

Cannabinoid Therapies

The coming retail wave

The momentum towards cannabis legalization is unmistakable and likely unstoppable. The total legal cannabis market in the US was only around \$8bn in 2017 compared to \$234bn in sales for the alcoholic beverage industry. However, things are changing as legalization is popular with voters and politicians recognize that the increased tax revenue that could be extracted through sales taxes or VAT. It is not unreasonable to project legal cannabis sales estimates of \$90bn in the United States and \$40bn in the major western European economies (assuming recreational legalization).

The tide has turned in North America

Despite a relatively benign safety profile even compared to alcohol, cannabis use has been broadly banned historically, even for medical use. This is all changing. Canada became the first major western country to legalize recreational cannabis in 2018. In the United States, 10 states have legalized recreational cannabis (with a bill to legalize in Illinois heading to the Governor's desk for signature) and 33 states have legalized medical cannabis (though it remains illegal on a federal level). More importantly, several prominent Democratic presidential candidates have endorsed removing cannabis from the Schedule of Controlled Substances.

An evolving market

Like all markets, the legal cannabis market will take time to evolve as it is being transformed from a mostly illegal market. In US states that have legalized recreational cannabis, like Colorado and Oregon, the market has gone through a high-growth phase that lasts a few years and then starts levelling off as the initial surge of people switching from the illegal market works itself through the system. Market growth is also hampered by oversupply, which forces prices down considerably. In Colorado, for example, wholesale prices fell by 47% between 2017 and 2019. So while the cannabis wave is undeniable, it is important to choose the segments that can profit despite consistent price decrease.

Likely winners...

- **Key brands:** companies with good multi-state branding will be key winners as most of the market share tends to go to the top five brands.
- **Consumers:** patients with a variety of ailments including epilepsy and pain.

Likely losers...

- **Alcohol companies:** AB InBev, Heineken, Molson Coors
- **Opioid-focused specialty pharma:** Purdue, Insys, Endo, Teva

Winners and losers: the companies shown above do not translate into buys and sells as other themes (and valuation parameters) may conflict with this one.

Edison themes



6 June 2019

From the street

We believe the growth of the global legal cannabis industry will be driven by increasing penetration in largely untapped 'mainstream' consumer markets, and the legal industry could grow to more than two times the estimated size of the current illegal market. We believe that cannabis will eventually become federally legal in the US for recreational enjoyment by adults and for use in a broad range of safe drugs and therapeutic products. After US federal legalization, we believe the US market will exceed \$100bn annually, with more than 50 million consumers. Globally, we estimate the legal cannabis market has the potential to reach \$500bn annually, approaching one billion consumers.'

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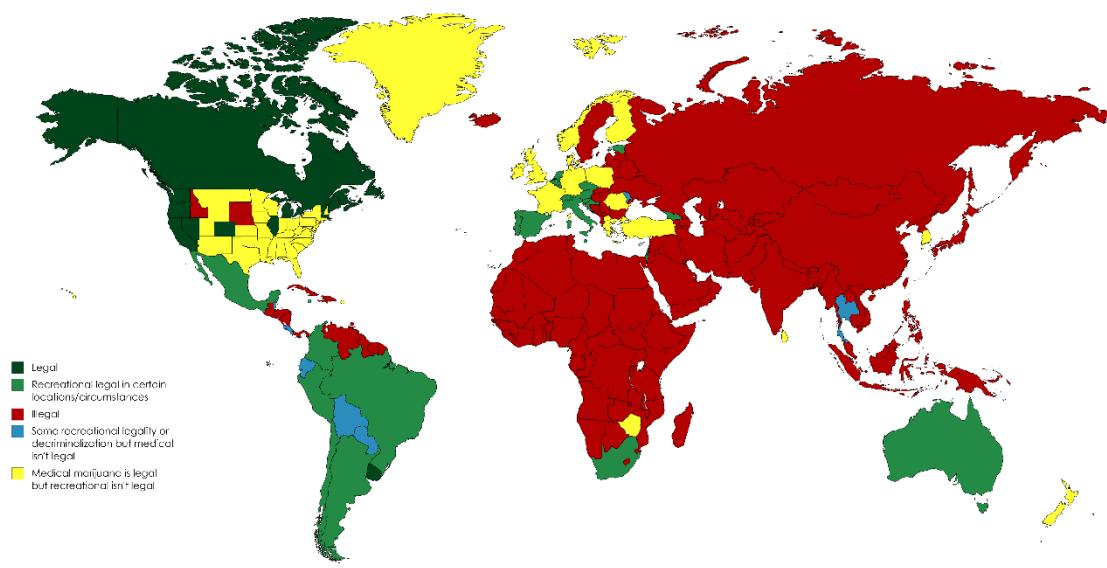
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It's not just hype, it's real

