

Boston University School of Law

Scholarly Commons at Boston University School of Law

Faculty Scholarship

8-27-2018

Taxing & Zapping Marijuana: Blockchain Compliance in the Trump Administration Part 5

Richard Thompson Ainsworth

Brendan Magauran

Follow this and additional works at: https://scholarship.law.bu.edu/faculty_scholarship



Part of the [Food and Drug Law Commons](#), [State and Local Government Law Commons](#), [Taxation-State and Local Commons](#), and the [Tax Law Commons](#)



**TAXING & ZAPPING MARIJUANA:
BLOCKCHAIN COMPLIANCE IN THE
TRUMP ADMINISTRATION
Part 5**

Boston University School of Law
Law & Economics Paper No. 18-03

Revised August 27, 2018

Richard T. Ainsworth
Boston University School of Law

Brendan Magauran

TAXING & ZAPPING MARIJUANA:
BLOCKCHAIN COMPLIANCE IN THE TRUMP ADMINISTRATION
Part 5

Richard T. Ainsworth
Brendan Magauran

Back end leakage [13] & [14]

The state's obligation to control both the *physical flows of legalized marijuana*, as well as the related *fiscal flows (the proceeds of legalized marijuana sales)* intersect dramatically at points [13] and [14].

Points [13] and [14] present the most obvious *physical leakage* opportunities in the basic marijuana supply chain. In a jurisdiction that has legalized both medicinal and recreational marijuana consumers can re-sell any excess medical marijuana they have purchased from a retailer [14] to a recreational user [13]. This leakage is incentivized when there is a tax difference between the two classes of marijuana. In jurisdictions that have only legalized medicinal marijuana [14], consumers with medical authorization can purchase and re-sell directly into the black market.¹

The Tax Foundation noted this concern with respect to Massachusetts, which is planning to sell and tax recreational marijuana alongside un-taxed medicinal marijuana as of July 1, 2018. It observed:

Despite the changes to the tax treatment, medical marijuana in Massachusetts will remain untaxed. This has the potential to create problems for the state as it might keep some recreational marijuana in the gray market. For instance, people with medical cards might resell their untaxed marijuana to those without medical cards.²

These transactions will be *un-traced* and *un-tracked* by the Massachusetts METRC system. There is no RFID tag placed on medicinal marijuana when it is sold to a consumer, nor is there a daily marijuana inventory report filed by consumers. The same scenario plays out with recreational marijuana that is re-sold to underage users in states that have legalized recreational use.

Far more important however, is the fact that points [13] and [14] are the places where all the cash that sustains the entire marijuana supply chain enters the system. All *fiscal flows* start at [13] and [14].

¹ See *supra* note **Error! Bookmark not defined.** (listing the states that have legalized marijuana and the tax rate for medicinal and recreational marijuana). For a map of the US States color coded to reflect the status of marijuana legalization in each state see: School of Public and Environmental Affairs, Indiana University, *Marijuana Laws in 2018 Map*, GOVERNING: THE STATES AND LOCALITIES (data as of January 8, 2018) available at: <http://www.governing.com/gov-data/state-marijuana-laws-map-medical-recreational.html>

² Morgan Scarboro, *Massachusetts Increases Marijuana Tax Rate* TAX FOUNDATION (August 1, 2017) available at: <https://taxfoundation.org/massachusetts-marijuana-tax-increase/>

FinCEN's eight-point guidance under the Bank Secrecy Act (BSA) is the reason the States are dealing with so much un-traceable cash in the basic marijuana supply chain. The FinCEN guidance identifies the due diligence obligations that financial institutions have when dealing with marijuana-related businesses.³ This Obama era FinCEN guidance has not been rescinded by the Trump Administration. All the *BSA Expectations Regarding Marijuana-Related Businesses* rules are still applicable.⁴

Proposed State Solutions

Physical flows. There are very few new proposals on how to solve the *physical flow* problems with consumer re-sales into the black market at points [13] or [14]. Traditional enforcement is universally applied. It is highly indirect. There is however, one high tech proposal is being advanced by 420 Blockchain.

The traditional approach is to conduct audits enforcing rules that limit the amount of marijuana an individual can possess. The audit however, is of the *retailer* that sells, not the *consumer* who buys the marijuana. It has proven difficult to audit consumers directly. The audit methodology is based around *stings* using undercover police at dispensaries.

