregon resident use.

We note that research shows decriminalization has had little or no impact on rates of use.\(^{34}\) However, decriminalization is not the same as legalization. The only research ECONorthwest found estimates a 13 percent increase in post legalization use.\(^{35}\) That is similar to what is forecast here.

**Medical Marijuana**

We assume no impact in demand due to medical marijuana users moving into the legal, taxed, market. We conclude that unlike Colorado, where there is a large price differential between medical and non-medical marijuana, the gap in Oregon is an average tax of $28, which is not large enough for consumers to switch sources. Medical marijuana, although untaxed in Oregon, still requires payment of an annual $200 state fee plus medical clinic charges.\(^{36}\) Thus, the overall annual cost of both sources are likely similar.

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\(^{33}\) Crawford, S. “Comments of ECONorthwest.”


\(^{36}\) Dr. Seth Crawford (OSU) email to Robert Whelan (ECONorthwest). June 3, 2014.
Price Elasticity of Demand Effect

We calculate that the average price, using “flowers” as a basis, would decline from its current level of $180 an ounce to about $145 after legalization. That is a decline of 19.5 percent. The short-term price elasticity of demand for marijuana is -0.84.\(^{37}\) Therefore demand would rise 16.4 percent because marijuana would be less expensive than it previously was.

In FY 2017, we determined that there would be, without legalization, 272,370 resident consumers in the market averaging 6.75 ounces a year. With legalization, 40 percent would migrate to the legal market. That is 108,948 Oregonians buying 6.75 ounces each a year or 735,398 ounces total in FY 2017.

Without legalization, in FY 2017 there would be 1,299,067 residents that would not have easy access to marijuana. Even once legalized, about half will still not use it due to employment considerations. If the rest begin buying marijuana in the same proportion that current easy access users do (about 15.5 percent based on Dr. Crawford’s survey), there would be 89,065 new entrants into the market. We assume they would be light to infrequent consumers averaging 1.06 ounces a year for a total of 94,415 ounces in FY 2017.

Thus, assuming no price change, total resident demand on the legal market would be 829,813 ounces in FY 2017. However, prices should be lower.

Applying the price elasticity of demand increases total quantity demanded by approximately 16.4%. Therefore, FY 2017 demand increases to 965,762 ounces. Similar percent increases would occur in the 2017-19 biennium. Some of this demand would be satisfied through home gardening output.

Home Production

Home production reduces total state tax revenues by reducing retail sales offset only partly by a $5 tax on plant starts. Most home growers will choose starts over seed, which are less expensive and untaxed; because plant starts have inherent quality advantages.

Using evidence from other agricultural products, we impute the estimated quantity of marijuana grown as a percentage of total use. Since 2000, the percentage of food produced at home, rather than purchased, has held steady at around 3.22% of all consumption.\(^{38}\) We therefore reduced the


total resident demand by 3.22% in order to estimate the quantity of final products bought at retail.

In FY 2017, an estimated 31,108 ounces of useable product would be produced at home. In the 2017-2019 biennium, 63,548 ounces would be consumed from home gardening. These amounts reduce the amount of tax paid on flowers and leaves by fulfilling demand with homegrown, as opposed to commercially-grown product.

We used 5.47 ounces of useable product from plants grown outdoors under nine square foot spacing so to measure tax revenues from plant starts sold. Further, assuming a 75 percent success rate (growth to maturity), 25 percent grown from seed (untaxed), and a $5 tax on plant starts, we conclude that Oregon would garner $28,435 in taxes from the sales of immature plants in FY 2017. For the 2017-2019 biennium, Oregon would collect $58,090 through the plant tax.

Deducting homegrown production, the total amount of taxable flower and leaf purchases in FY 2017 by Oregon residents is 934,655 ounces and 1,909,297 ounces in the following biennium.

Non-Resident Demand
Non-residents will be a large source of demand. Some demand will come from commuters, but most will be from tourists visiting Oregon.

Tourists
Tourists (defined here as non-resident visitors to Oregon coming from more than 50 miles away for purposes other than routine commuting for work or shopping) will be an important market segment. For this analysis, ECONorthwest forecast sales to tourists using data from Colorado, the only other state to date that has retail marijuana sales.

In Colorado, tourists cannot buy medical marijuana but they can buy recreational marijuana from retail stores. Buyers show their identification proving state of residence and age at the door. Residency is important because locals can buy an ounce while tourists can buy only ¼ ounce at a time. How much tourists buy statewide is unknown. Storeowners do not record residency. However, anecdotal evidence suggests strong demand. Press reports quote storeowners

41 Harden , M. “Denver hotel inquiries have soared since pot was legalized.” Denver Business Journal. April 11, 2014.
claiming heavy demand from tourists. CNBC, after talking to numerous retailers, said that almost half the recreational marijuana buyers are tourists. One report at a ski area quoted storeowners saying that 80 to 90 percent of their sales went to tourists.