Cannabis is thought to be one of the oldest plants cultivated by humans with multiple medicinal uses (including problems with the eyes, gynecological disorders as well as to fight inflammation) documented in ancient Egyptian texts. In all, cannabis was used to treat a wide variety of different indications, including pain, spasticity, cancer, epilepsy, nausea, anorexia and infectious disease.¹

In the 1800s and early 1900s, cannabis was included in certain patent medicines and elixirs for a variety of indications though with little evidence to back up claims. Regulation in the US started with the Pure Food and Drug Act of 1906 (which also led to the creation of the FDA) and continued with numerous state laws until the possession and transfer of cannabis, outside of medical and industrial use, was made illegal by the Marihuana Tax Act of 1937. The modern regime for the regulation of cannabis was born in 1970 with the passage of the Controlled Substances Act, which assigned cannabis a Schedule I classification and prohibited all uses, even medical ones. Regulation outside of the United States had a similar progression with generally broad illegality by the early 1970s.

Exhibit 1: Current status of cannabis laws globally



Source: European Monitoring Centre for Drugs and Addiction, National Organization for the Reform of Marijuana Laws, various. Created with mapchart.net. Note: Illinois is marked as a state where recreational is legal, although the bill to legalize is awaiting signature at the time of writing.

The Netherlands was the first major Western country to loosen the iron grip of the state on cannabis. In 1976, cannabis was made available for recreational use in licensed coffee shops and possession of up to 5g for personal use was decriminalized. Then in 2001, Portugal decriminalized possession of up 25g of cannabis plant material and 5g of hashish (purified cannabis resin). As of today, most major western jurisdictions have legalized at least the medicinal use of cannabis or cannabis derivatives, with recreational use only legal in certain jurisdictions or circumstances, though that list is growing. Political momentum does not seem to be there yet in the UK as the Liberal Democrats are the only major UK party to come out in favor of recreational legalization, while in Germany, there is support from the Free Democrats (FDP), the Left and the Greens, but neither the Christian Democrats (CDU) nor the Social Democrats (SPD) have backed it.

1 Russo et al., History of Cannabis and Its Preparations in Saga, Science, and Sobriquet. *Chemistry and Biodiversity* – Vol. 4 (2007) 1614-1648

Exhibit 2: Prevalence and legal status in select countries

Country	Prevalence of use (15–64)	Estimated using population (millions)	Medical cannabis status	Recreational cannabis status
United States	17.0%	36.7	Legal in 33 states. Cannabis itself is illegal at federal level. Only FDA approvals have been for synthetics and CBD	Legal in 10 states (with Illinois expected to be the 11th) but cannabis itself is illegal at federal level. Hemp (<0.3% THC) was de-scheduled in December 2018.
Canada	14.7%	3.5	Legal	Legal.
Germany	6.1%	3.3	Legal for seriously ill patients with no alternative	Illegal but not always prosecuted. CBD with <0.2% THC is legal.
Italy	9.2%	3.4	Legal	CBD with <0.2% THC is legal. Small amounts with higher levels are decriminalized.
France	11.1%	4.5	Cannabinoid drugs are legal with a prescription	Illegal. CBD oil with less than 0.2% THC is legal.
Spain	9.5%	2.9	Cannabinoid drugs are legal with a prescription	Somewhat legal in private areas unseen from public spaces via cannabis social clubs though sale continues to be illegal. CBD is legal.
UK	6.3%	2.7	Legal	Illegal. CBD oil without THC is allowed.
Israel	27.0%	1.4	Legal	Decriminalized.
Australia	10.4%	1.7	Legal	Decriminalized in three territories.