The violation (by the dispensary) is colloquially called *looping*. Looping means that when multiple separate sales of marijuana are made to the same individual on the same day, the amounts sold can be aggregated. If that total exceeds the allowable limit an individual can legally possess, then the retailer is *presumed to have known* that it was selling the consumer more than the statutory limit for possession *in a single transaction*. An enforcement letter sent by the Colorado Marijuana Enforcement Division explains:

Sales that are structured as multiple, stand-alone transactions may be viewed by the [Marijuana Enforcement] Division as an attempt to evade quantity limitations on the sale of Retail Marijuana, resulting in the recommendation for administrative action.⁵

³ See *supra* text and notes at notes **Error! Bookmark not defined.** through **Error! Bookmark not defined.**

⁴ *BSA Expectations Regarding Marijuana-Related Businesses* (February 14, 2014) (directly following up on the now-rescinded August 29, 2013 Cole Memo was itself followed by a second, and also rescinded Cole memo, *Guidance Regarding Marijuana Related Financial Crimes* on the same date, February 14, 2014) available at: <https://www.fincen.gov/resources/statutes-regulations/guidance/bsa-expectations-regarding-marijuana-related-businesses>. The FinCEN guidance remains in place, and was not among the documents rescinded by Attorney General Sessions on January 4, 2018. See also: Lane Powell PC, *FinCEN Retaining Bank Secrecy Act Marijuana Guidance – At Least for Now* (January 11, 2018), indicating:

This morning, we received the following note from the FinCEN's Resource Center:

“The SAR reporting expectations outlined in the February 14, 2014 guidance, FIN-2014-G001 remains in place. FinCEN will continue to work closely with law enforcement and the financial sector to combat illicit finance, and we will notify the financial sector of any changes to FinCEN's SAR reporting expectations.”

available at: <https://www.lexology.com/library/detail.aspx?g=ef199000-3754-40b0-83cd-ad95fda5fcf6>.

⁵ Randy Robinson, *Bitter Sweet: Denver Shuts Down 11 Dispensaries for Double-Dealing Weed*, MERRY JANE (December 20, 2017) available at: <https://merryjane.com/news/bitter-sweet-denver-shuts-down-11-sweet-leaf-dispensaries-for-double-dealing-weed> (noting also that the investigation involved police officers purchasing 1 oz. of marijuana at a retail establishment, and then returning as many as 16 times in the same day to purchase additional 1 oz. of marijuana from the same budtender).

Acting on an investigation that lasted from December 2016 through September 2017, the Denver Police moved on December 14, 2017 to shut down 26 cannabis operations licensed under Sweet Leaf, one of Colorado's largest dispensary chains, for looping. Colorado law limits the adults 21 and over to possessing only 1 oz. of marijuana at any one time.

It is not clear if criminal charges (with jail time) will be brought against the 13 arrested budtenders. Nor is it clear if this enforcement measure will actually prevent consumers from re-selling marijuana into the black market. This enforcement is only effective when all the marijuana is purchased from the same dispensary. It would not identify a consumer who bought an amount that was just under the legal limit for possession from multiple retail establishments. There are 20 dispensaries in Seattle. Avoiding enforcement through "stings" is not difficult.

420 Blockchain⁶ is proposing something different – a blockchain. Based in Boca Raton, Florida, 420 Blockchain is (allegedly) beta-testing (in Rhode Island and California) a blockchain solution to the frauds at [13] and [14] based on Augusta High Tech's Framework HyperLedger,⁷ running on the Google platform. Although a system launch was expected in January 2018, there has been no public announcement about it or about the system's workability.⁸

The thrust of the 420 Blockchain effort is to track the *consumer* who makes purchases so that a more comprehensive picture of possession can be measured. Michael Kramer, the CEO of 420 Blockchain, explains:

"Besides, if someone really wanted to circumvent the rules, they could simply buy an ounce at Dispensary A, then drive over to Dispensary B across town and buy another ounce. There's no system in place to trace who buys what, when, or where." Michael Kramer believes blockchains could prevent looping while taking the burden of memorizing everyone's IDs off budtenders.⁹

But there is a natural extension to the 420 Blockchain proposal. The State could turn each dispensary into an AmazonGo store,¹⁰ collect this data on a state-wide basis, load it on a blockchain, and conduct risk analysis of consumers through artificial intelligence (AI). The analytics of the AmazonGo extension will be developed more thoroughly in a forthcoming paper

⁶ See: 420 Blockchain, News, available at: <http://420blockchain.cloud/news.html>

⁷ See: Augusta High Tech, available at: <https://augustahitech.com/services/blockchain.html>

⁸ Randy Robinson, *supra* note 5.

