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Potential for Legal Marijuana Sales in California to Supply Rest of U.S.

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Abstract
We use four data sets (two from law enforcement, two from user reports) to estimate that the current price gradient for marijuana in the United States is $300 - $1000 per pound per thousand miles, with $450 being perhaps the best guess. We take this as a measure of the cost of smuggling marijuana through parts of the US interior where marijuana is illegal. We combine this gradient with estimates of post-legalization production costs in California to project the proportion of the lower 48 states for which taxed, legally produced sinsemilla would undercut current sinsemilla prices. This analysis suggests that: (1) legalization of marijuana in California would put downward pressure on sinsemilla prices throughout most of the country and (2) the number of past-year marijuana users outside of California who would find buying taxed California sinsemilla to be cheaper than their current source is roughly six times the number of marijuana users who live in California, so, under the right conditions, "exports" might generate significant excise tax revenue for California.

Introduction

California has the potential to reap tax revenues from the legal sale within its borders of marijuana that is then exported illegally to consumers elsewhere.[1] Here we try to estimate potential exports to other U.S. states in the lower 48 only. Currently the U.S. imports rather than exports to Mexico and Canada (NDIC, 2009). In principle that could change if legalization reduced California's production costs sufficiently. Likewise, it seems odd but is not impossible that California might illegally export legally purchased marijuana further afield; border controls heading into the U.S. are generally tougher than controls on material flowing out. However, we ignore such possibilities here. Hence, the estimates here are conservative in that respect.

The basic exercise is to compare for each state (1) the post-legalization, taxed price in California bumped up by the cost of smuggling marijuana illegally from California with (2) the current price of marijuana. If the former is smaller than the latter, then consumption in that other state might end up being supplied from California. If the California price plus smuggling cost were only slightly lower, then the current suppliers might merely cut their prices but retain market share. Hence, we present the final analysis of market sales that California could capture as a function of the price advantage needed to capture market share from the current sources.

Here we take the post-legalization price in California simply as an exogenous parameter to be estimated elsewhere. In particular, we assume that it is $1,500 per pound, including $800 per pound for a $50 per ounce excise tax. That is essentially the same price per unit weight that we use elsewhere for the retail price per ounce (with taxes), and so is conservative. People smuggling taxed California marijuana would presumably buy in bulk and so might receive better prices, but we find below that even starting with this projected retail price, California exports would still undercut current prices in almost all of the lower 48 states.

[1] We do not speculate about whether federal enforcement of anti-marijuana laws will change if California legalizes marijuana. This could influence the smuggling costs. We do briefly discuss possible federal actions in Chapter X.

The original analysis here is of the smuggling cost, which we estimate in terms of dollars per pound per thousand miles transported from the source. There are two reasons for framing smuggling costs as proportional to distance: (1) such a linear model fits the data reasonably well and (2) we anticipate that most smuggling would be by automobile. Fourth Amendment protections against unreasonable search and seizure as applied to the trunks of personal automobiles offer important advantages to drug smuggling within U.S. borders relative to other means of transit. If the smuggling were instead conducted primarily on commercial airline flights, one might expect the cost to be more closely related to the number of flight connections, not the distance traveled.

The key insight is that there is no reason why California's legalizing marijuana should affect the cost of smuggling marijuana from California to other states within the U.S. because the risk associated with that smuggling comes from enforcement by the federal government and other states' law enforcement agencies. Hence, evidence about smuggling costs today is directly relevant.[2]

We infer those smuggling costs from currently observed spatial variation in marijuana prices. That is, we presume that arbitrage equilibrates marijuana prices across location, apart from the cost of buying in the low price market and selling in the high price market. Hence, we simply plot the current price per unit weight as a function of distance from the presumed source, in miles, and observe the slope of the best fitting line passed through those points. That slope measures directly the price gradient and, hence, the inferred smuggling cost.

Drug prices are not measured perfectly, so this approach can only work if the transport costs are not small compared to the error in measurement of the prices. In the language of statistics, we need the "signal" (the actual variation in price with distance from the source) to be large compared to the "noise" (the random error in measurement at any given location).

To foreshadow the results, we estimate the price gradient to be on the order of $300 - $1000 per pound per thousand miles. That signal is small enough that it is seen more easily in data reported by law enforcement agencies (our two primary sources) than in data reported by users (our 3rd and 4th data sources). In particular, the price gradient can only be seen in user self-report data after some outliers have been eliminated. Nevertheless, the fact that broadly consistent findings are obtained with four independent data sets is reassuring.

Variability in repeated observations of price at a particular location seems to be roughly proportional to the average price. For example the coefficient of variation or ratio of standard deviation to mean price for illegal drugs may be on the order of 0.2 – 0.4 (Reuter and Caulkins, 2004). Since the average price of sinsemilla around the U.S. today is on the order of $4,000 per pound, two standard deviations is on the order of $2,400 per pound, or potentially as large if not larger than the smuggling cost between most pairs of points within the U.S. Hence, it is easiest to detect the gradient in prices across locations for cheaper, commercial grade marijuana. Typical prices for commercial grade marijuana in the U.S. are on the order of $1,000 per pound, so two standard deviations (on the order of $600) is smaller than the cost of transporting that marijuana across the U.S.