Source: United Nations Office on Drugs and Crime, World Bank, The European Cannabis Report, 4th Edition by Prohibition partners

US market provides an enormous opportunity

The US, which will likely be the most important market for cannabis for some time, is a hybrid state. Eleven states (including Illinois where the legalization bill awaits signature) and the District of Columbia (around 28% of the US population) have legalized the recreational and medical use of cannabis. Another 23 states, representing 39% of the US population, have legalized the medical use of cannabis. In 14 states, only CBD, one of the major cannabinoids found in the cannabis plant, has been legalized (either for medical-only or for any use); CBD is not psychoactive and hence deemed not abusable. Only three relatively small states continue to deem all forms of cannabis illegal.

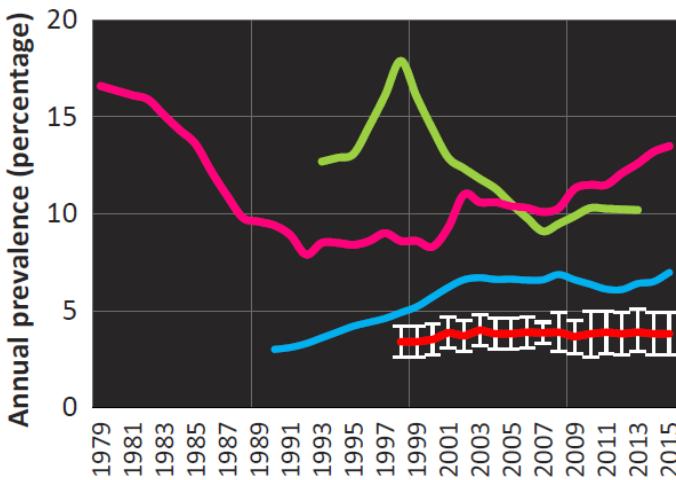
Both New Jersey and New York are targeting recreational legalization in the next year or so. One major motivator for this trend towards legalizations is the tax revenue involved as all the states that have legalized so far have effective sales taxes of between 20% and 47% on sales. Even politicians who have not had some sort of grand libertarian awakening can see the logic of this.

US federal law for cannabis is different and in many states, it contradicts state law. CBD derived from hemp (a cannabis plant with only trace levels of Δ9-tetrahydrocannabinol [THC]) is legal on the federal level (but also requires state level legalization to be sold) thanks to the 2018 Agriculture Improvement Act but cannabis itself remains illegal in all forms. The federal authorities, however, have not been enforcing federal law, instead deferring to state law. As this policy is not based on any legislation, it could change at any moment, although President Trump has indicated his support of a legislative solution to take the US cannabis industry out of regulatory limbo. However, until there is federal legislation that legalizes cannabis, importing cannabis or even moving it across state lines would continue to be illegal (state laws would not apply in either situation). Any manufacturer of cannabis products needs to have access to supply and facilities in each state where it sells products, which does hamper the ability for a company to scale up into a multi-state business. Additionally, federal law currently places a high tax burden on cannabis companies as they cannot deduct operating costs outside of COGS for their federal taxes due to special regulations regarding the “trafficking” of Schedule I and II substances (Section 280e of the Internal Revenue Code). The federal prohibition also affects access to financing and capital markets as the compliance departments of financial institutions are generally wary of getting involved.