⁹ *Id.*

¹⁰ The first AmazonGo store opening in Seattle Washington on January 21, 2018. The Amazon web site explains the concepts as follows:

Amazon Go is a new kind of store with no checkout required. We created the world's most advanced shopping technology so you never have to wait in line. With our Just Walk Out Shopping experience, simply use the Amazon Go app to enter the store, take the products you want, and go! No lines, no checkout. (No, seriously.)

Our checkout-free shopping experience is made possible by the same types of technologies used in self-driving cars: computer vision, sensor fusion, and deep learning. Our Just Walk Out Technology automatically detects when products are taken from or returned to the shelves and keeps track of them in a virtual cart. When you're done shopping, you can just leave the store. Shortly after, we'll send you a receipt and charge your Amazon account.

Available at: <https://www.amazon.com/b?node=16008589011>

by Peter Dutz Manda, *Taxing Non-Cash Sales: Is Dynamic Taxation A Remedy for Tax Uncertainty?*¹¹

Fiscal flows. Even the AmazonGo solution, while it would provide an excellent record of the *physical flows* of registered marijuana through the retail dispensaries, will not overcome the hesitancy of the banking system to more broadly facilitate the marijuana supply chain. Any kind of banking account (checking or savings, business or personal), check clearing, credit or debit card services is restricted. Thus, even if AmazonGo dispensaries “worked,” the upstream supply chain would still be awash in cash.¹²

There are proposals to set up a state marijuana bank (in California)¹³ or a credit union (in Colorado).¹⁴ In each instance the proposed institutions are having problems. To function as a bank under either permutation would require recognition by the Fed to gain access to deposit insurance, and wire transfer services. These banking connections are not easily negotiated when the customers are marijuana-related businesses. They are privileges not freely or fully granted. Evidenced by the *Fourth Corner Credit Union v. Federal Reserve Bank of Kansas City* litigation and settlement where banking access was granted provided the Fourth Corner Credit Union limited its engagement to businesses on the periphery of the marijuana trade.¹⁵

CALCoin

Faced with a similar problem of large numbers of improperly tracked transactions along complex supply chains, where traces of the funds and tax payments passing from one party to the next were misstated, the EU VAT has begun to look at a VATCoin solution that utilizes a

¹¹ Peter Dutz Manda, *Taxing Non-Cash Sales: Is Dynamic Taxation A Remedy for Tax Uncertainty* __ TAX NOTES __ (2018).

¹² Bob Blumenfield, LA City Counselor-Third District, in an Opinion article suggests that cash can be removed from the retail stores by adopting a program like the LA Transit Access Pass, a pre-paid card that can be re-loaded at a kiosk. *Opinion: On Marijuana, Removing the Cash, Adding Legal Clarity Will Make Our Communities Safer*, LA DAILY NEWS (December 2, 2017), available at: <https://www.dailynews.com/2017/12/02/on-marijuana-removing-the-cash-adding-legal-clarity-will-make-our-communities-safer/>

¹³ California is negotiating the designation of one California bank as a “central correspondent bank that would hold accounts from other banks that are doing business with marijuana firms ... [but] State officials don’t expect the federal government to formally approve any plan.” Patrick McGreevy, *California Considers “Green Banking” as it Transitions to Fully Legal Pot*, LA TIMES (December 17, 2017) available at: <http://www.latimes.com/politics/la-pol-ca-jerry-brown-marijuana-banking-plan-20171217-story.html>