The pattern may also be easier to observe in commercial grade data because sinsemilla is typically cultivated indoors throughout the U.S., so distance from source is less well-defined.

[2] One could argue that post-legalization the early part of the smuggling trip – from the California source to the California border – would be safer. However, that would (1) be relatively minor compared to the overall distances travelled and (2) is conservative since it would make California-produced marijuana even more competitive than without this correction, so we neglect this point in our calculations.

Even though the smuggling costs are estimated primarily with commercial grade marijuana we assume they apply to all forms of marijuana. Marijuana sentences are based on weight and other circumstances, but not the type or potency of marijuana, so it is not obvious why smuggling costs for sinsemilla should be any higher or lower per pound per thousand miles than are smuggling costs for commercial grade marijuana.

If smuggling costs are in fact on the order of $300 - $1000 per pound per thousand miles, California produced commercial grade marijuana would have a hard time undercutting current costs of commercial grade marijuana outside of the western states. However, if production costs fall as much as under some contemplated scenarios, California-produced, legally sold and taxed sinsemilla could undercut current sinsemilla prices in much of the U.S.

With that overview, we turn now to the data and price gradient estimation.

Data

Price Data

The data on prices of marijuana purchased throughout the U.S. came from four sources: the Narcotic News website (http://www.narcoticnews.com/), the Drug Enforcement Administration's (DEA's) Illegal Drug Price/Purity Reports (IDPPR), the Arrestee Drug Abuse Monitoring (ADAM) system, and High Times magazine.

The Narcotic News (NN) website appears to be a private undertaking that, in its own words "is designed to appeal to Law Enforcement personnel and all others who have a desire to read about the latest news in cocaine, marijuana, heroin, methamphetamine, etc. In addition we will post news articles relating to large cash seizures and hidden compartments that are used to conceal dangerous drugs. The goal of this site is to bring awareness to the worldwide drug problem."

The NN web site does not describe its methods of data collection or authentication. They appear to be intended to reflect voluntary self-report by law enforcement agencies. The site invites "If you are involved in law enforcement and would like to submit the going prices for your area, please email us at info@narcoticnews.com".

The site lists wholesale price ranges for a pound of marijuana, organized by state and city. Prices are usually given as ranges, of which we took the midpoint. Some are supplemented by parenthetical descriptions (such as "High Grade"); no date information is given.

We separated those reported to be sinsemilla or high grade (n=22) from the others, assumed to be commercial grade (n=126). The 22 sinsemilla or high grade entries were not enough to support analysis of price as a function of distance from source. We did use those observations as our data on the current price when estimating potential export market below.

The DEA IDPPR data had been assembled previously for another project and are described in Pacula et al. (2001). The data include 1,369 quarterly observations (4th quarter of 1982 through 2001) giving pound and ounce level prices for sinsemilla and commercial grade marijuana, usually expressed as a range, for one of 20 cities (and the nation as a whole, but national data were not useful for this analysis). The DEA originally published the numbers in a series of hard copy reports (Domestic Cities Reports, 1982-1985; Illicit Drug Wholesale/Retail Price Reports, 1985 – 1990; and Illegal Drug Price/Purity Reports, 1991-1998).

Annual prices were computed by averaging the midpoints of the quarterly ranges for any location-year for which there were two or more quarters of data; this effectively restricted the

analysis to 282 observations covering 1986 – 2000.[3] Regressions were run with all 282 observations with dummy variables for each year and for three-year blocks; we also ran separate regressions for each year. Plotting the price gradients from the single-year regressions over time shows a clear trend of increasing price gradients from 1986 to 1994; between 1994 and 1999 the gradients fluctuated but remained high before falling back sharply in 2000. Because of that pattern, we report the averages of the single-year regressions both for all fifteen years (1986-2000) and also just for 1991 – 2000.

The Arrestee Drug Abuse Monitoring Program (ADAM) data have been described elsewhere. ADAM is a federally-funded monitoring system that interviews and collects urine samples from arrestees quarterly in a number of cities around the U.S. Further information about ADAM is available at http://www.icpsr.umich.edu/icpsrweb/ICPSR/series/00110.

The ADAM data contained 25,308 observations from 2000 – 2003 and 43 locations. Each observation included the city, year, quarter, amount paid, number of units, and type of units (e.g., gram, ounce, etc.). We focused on the 15,709 observations whose units were pound, ounce, gram, or joint, and excluded those whose units were ambiguous (bag, "other", "don't know", etc.).

The ADAM data appeared to be contaminated by outliers, so we regressed log of amount paid on log of weight and dummy variables for time and city. We removed the 431 observations whose value was more than 2.5 standard deviations away from the regression line. The data points for Hawaii and Alaska were excluded because they do not inform price gradients for the continental U.S.

One limitation of the ADAM data is that they include no information about quality. Some respondents might be describing the price of commercial grade; others of sinsemilla. As is discussed below, we run the initial analysis pooling all responses, effectively assuming they are all commercial grade, and then also consider the results when dropping the five cities whose average prices are much higher than elsewhere. That may be only a partial correction; if other cities have varying proportions of respondents describing sinsemilla prices but not in such numbers as to make the overall average standout, that could affect the ADAM analysis.