The quantities bought by tourists are unrecorded. In an interview with the largest dispensary in Colorado, we were told that tourists account for about half the sales volume. Although limited to ¼ ounce, tourists will buy from more than one retailer if they desire more. Most consumers buy about ¼ ounce regardless of residency.

Not all purchases are flowers for smoking. Tourists also buy edible marijuana products. Edibles are food items made from marijuana extracts taken from leaves, trim (small leaves of female plant inflorescences), and other plant material containing tetrahydrocannabinol, or THC, the psychoactive ingredient in marijuana. Colorado law prohibits smoking marijuana in public and in cars. Indoor smoking of tobacco, and also marijuana, is widely prohibited in hotel rooms. As a result, many tourists are compelled to eat marijuana products and not smoke.

In general, most consumers, including tourists, prefer smoking to edible products. About 38 percent of Colorado tourists stay with friends and family, so they have convenient private homes where they may smoke.

Similar to traditional smoking is vaporization, which is less malodorous. Legalization has freed up entrepreneurs to develop, produce, brand, and market many new infused products (edibles, extracts, and vaporizing oils). Observers, such as UCLA professor of public policy Dr. Mark Kleiman, conclude that “oral administration and vaporization are going to wipe out smoking.”

Currently over 40 companies produce edibles in Colorado. The Colorado Department of

46 Crawford, S. Email to R. Whelan and M. Wilkerson of ECONorthwest June 26, 2014. Citing a conversation Dr. Crawford had with Elan Nelson, Business Strategy and Development Director @ Medicine Man Denver.
52 Gorski, E. “Pot-infused products’ potency on the table.” Denver Post. May 2, 2014. Pg. 1A
Revenue describes the marijuana edibles market as being “huge and growing.” Infused products make up half of Colorado’s market now, up from ten percent four years ago.

**Estimating Tourist Sales**

For the purposes of estimating how much marijuana visitors to Oregon may buy, ECONorthwest used available data to approximate Colorado’s current average sales in ounces per visitor.

ECONorthwest used the excise tax revenues reported by the Colorado Department of Revenue on the first sale or transfer of marijuana. Colorado statutes state, “the excise tax is imposed on the first sale or transfer from a retail marijuana cultivation facility to a retail marijuana store, retail marijuana product manufacturing facility or to another retail marijuana cultivation facility.” By definition, an excise tax is a set dollar amount per unit. Colorado calculates that amount by estimating a fair transfer price for marijuana production, then takes 15 percent of the total as an excise tax. The resulting tax rate is applied uniformly throughout the State.

For 2014, Colorado set the values at $1,876 per pound for flowers and $296 per pound for leaves and trim. The excise tax rates are 15 percent of those values. The State uses as an example a ratio of three pounds of flowers and five pounds of leaves. This equals $8.33 an ounce. There are additional taxes imposed beyond the excise tax. Colorado reports excise taxes paid, but not quantities taxed. Retail recreational marijuana sales began January 1, 2014 and, to date, the State reports four months of tax data. Total excise taxes paid for the first four months of 2014 were $1,879,191.

In addition to excise tax, Colorado imposes *ad valorem* taxes on retail marijuana. Through April 2014, the State of Colorado collected sales taxes of $9,016,951 for recreational marijuana. Total state taxes were $10,896,142.

Using the $8.33 an ounce tax rate, we estimate 225,602 ounces were sold at retail stores for recreational use. Our analysis assumes that half of the customers making purchases in

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57 Colorado Department of Revenue. “Marijuana taxes, licenses, and fees transfers and distribution, April 2014 sales reported in May.” June 2014.
58 There is variability in the mix of plant parts sold. Some immature plants, taxed at $9 each, are also included in the excise tax mix. Also, product goes into inventories at stores and facilities where edible products and extracts are made. ECONorthwest recognizes these issues, but Colorado declined requests for sales quantity data.
Colorado are non-residents. Therefore, approximately 122,801 ounces were sold to tourists in four months.

Using 2012 data from the Colorado Tourism Office, we estimate 8.3 million out of state tourists visited Colorado in January through April 2014. That estimate is based on 29.5 million overnight trips (of which 60 percent came from out of state), 30.8 million daytrips (of which 22 percent were from out of state), and 32.9 percent of all trips in 2012 occurring in the months January through April. In order to estimate 2014 visitor volume, we applied the compound annual growth rate of Colorado visitor volume from 1992 to 2012, which was about 1.29 percent.

We conclude that Colorado out of state tourist purchases of retail marijuana in the first four months of 2014 averaged about 0.014 ounces per person. We used this to forecast tourist demand in Oregon.

Travel Oregon is the State agency in charge of tourism development. Their most current estimate of visitors is for 2011. Using data from that report, ECONorthwest determined that 23.1 million people from out of state visited Oregon for purposes other than commuting. There were 28.8 million overnight visitors and 42 percent came from outside of Oregon. Another 44.2 million came on daytrips, of which 25 percent were from out of state.

Oregon saw about 23.1 million tourists from out of state. If they too averaged about .014 ounces, as those visiting Colorado did in early 2014, total consumption (had retail marijuana been legal in Oregon in 2011) would have been 316,041 ounces.