¹⁴ In May 2014 Colorado established a new class of financial institutions called a cannabis credit cooperative that would not have to maintain deposit insurance, but the Federal Reserve seems unlikely to approve them. Later the Colorado legislature authorized a credit union for the cannabis industry, but the Fed denied access to a “master account,” which is essential to transfer money. The National Credit Union Administration also refused to insure deposits. Even transporting funds known to have been derived from the distribution of Marijuana is illegal according to the Federal Reserve Bank of Kansas City. Sophie Quinton, *Why Marijuana Businesses Are Still Cash-Only*, GOVERNING, (March 22, 2016) available at: <http://www.governing.com/topics/finance/sl-marijuana-businesses.html> However, after the Fourth Corner Credit Union sued the Federal Reserve a settlement was reached granting conditional approval if (a) they can secure insurance, and (b) the Fourth Credit Union agrees to focus of individuals and companies that support legalized marijuana, such as vendors like accountants and landlords. The *Fourth Corner Credit Union v. Federal Reserve Bank of Kansas City*, 154 F. Supp. 3d 1185 (D.Colo. 2016); vacated by *Fourth Corner Credit Union v. Federal Reserve Bank of Kansas City*, 10thCir. (Colo.) June 27, 2017

¹⁵ Lalita Clozel, *Fed Backs Marijuana-Focused Credit Union*, WALL STREET JOURNAL (February 5, 2018) available at: <https://www.wsj.com/articles/fed-backs-marijuana-focused-credit-union-1517870188>

blockchain to allow detailed, real-time, tracing of funds throughout a supply chain. VATCoin is a limited purpose crypto-tax-currency. It is issued on demand by the government, used for limited-purpose payments, and convertible back into fiat currency only by the state that minted it.

The States that have legalized marijuana could do the same with a similar limited purpose crypto-tax-currency. It would be mandated as the only legal token/ currency allowed to be exchanged for marijuana. For example, in California this digital currency might be called CALCoin (this denomination is used in the remainder of this discussion). In brief, the following example shows:

- Consumers securing newly minted CALCoins¹⁶ from the State Treasury;¹⁷
- Consumers purchase recreational and medicinal marijuana from a Retailer with some of the CALCoins (saving others in their digital wallet);
- Retailer using the CALCoins received to re-stock inventory with purchases from a Distributor;
- Distributor redeeming some CALCoins for cash and using other CALCoins to restock a specialty blend of marijuana from a Cultivator, and some infused brownies from a Manufacturer;
- Manufacturer using some of the CALCoins received to secure third-party Lab services, other CALCoins to pay for more marijuana ingredients for infused products, and using the remaining CALCoins to directly pay State Income Taxes due;
- Lab redeeming the CALCoins it received to directly pay Local Property Taxes due;
- Cultivator redeeming some of the CALCoins it received to pay Federal Income Taxes (it is unlikely that the federal government would accept CALCoins directly for a tax payment, making conversion to CASH necessary before paying federal taxes) and other CALCoins are held in the Cultivator's corporate wallet for later use;
- CALCoins that are redeemed at the State Treasury are transferred back to the State and destroyed. CALCoins are not a recognized investment vehicle, nor are they a substitute for fiat currency. They cannot be transferred other than in a marijuana-related activity, to a registered marijuana establishment.

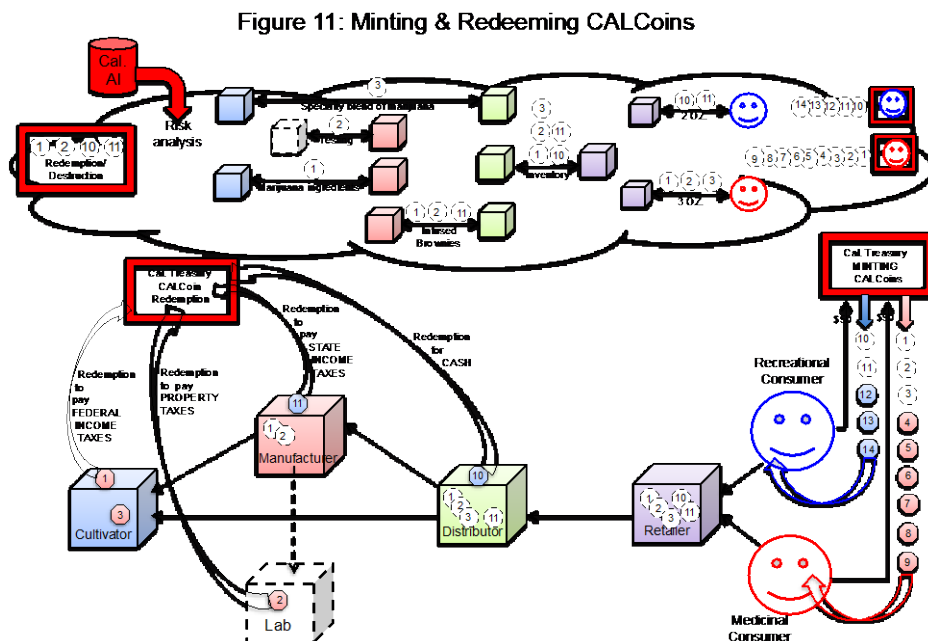
In each case the diagram indicates that a CALCoin is *not in use* by coloring in the coin (either blue to represent origination with the recreational consumer, or red to represent origination with the medicinal consumer). The diagram indicates the historical passage of a CALCoin *through* an entity as a white coin edged in dashes.