The final source of price data is High Times, a "fanzine" that has been published monthly since 1975. In each issue, contributors to the "Trans High Market Quotations" (THMQ) section write in with descriptions and prices of marijuana in their part of the country. These data are described in more detail by Jacobson (2004), who provided us with the data. Briefly, the data consist of 2157 prices submitted to High Times magazine by growers/readers from 1996-2005 for an ounce of schwag (n=490), mids (244), or sinsemilla (1422). The data set also reports the city, state, month, year, and a "description" of the marijuana. The description field contained a name such as "Hydro" or "Purple Haze"; we did not use the description field information because so many different types were mentioned (844) that most observations were of a type that was mentioned at most a few times.

The prices tended to be lowest for schwag (average $111 per ounce), highest for sinsemilla (average $360) and intermediate for mids ($182). Prices of schwag and sinsemilla appeared to be stable over time, whereas mids prices increased by roughly one-quarter over the period covered by the data.

[3] Nineteen cities were in the data set from the beginning; El Paso was only added in 1999. So there are potentially 19 * 15 years + 2 = 287 observations, but 5 were dropped because data were only reported for that city in one quarter in that year.

Initial plots of price vs. distance suggested that there were outliers on the low side that might be obscuring the relationship between price and distance, so we conducted the analysis both with all observations and after deleting ("trimming") observations with prices equal to or below $200 for an ounce sinsemilla, $100 for mids, and $50 for schwag. This increased the average prices to $378 per ounce for sinsemilla, $186 for mids, and $117 for schwag. We also retained only states for which there was more than one data point, and used the average across those data points. This left us with 48 states for sinsemilla, 35 for mids, and 44 states for schwag.

Distance Data

We assumed the primary source of marijuana was either Mexico or Humboldt County California. We evaluated both sources for all types of marijuana, but, as expected, the price data varied most sensibly with distance from Mexico for commercial grade and schwag and with distance from Humboldt County for sinsemilla, so only those results are reported below.[4]

Distance from Mexico was operationalized as distance to the nearest city in Mexico using the web site http://www.mapcrow.info/Distance_Mexico.html. For sinsemilla we focused on Humboldt County for the sake of specificity, because it is a top ten county in terms of Campaign Against Marijuana Planting (CAMP) eradication totals,[5] and because among the emerald triangle of high eradication counties, it is at least as far as the others (Lake, Mendocino, Trinity, Shasta) from the population centers to the east, and so is in that sense conservative.

We also considered Canada as a potential source, focusing specifically on distance from Vancouver or Quebec. In particular, for any given location, we computed the distance to the "nearest" source, allowing for an additional "fixed charge" for having to cross the US-Canadian border. In analyses that viewed the source as either Humboldt County or a location in Canada that charge would represent the risk or cost of crossing the US-Canadian border. In analyses that viewed the source as either Mexico or Canada the fixed cost would represent how much harder it is to smuggle across the US-Canadian border than across the US-Mexican border.

There is some evidence in the price data that marijuana from Canada affects prices in the US. E.g., when regressing price only on the distance from Mexico, the locations with negative residuals (meaning prices are lower than would be expected solely based on distance from Mexico) tend to be states close to the border with Canada. However, including this more complicated notion of distance from the source did not materially improve the proportion of variation in price explained, so we focus here on the results that looked simply at price as a function of distance from either Mexico or Humboldt County.

Price Gradient Results

Table 1 summarizes the regressions of price on distance from source, with Humboldt County as the source for sinsemilla and Mexico as the source for lesser quality types of

[4] Commercial grade prices as reported by Narcotics News show a statistically significant increase with distance from California, but that appears to be primarily because for the eastern US increases in distance from California are correlated with increases in distance from Mexico. At any rate, distance from Mexico explained substantially more of the variation in price for commercial grade marijuana.

[5] See, e.g., http://www.ag.ca.gov/bne/camp.php.

marijuana.[6] Figures 1 – 4 provide the corresponding scatter plots for the Narcotics News, IDPPR (1999), ADAM, and High Times mids data.

The best fitting regressions are the ones using law enforcement data (Narcotics News data on price per pound and IDPPR data). They suggest price gradients of between $395 and $563400 per pound of commercial grade per thousand miles. The High Times mids and ADAM regressions yielded larger gradients of about $500 and $1,000 per pound per thousand miles, respectively. The High Times schwag regression gradient was lower, closer to $300 per pound per thousand miles.

The ADAM data plot (Figure 2) suggests there are five outlier data points with prices of over $10 per gram. Perhaps those data points represent instances in which ADAM respondents were describing sinsemilla, whereas in other locations they were focused on commercial grade marijuana. (The ADAM data do not describe quality.) Four of the five were in the Pacific Northwest (Portland, Spokane, Seattle, and elsewhere in Washington); one was from San Jose. We were concerned that these observations might be affecting the slope, so we re-ran the regression without them. Eliminating them naturally increased the fit (R^2 increased from 0.144 to 0.480), but had almost no effect on the price gradient (decreasing it from $998 to $953 per pound per thousand miles).

We also considered ADAM prices as a function of distance from Sacramento, on the possibility that most respondents were describing sinsemilla prices. However, there was no relationship (R^2 and slope both near zero).