This could all change, though, as legislators are increasingly examining approaches to change federal law. For example, Cory Booker, a Democratic senator from New Jersey and presidential candidate, has introduced the Marijuana Justice Act of 2019, which is cosponsored by several prominent senators vying for the Democratic nomination for president, namely Bernie Sanders,

Elizabeth Warren, Kamala Harris and Kirsten Gillibrand. It is unclear whether such legislation will pass before the 2020 election cycle.

Exhibit 3: Annual prevalence of cannabis use across the US, EU, Australia and globally



Source: United Nations Office on Drugs and Crime, World Drug Report 2017. Note: Green = Australia prevalence aged 14 and up; pink = US prevalence 12 and older; blue = EU prevalence aged 15–64; red = global prevalence aged 15–64, 1998–2015.

Even with this regulatory limbo, the US market for cannabis products is already the largest of any developed market and growing (see Exhibit 2 and 3) though it is a small fraction of its full potential. In the US, the legal cannabis market is estimated to have been \$8bn in 2017 (both recreational and medical) by Ackrell Capital, an investment bank focused on cannabis companies. If the level of consumption per capita becomes similar in the states that recently legalized recreational cannabis to that seen in Colorado, the market could grow to \$18.8bn in just a few years, as markets mature in these states alone. If there were a full legalization in the US, at Colorado per-capita usage levels, the US could potentially be an \$88bn market. As a comparison, total alcoholic beverage sales in the US were \$223bn in 2016 according to the Beverage Information Group. And cannabis sales are likely to have a major impact on other industries, including the liquor industry. In a study of purchase data between 2006 and 2015, medical cannabis legalization by itself was associated with a 15% reduction in alcohol sales.²

Exhibit 4: Annual legal sales of cannabis in the US by market

Market	Annual sales
Total legal cannabis market in the US (recreational and medical, 2017)	\$8.0bn
Total medical cannabis market (2016)	\$4.7bn
California medical cannabis market (2016)	\$2.7bn
Colorado (recreational and medical, 2017)	\$1.5bn
Washington (recreational and medical, 2017 annualized)	\$1.4bn
Oregon (recreational and medical, 2017)	\$470m
CBD oil (2017)	\$358m

Source: Ackrell Capital, LLC, New Frontier Data, Colorado Department of Revenue, Washington State Liquor and Cannabis Board, Hemp Business Journal.

While the illegal market was primarily focused on the buying and selling of cannabis flower product itself, the legal market has evolved into something more complex. Approximately half of product sold is still flower, but the rest is concentrate (vape, wax and shatter), edibles and pre-rolled (see Exhibit 5).

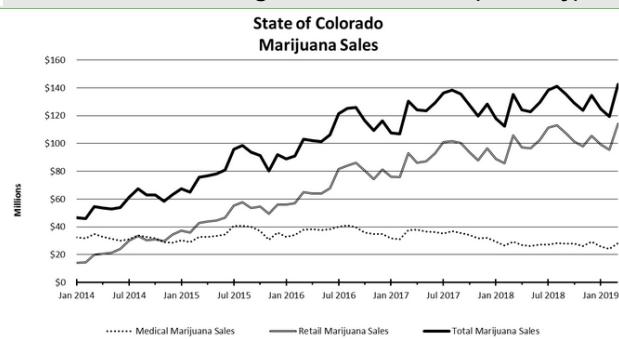
² Baggio et al., Helping Settle the Marijuana and Alcohol Debate: Evidence from Scanner Data. SSRN.

Exhibit 5: Market share of cannabis product types by state, 2017

	Flower	Concentrates	Edibles	Pre-rolled	Others
California	55	25	12	5	4
Washington	55	23	9	11	1
Oregon	51	22	14	7	6
Colorado	48	27	15	5	5

Source: Statista

Also, the US markets where recreational use has been legalized seem to mature quickly, with the high-growth phase lasting two to three years and then levelling off as outlets to purchase product have already become ubiquitous (see Exhibits 6 and 7). Another factor that might be curtailing sales growth in individual states is the feedback effect from legalization becoming more widespread in more areas of the country. Around 12% of cannabis use in Colorado is estimated to have come from tourists in 2017, with California being the largest home state for these visitors. Another important item to note is that medical cannabis sales tend to fall post-recreational legalization as medical prescriptions are no longer necessary. In Colorado, medical cannabis had represented 39% of legal sales two years after legalization but currently only accounts for around 20% of sales.