ECONorthwest considered whether tourists from Washington would buy less than tourists from other states because retail marijuana would be legal there at the time sales begin in Oregon. However, it is possible that sales to Washington residents could be higher. Washington is

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60 Ibid., Page 9.
61 Ibid., Page 26.
62 Ibid., Page 16.
63 Ibid., Page 28.
64 Ibid., Pages 80 and 91.
65 Ibid., Page 60.
67 Ibid., Page 12.
68 Ibid., Page 26.
69 Ibid., Page 16.
70 Ibid., Page 48.
imposing a 25 percent tax on each stage of production in addition to sales tax. Some forecast consumers having to pay $370 to $465 an ounce.\textsuperscript{71} Initial retail prices were $25 a gram and higher (\textit{i.e.}, over $707 an ounce).\textsuperscript{72} That is more than triple the current black market price\textsuperscript{73} and substantially more than four times our forecast retail price.

If such pricing is in place when Oregon stores open, Oregon sales and tax receipts from marijuana bought from Washingtonians may be substantially higher than shown in this analysis. We feel confident, albeit perhaps too conservative, to assume no difference in purchases by Washington tourists compared to those from other states.

Tourism is growing in Oregon. Data from the Oregon Tourism Commission show a compound annual growth rate from 1991 to 2013 of 1.61 percent.\textsuperscript{74} Applying that rate, we estimate that in the fiscal year ending June 30, 2017, the State would see 351,616 ounces bought by out of state tourists. For the biennium (2017-19), sales to tourists would total 720,259 ounces.

**Estimating Out-of-State Commuter Sales**

Oregon is the workplace for 71,000 Washington and 5,200 Idaho resident daily commuters.\textsuperscript{75} They and many others shop in Oregon due to the absence of a sales tax. All are potential marijuana buyers. With retail prices less in Oregon than in Washington, we estimate sales to commuters will equal 25 percent of that of tourists. Therefore, we estimate 87,905 ounces sold to out-of-state commuters in FY 2017 and 180,064 in the biennium.


\textsuperscript{73} Washington average for high quality marijuana as reported on July 8, 2014 at http://www.priceofweed.com/


\textsuperscript{75} 2006-2010 U.S. Census American Community Survey
Fiscal Revenue Estimate

The total taxable demand is the combination of resident, tourist, and commuter demand minus amounts satisfied through home growing. ECONorthwest estimates that the total quantity demanded in the FY 2017 would be 1,374,175 on the taxable, legal non-medical commercial market. That, plus about $28,435 in taxes on plant starts, would generate $38,505,354 in state tax revenue.

In the biennium 2017-2019, taxable sales of non-medical marijuana flowers and leaves would be 2,809,620 ounces. Those sales, in addition to plant sales, would produce $78,727,462 in state taxes.

In addition to marijuana taxes, the state would receive revenues from licenses, permits, personal income taxes, corporate income taxes, and other miscellaneous sources due to the investment, employment, and private business activity this industry would generate. Alcoholic beverage sales might decline when marijuana is legalized, as alcohol and marijuana seem to be substitutes. However, research studies on their substitutability are not unanimous and whatever impacts may occur would likely be small. Therefore, we did not include effects on state alcoholic beverage revenues in our fiscal impact estimate.

Long-term changes in the structure of the industry will occur, so too would laws in other states, making prediction difficult. Generally, we believe that as an industry emerges out of prohibition, consumer prices and production costs tend to decline, product choice increases, and innovation takes hold. We have been told, and suspect is true, that the climate of southern Oregon is nearly ideal for outdoor marijuana growing. Furthermore, through years of work by growers, Oregon has developed highly desirable marijuana cultivars. If legalization extends nationwide, Oregon would become a formidable exporter based on its ideal climate for growing and the early mover advantage in commercial production.

The long-term is unpredictable and data is lacking for all but weak speculation. However, based on what we see in Colorado now and what we believe the cost and tax structure would be, we can forecast conservatively that the legal non-medical marijuana market in Oregon would exceed 1.3 million ounces in FY 2017 and produce about $38.5 million in state tax revenues as illustrated in the following, Figure 1.

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Oregon Fiscal Revenue From Cannabis Legalization – FY 2017

**Current Market**
- Medical
- Black Market, In-State
- Black Market, Export

**Future Market Forecast (FY 2017)**
- Medical (no tax)
- Grey Market (no tax)
- Legal Market (taxed)

**Current OR resident use**
- 108,948 users @ 6.75 oz.

**OR market entrants (access/ legalization)**
- 89,065 users @ 1.06 oz.
- 829,813 oz.

**Price Elasticity (lower price)**
- + 16.4%
- 965,762 oz.

**Non-resident (tourist and commuter)**
- 439,521 oz.

**Home Production/ Use**
- (31,108) oz.

$5 tax per plant start generates $28,435 in revenue

$38.5 million

$28 per ounce

1,374,175 oz.

Fiscal Revenue (not including licenses and fees)