The High Times sinsemilla data for the U.S. as a whole showed no systematic relationship with distance from Humboldt County. Looking just at prices within California, however, prices tended to be marked lower close to Humboldt County, producing the highest estimated price gradient (Figure 5). We do not put much stock in that estimate, however, because the distances involved are smaller, reducing the effect of what we seek to measure, and there are obvious omitted variables that could well be driving the relationship. Notably, marijuana enforcement may be taken less seriously closer to Humboldt County and more seriously in southern California, leading to higher prices in the Southland.

Hence, we interpret the data as suggesting smuggling costs of $300 - $1000 per pound per thousand miles with a best guess of $450 per pound per thousand miles.

Table 1: Summary of Regressions of Price vs. Distance from Source

Source	Marijuana Units	Distance Measurement	Slope	Intercept, Constant	R^2	$/lb increase/ 1000 miles
Narcotic News	Pounds of Commercial Marijuana	Miles from Mexican Border city	0.3952x	$475	0.524	$395
IDPPR	Pounds of Commercial Marijuana	Miles from Mexican Border city				

[6] That Mexico is the source of most of the lower quality or "commercial grade" marijuana in the U.S. is a conventional wisdom, to the point that official DEA price lists describe the low-end of the market as "Mexican low grade" (LA CLEAR, 2006). Its empirical basis is hard to pin down and so potentially suspect. This would be troubling except that inasmuch as we do find a clear price gradient with commercial grade marijuana prices increasing with distance from Mexico, the data seem to support the conventional wisdom.

All years (1986 – 2000) with 14 dummy variables for individual years			0.4374x	$516	0.621	$437
All years (1986 – 2000) with 4 dummy variables for clusters of 3 yrs			0.4377x	$638	0.593	$438
Average of 15 separate single year regressions, 1986-2000			0.4385x	$681	0.494	$439
Average of 10 separate single year regressions, 1991-2000			0.5629x	$697	0.620	$563
ADAM	Grams of Commercial Marijuana	Miles from Mexican Border city	0.0022x	$5.67	0.144`	$998
High Times	Ounces of mids	Miles from Mexican Border city	0.032x	$147	0.251	$512
High Times	Ounces of Schwag	Miles from Mexican Border city	0.0211x	$93	0.166	$337
High Times	Ounces of Sinsemilla	Miles from Eureka, Humboldt County, CA (data from entire country)	0.0099x	$365	0.039	NA
High Times	Ounces of Sinsemilla	Miles from Eureka, Humboldt County, CA (data from within CA only)	0.1602x	$324	0.352	$2,560

Figure 1: Price per Pound of Commercial Grade Marijuana Reported by Narcotics News vs. Distance from Mexico