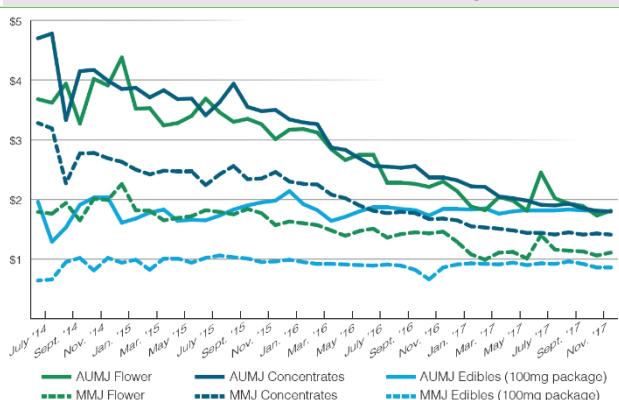
Exhibit 6: Colorado legal cannabis sales (monthly)


Source: Colorado Department of Revenue

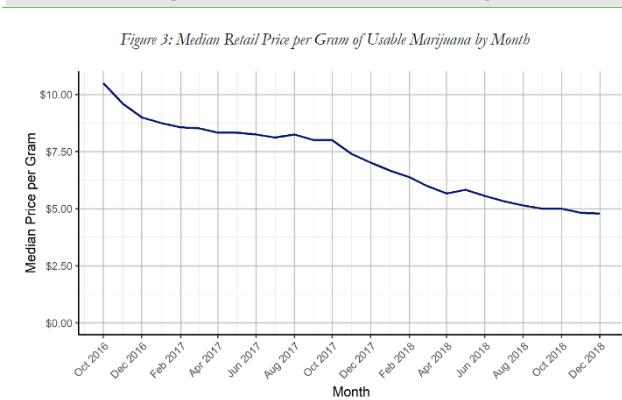
Exhibit 7: Oregon legal cannabis sales (monthly)


Source: Oregon Liquor Control Commission

In addition, as more producers and retailers enter the growing cannabis market, prices have fallen precipitously (see Exhibits 8 and 9). In Colorado, according to the Colorado Department of Revenue, wholesale prices fell 47% from the beginning of 2017 to the beginning of 2019, while they fell by almost 40% in Oregon for indoor growers and over 50% for outdoor growers over the same period, according to the Oregon Liquor Control Commission. Oregon especially is facing a massive supply glut. Recreational producers harvested 2,000 metric tons of cannabis in 2018 with current inventory levels amounting to 6.5 years' worth of supply. The Oregon Liquor Control Commission estimates that if all pending producer applications were approved, production would nearly double, so there is probably no end in sight to the supply glut and falling prices (which may only get worse if the restrictions on the interstate commerce of cannabis are lifted).

Exhibit 8: Colorado Price per THC serving


Source: Colorado Department of Revenue

Exhibit 9: Oregon median retail price per gram


Source: Oregon Liquor Control Commission

This supply glut will make it more challenging for certain businesses and many will likely fail. However, just as we saw with the dot-com businesses, branding helps to separate the wheat from the chaff. The top five brands have 52% market share in California, 71% share in Colorado and 73% share in Oregon, according to BDS Analytics.

With regards to the CBD market, while historically it has been a relatively small proportion (~5%) of the overall cannabis market, it will likely get a boost by the removal of CBD derived from hemp (a cannabis plant with only trace levels of THC) from DEA scheduling thanks to the 2018 Agriculture Improvement Act, which was signed into law in December 2018. This removed federal restrictions on hemp-derived CBD but there are still state restrictions in place in certain states. There also is a trend towards "CBD-infused" products though the FDA has recently reiterated that adding CBD to food and drinks is still not allowed. So while that market is growing, the industry is awaiting some regulatory guidance from the FDA, which will put it on a firmer footing. A public hearing is currently scheduled for 31 May on the topic.