There will be no cash hoard in any marijuana establishment. There may be digital wallets which may contain a large amount of CALCoins, but hacking the digital wallet would be pointless. The CALCoins contained there (a) have a digital history and would be immediately identify them as stolen CALCoins by the Artificial Intelligence (risk analysis) engine that is scanning all CALCoin transactions, and (b) CALCoins can only be used in another marijuana-

¹⁶ The dollar conversion rate in the diagram is \$10.00 = 1 CALCoin. Other conversion rates are possible. Fractional CALCoins are also possible.

¹⁷ Unlike the proposal of LA City Counselor Bob Blumenfield, CALCoins are not stored on anonymous "gift cards" or the LA Transit Access Pass (TAP). It is important to associate each CALCoin with the individual who first purchased the newly minted coin.

related purchase with a certified (registered) marijuana establishment, so it is impossible to escape the AI's risk analysis. Used CALCoins will not be re-issued after redemption. They will be destroyed. They only have value within the marijuana commercial chain. When they leave the supply chain they become useless. Figure 11 (below) diagrams the above text.



CALCoin Blockchain

CALCoin lends itself naturally to blockchain. Each digital transfer of CALCoin is recorded, registered with the California Treasury. After the first transaction where a consumer acquires CALCoins, the California State Treasurer will broadcast the transaction to the nodes. [The California Treasurer will effectively be saying “I give the right to spend certain CALCoins to the person who owns the corresponding private key.”] The data for this (and all subsequent) transactions involving this CALCoin is stored in a chain of ownership in the cloud. Anyone can have access.

CALCoin’s blockchain follows the BitCoin model.¹⁸ The resulting distributive ledger will be a *public*, not a *private* blockchain (unlike the blockchain that was proposed for the main commercial chain). The consensus mechanism for the CALCoin blockchain however, should not be the cumbersome and expensive *proof of work* used by BitCoin. A new consensus mechanism for public ledgers developed by MIT Professor Silvio Micali seems ideal for the CALCoin

¹⁸ The CALCoin protocol will be based on asymmetric cryptography. Public key cryptography allows you to hand someone a public key and use the corresponding private key to prove the ownership. Using the associated private key, you can sign a message and other people can verify that you own the private key by using your public key.

application. It is called ALGORAND, and the details of its application are set out in *ALGORAND: The Efficient Public Ledger*.¹⁹ Micali also describes Algorand on YouTube.²⁰

Micali calls his approach *cryptographic certation*. The design is to cryptographically select a set of *verifiers* who would collectively be in charge of creating the “next” block. This small group of people are selected randomly and suddenly in a way that is provably immune from manipulation. It is unpredictable until the last moment.

No person selects the group, it is done entirely by hash. Micali’s approach “... requires a negligible amount of computation, and generates a transaction history that does not fork with overwhelmingly high probability. In fact – over a million years statistically.”²¹ Kastelein explains:

The group [committee] decides the next block by a redesigned Byzantine Agreement where a leader is picked randomly from the group. If he’s a bad choice an agreement will not be able to be made. Everyone is forced to agree on nothing. Zero progress. With a bad leader, you just don’t get a block and if you have an empty block you get no money.

That’s the game theory.²²

The reward for performing the verification function in ALGORAND is a percent of the block transaction which is awarded to the group of verifiers. In the case of CALCoin the reward will be in CALCoin, which will make the entire system heavily California-based, because receiving an allocation of CALCoin in a digital wallet will only have value in California where CALCoin can be exchanged for marijuana. This is the preferred outcome. It is a blockchain enforced by California citizens, that assures that *financial flows* in the California marijuana market are secure (not leaking out to organized criminals.)