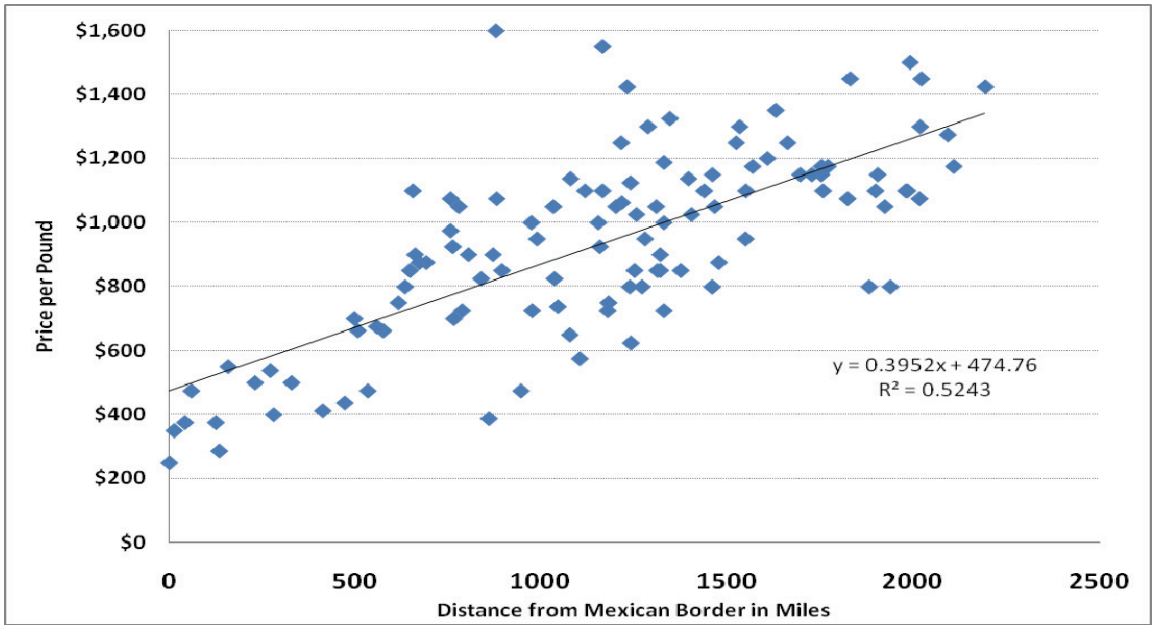


Figure 2: Price per Gram of Marijuana Reported in ADAM vs. Distance from Mexico

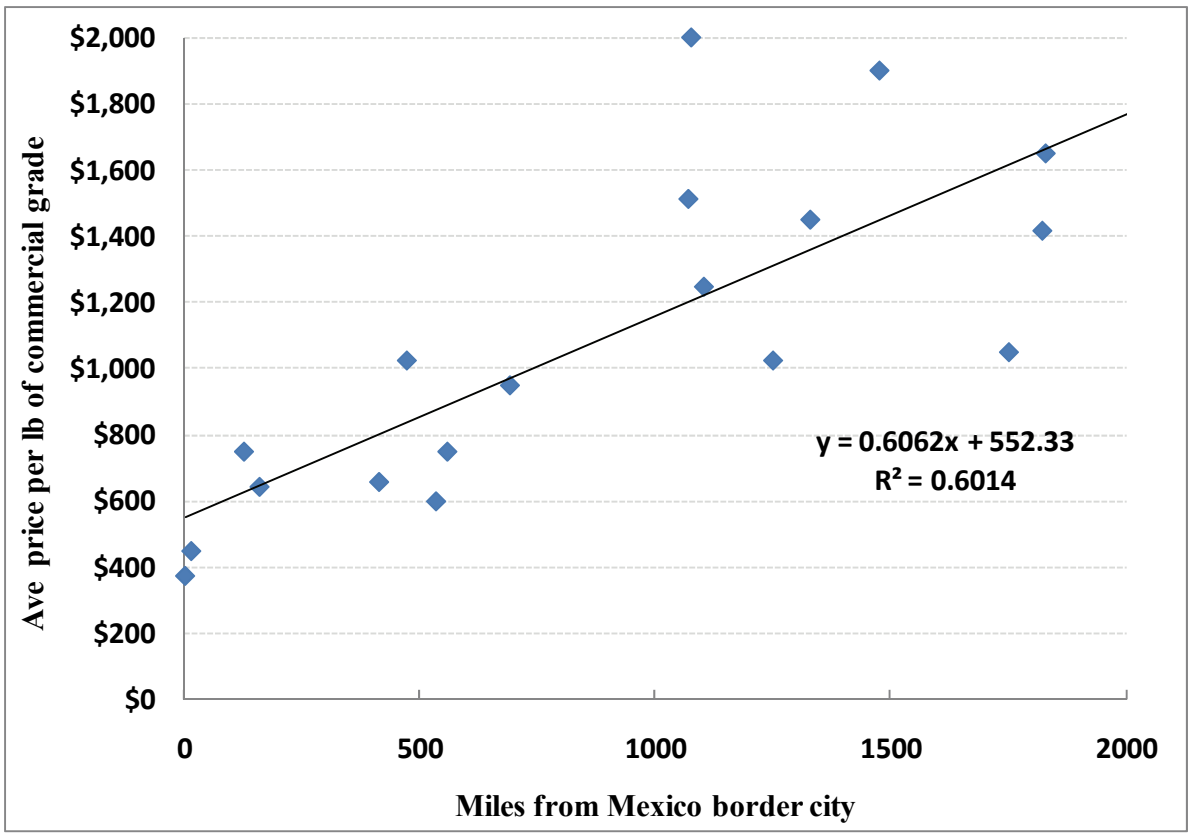

$2,000
$1,800
$1,600
$1,400
$1,200
$1,000
$800
$600
$400
$200
$0
Ave price per lb of commercial grade
0
500
1000
1500
2000
Miles from Mexico border city
y = 0.6062x + 552.33
R² = 0.6014