The size of markets outside the United States

While the US is clearly the key market for the cannabis industry due to its size and high rate of cannabis use, other markets are also quite meaningful. New Frontier Data estimates that the recreational cannabis market in Canada will reach \$4.7bn by 2025. Prohibition Partners in its European Cannabis Report estimates that the recreational market size in Germany, Italy, France, Spain and the UK would total €41.3bn in 2028 if recreational cannabis were legal, and the medicinal market would be €36.5bn. However, please note that while the firm's European recreational market estimates are in the ballpark of what we would expect based on the size of their cannabis-using populations, its medicinal cannabis market assumptions are much higher than what we would assume. Mature markets in the US states where both recreational and medicinal cannabis are legal indicate that the recreational market would be much larger than the medicinal markets by a wide margin (in Colorado, medicinal cannabis is only 20% of the market).

Exhibit 10: Estimated size of key European cannabis markets in 2028 post-legalization

	Medicinal cannabis market value 2028 (€bn)	Recreational cannabis market value 2028 (€bn)	Total market value (€bn)
Germany	7.7	8.5	16.2
Italy	7.5	8.2	15.7
France	9.5	9.7	18.6
Spain	3	5.3	8.3
UK	8.8	9.6	18.4

Source: The European Cannabis Report, 4th Edition by Prohibition Partners

Then there is the question of whether cannabis will be legalized at all, as Europe has been behind North America in this respect. In Germany the biggest proponents are the Greens, who have 67 seats out of 709 in the Bundestag, although both the FDP (80 seats) and the Left (69 seats) have also voiced support for legalization. In July 2017, the Greens proposed the Cannabis Control Act, which would legalize recreational cannabis and create a regulated market on the supply side. With the CDU and SPD in a grand coalition, and unsupportive of legalization, reform is unlikely before a new federal election, scheduled for 2021. Currently the Greens are polling at twice their level in the last election and may become the second-largest party in German legislature after the next election. If that happens, they may be able to form a government and work to legalize cannabis in the country.

For the other major countries in Europe, the chance of broad legalization is quite slim in the foreseeable future. In Italy, the Five Star Movement has called for legalization but its coalition partners are against it. Five Star has not made it much of a legislative priority, so legalization is unlikely in the near future. The next election is scheduled for 2023 but none of the other major parties or coalitions have come out for any major reform. Regulatory reform is also unlikely in

France, Spain and the UK, where the Liberal Democrats are the only major party to back legalization but they have little chance of gaining power.

Taxes incentivize legalization

One major motivator for the recent legalizations has been to transform an illegal market into a legal one that could be taxed. There is significant pressure on countries to find new sources of revenue due to massive unfunded liabilities related to state employee pensions and retiree health benefits as well as servicing debts from prior budgets. The governments that have legalized cannabis are also taking full advantage of the new legalizations as the states in the US that have legalized it so far have effective sales taxes of between 20% and 47%.

Exhibit 11: State tax rates for recreational cannabis

	Year of commencement of recreational sales	Effective sales tax rate (total local + state taxes and fees)	Tax revenue (\$m)
Colorado	2014	~29%	263.8 (2018)
Washington	2014	~47%	319.1 (2017)
Oregon	2015	~20%	78 (2017)
California	2018	30-45%	345.2 (2018)

Source: Institute of Economic Affairs, Colorado Department of Revenue, California Department of Tax and Fee Administration

European countries also stand to benefit as they start with high baseline VAT rates of around 20% then could easily add a surcharge of 10–20% for cannabis sales. Germany, which could potentially have a €8.5bn recreational market, would see €3.3bn in added annual tax revenues if it adds 20% to its 19% VAT tax rate.

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