Figure 3: Price per Gram of Marijuana Reported in ADAM vs. Distance from Mexico

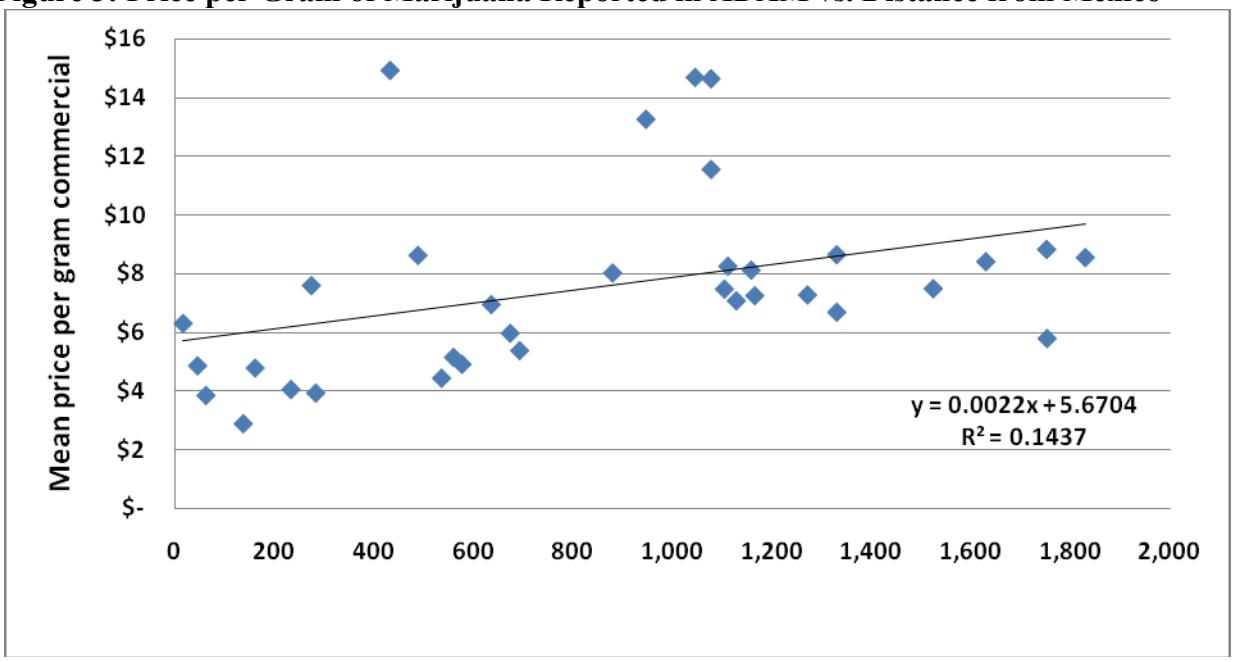


Figure 4: Price per Ounce of Mids as Reported to High Times vs. Distance from Mexico

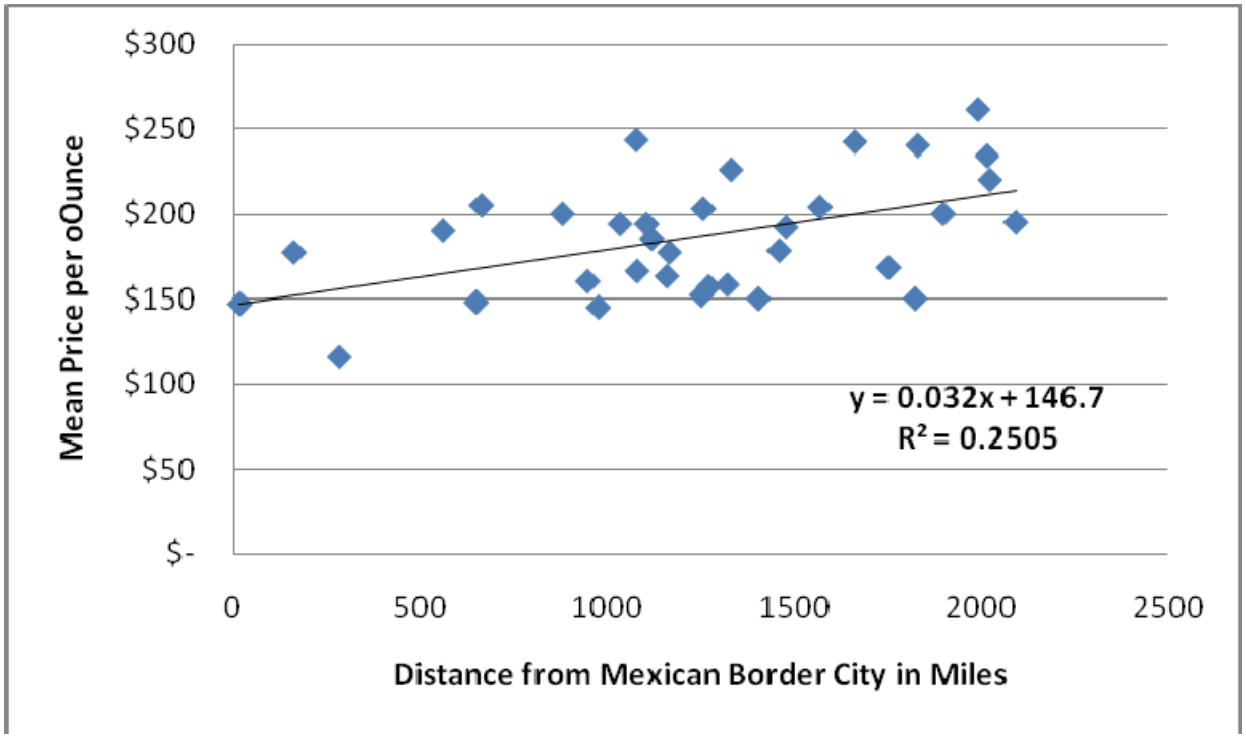
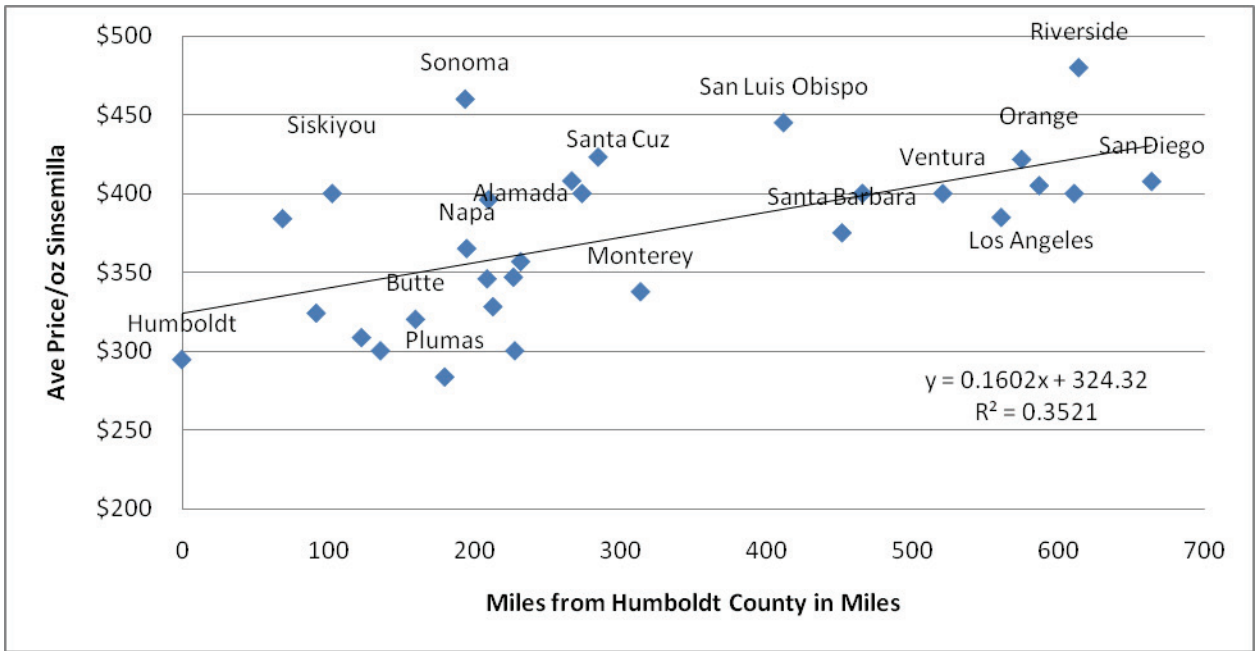


Figure 4: Price Gradient for Ounces of Sinsemilla Within California, as Reported to High Times



It is interesting to compare these figures to a direct estimate of the cost of smuggling. Suppose two people drove a car to California from 1,000 miles away to purchase a wholesale quantity of marijuana. The direct costs of such a trip might be roughly $2,000 - $2,500 if the trip took three days (one day of driving each way plus one day to arrange the purchase and subsequent resale).[7] If the trip was made to purchase and re-sell only 5 pounds, such tangible costs could account for all of the price gradient. Of course if the trip involved transporting 50 pounds, not 5 pounds, then these tangible costs would only account for $40 - $50 per pound per thousand miles. That does not contradict the observed gradient; the difference could represent compensation for the risk of arrest, being robbed, and/or violent confrontation with the other transaction parties (Reuter and Kleiman, 1986).

An interesting speculative aside is that reductions in production cost might possibly reduce the smuggling or distribution costs. The trunk of a car can easily hold even more than 50 pounds without making the suspension sag visibly in ways that might arouse police suspicion. Yet there may be limits on the dollar value that typical smugglers are able or willing to carry on a particular run. Smuggling 100 pounds of sinsemilla worth $4,000 per pound requires amassing $400,000 in working capital, and suitcases full of $400,000 in cash might present tempting targets for fraud or robbery.

If the limit on the amount carried on such a smuggling trip were determined by the value, not the weight of the drugs, then halving the cost in California might double the amount that can be comfortably be carried on a particular smuggling trip, thereby halving the cost per pound per thousand miles of these tangible smuggling costs. The smuggling cost per pound that represents

[7] 2,000 miles driven times $0.50 per mile = $1,000 for gas, oil, depreciation, etc (http://www.gsa.gov/Portal/gsa/ep/contentView.do?contentId=9646&contentType=GSA_BASIC). Six person days times $125 per day wage plus $50 per day "per diem" for meals on the road equals roughly another $1,000. Hotel bills for the two nights could be roughly on the order of $200 - $500 depending on how fancy the hotel is and whether the two conspirators share a hotel room

compensation for the risk of robbery would likewise be halved, but the part reflecting compensation for law enforcement risk would not fall as much. The risk of making one trip with 100 pounds might be smaller than the risk of making two trips with 50 pounds each, but it is surely greater than the risk of making one trip with 50 pounds since sentences generally are longer for those caught with greater quantities.

Implications for California's Potential Share of the Market

We next consider what the price gradient estimated above implies for how much of the U.S. marijuana market might plausibly be supplied by legal, taxed marijuana from California. We do this estimate only for sinsemilla. Typical prices for commercial grade marijuana are only $500 - $1250 per pound, so legal marijuana from California taxed at $50 per ounce ($800 per pound) would not be cost-competitive, particularly since the high end of the range of commercial prices is seen far from Mexico and, hence, also far from California. In short, no matter how much legalization reduces the cost of producing marijuana in California, legal commercial grade marijuana taxed at $800 per pound cannot compete with commercial grade marijuana from Mexico that sells within the U.S. along the Southwest border for $300 - $600 per pound. (That the sale in California would be legal is not a consideration since the California-grown marijuana would be just as illegal as the Mexican marijuana as soon as it left California.)

Of course if the excise tax were lower, e.g. $5 or $10 per ounce, then commercial grade California-grown marijuana might be competitive with commercial grade marijuana imported from Mexico.

The economics of exporting look different for sinsemilla. Suppose that after legalization the cost of production, processing, distribution, and retail sale, including a normal profit margin, fell to $700 per pound, so that the selling price with a $50 per ounce tax were $1,500 per pound ($93.75 per ounce). Suppose also that the price gradient from smuggling costs were $450 per pound per thousand miles. Then sinsemilla purchased legally in California and smuggled 2,500 miles to New York would cost $2,625, which is less than the price Narcotics News currently reports for sinsemilla in New York State ($2,500 - $6,000 in New York City and $3,250 - $5,000 in Albany).

Indeed, if we estimate the state price as the average across cities in the state of the midpoints of the price ranges given for those cities, then there are only two states in the lower 48 (Minnesota and Wisconsin) where current prices are below the projected price of legal sinsemilla smuggled from California when using these parameters, and another three (Vermont, New Hampshire, and Maine) where the smuggled, taxed exports from California would undercut current prices by less than $250 per pound. For the other 42 of the lower 48 states, we might expect legalization in California to put significant downward pressure on sinsemilla prices, even if California imposes and successfully collects a $50 per ounce excise tax.

Based on state-specific past-month marijuana prevalence rates estimated by the Substance Abuse and Mental Health Services Administration using the 2006 and 2007 National Survey on Drug Abuse and Health,[8] there are six times as many past-month marijuana users in those 42 states as there are in California. Some of those individuals are using commercial grade marijuana, not sinsemilla. Still, it is clearly plausible that taxes from exports could represent an important share of the tax revenue California would reap from marijuana legalization.

Naturally, the prospects for tax revenues are less promising if the production cost in California is higher and/or the smuggling costs per mile is greater. For example, if we more than

[8] http://oas.samhsa.gov/2k7state/AppB.htm#TabB-1.

double the cost of production, processing, distribution, and sale to $1,500 per pound and the cost of smuggling to $1,000 per pound per thousand miles, while retaining the $800 per pound tax, then the number of past-month users outside California who would find taxed marijuana from California to be cheaper than current prices is only about 10% greater than the number of past-month users within California. I.e., exports could only roughly double tax revenues, even if most consumption were of sinsemilla not cheaper commercial grade marijuana imported from Mexico.

Furthermore, the current suppliers might have some capacity to cut their prices to retain market share, so California exports might have to beat current prices by a significant amount, not just by $1 per pound, in order to generate sales. Hence, it is instructive to examine plots of the number of past-month users – expressed as a proportion of California's number of past-month users – who would buy California taxed sinsemilla as a function of the extent by which such California exported sinsemilla would have to undercut current prices in order to be preferred. Figure 5 shows such a figure assuming a smuggling cost of $450 per pound per thousand miles and a sales price of $1,500 per pound in California (i.e., $93.75 per ounce with a $50 per ounce tax..

Figure 5: Export Market for Californian Sinsemilla as a Proportion of the "Domestic" (Californian) Market (vertical axis) as a Function of the Margin by Which California-Based Sinsemilla Would Have to Undercut Current Prices to Win Market Share (horizontal axis) (Drawn for California Production, Processing, Distribution, and Sale of $700 per Pound, Tax of $800 per Pound, and Smuggling Costs of $450 per Pound per 1,000 Miles)

This figure packs in a lot of information so it is worth explaining how to read it. Suppose one believed that sinsemilla from California had to be $1,000 per pound cheaper than the current price in order to out-compete the current suppliers. Then one would look at the $1,000 on the

horizontal axis and note that the line above that point is at the level of 370%. That would mean that taxed sinsemilla exported from California would be the preferred source of sinsemilla for 3.7 times as many people in the lower 48 states outside of California who are now past-month marijuana users, as there are past-month marijuana users in California.

The curve slopes downward because the larger the margin by which taxed sinsemilla from California would have to beat current prices in order to win market share, the fewer states there are where Californian sinsemilla would actually be consumed, as opposed to merely exerting competitive pressure that drives down prices without actually taking market share from current sources.

The portion of the curve to the left of the vertical axis means that there are some – although not many – past-month marijuana users who live in states where the taxed sinsemilla from California would not be cost-competitive at all (e.g., Wisconsin and Minnesota).

Increasing any of the three parameters (production cost in California, tax in California, and/or smuggling cost per pound per thousand miles) tends to pull the curve down and to the left, indicating prospects for California's marijuana tax revenues are less favorable.

The curve is "chunky" for two reasons. First, the analysis is done at the state not city level, so the curve jumps down quite a distance when a large state comes "within range" of marijuana from California. Second, the Narcotics News site only provided sinsemilla price data for 22 locations, so states with no data on current sinsemilla prices were assigned the price observed in their nearest neighbor for which price data were available.[9] When those states were north or south of each other and, hence, roughly equi-distance from California, the curve jumps down by the combined population of all those states for roughly the same price difference on the horizontal axis. With more complete and finer-grained data on current sinsemilla prices, one could recomputed Figure 5 and obtain a smoother curve, but that would not change the location of the curve or the basic results.

References

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[9] We tried to use the more numerous High Times Sinsemilla data to fill in prices for places with no data from Narcotics News, but there was no consistent relationship between the High Times and Narcotics News sinsemilla prices for the locations with both types of data.