Algorand is being commercialized by a joint venture Toda-Algorand Corp.²³

¹⁹ Available at: <https://arxiv.org/pdf/1607.01341.pdf>

²⁰ Silvio Micali, *ALGORAND: A Better Distributed Ledger*, ASSOCIATION FOR COMPUTING MACHINERY (ACM) (November 7, 2017) available at: https://www.youtube.com/watch?v=nQE_HAGlmM

²¹ Richard Kastelein, *Move Over Bitcoin – MIT Cryptographer Silvio Micali and his Public Ledger ALGORAND ... The Future of Blockchain?* BLOCKCHAIN NEWS (January 5, 2018) available at: <http://www.the-blockchain.com/2017/01/05/move-bitcoin-mit-cryptographer-silvio-micali-public-ledger-algorand-future-blockchain/>

²² *Id.*

²³ Charles Brett, *Toda-Algorand Platform Scalable to >3M tps and >4B users?* ENTERPRISE TIMES (July 31, 2017) available at: <https://www.enterprisetimes.co.uk/2017/07/31/toda-algorand-platform-scalable-to-3m-tps-and-4b-users/>

Toda-Algorand Corp. aims to deliver a decentralized transaction platform which combines the ledgerless ease and scalability of cash payment systems with a flexible ledger-based technology. The platform will enhance and incorporate features of existing financial payment systems.

The design of the Toda-Algorand platform aspires to a throughput of over three million confirmed transactions per second serving more than four billion users, all securely. It will combine:

- the decentralized ledger blockchain authored by Turing Award winner Silvio Micali
- the secure decentralized on-chain ledgerless TODA protocol co-authored by Toufi Saliba.

CONCLUSION

The issue throughout this analysis has been *trust*. Once marijuana is legalized by a State, how can systems be put in place so that the federal government *trusts* that the State is able to monitor and control the *physical flows* of marijuana as well as the related *fiscal flows* within the basic marijuana supply chain? Given the variances in the in the state-by-state legalization regimes and the related tax and enforcement rules, there are also deep inter-state *trust* concerns echoing these federal concerns.

The near universal answer to these concerns has been the adoption of third-party *track and trace* technologies, and to require daily inventory and product movement reporting. The problem is that these systems leak and are vulnerable to hackers. Hackers may be the most serious threat. There is more than enough source code out on the net for fraudsters to be able to design Zappers that will work in the Dark Cloud to suppress (B2C) sales, and to corrupt upstream (B2B) records.

Solutions to this kind of fraud are well developed in the EU (and other) VAT jurisdictions. VATs are supply-chain-based taxes. We know what is needed to block VAT frauds. It works. There is a global track record of successes. What the US needs are third-party security systems where the secure element used for signing documentation is (and must be) independent of the creator of the inventory management/POS systems that monitor the *physical* and *fiscal* flows of the supply chain. America may have a blind spot here, because our tax system has negligible experience with VATs. We can learn from the EU.

Trust however, requires more than a technological black security box. Trust has a visual as well as a technological component. For this reason, two blockchains, one *private* (dealing with *physical flows* of marijuana), the other *public* (dealing with the *financial flows* related to marijuana sales) have been proposed. Blockchains are “trust machines,” and the legalized marijuana trade needs to build trust.²⁴ This is how to do it.

A sketch has been provided of the four major criminal attack vectors in this field indexed to fourteen major leakage areas. The major frauds and their proposed solutions are:

- (1) Front-end frauds – exploiting openings at point [1] – solved by prohibiting home-grown marijuana;
- (2) Cyber-attacks on the main commercial chain – producing leaks at points [2] through [12] – solved with a multi-State *private blockchain*;
- (3) Sales suppression fraud – exploiting insecure transactions at point [10] – solved with anti-ESS security (an independent digital ratification service that confirms sales information and allows asynchronous verification); and
- (4) Back-end frauds – exploiting illegal re-sale opportunities at points [13] & [14] – solved with CALCoin (or variant) and a *public blockchain*.

It is the strong belief of this article that these frauds need to be addressed systemically (as a whole supply chain problem) not locally (targeting only specific points of leakage). The

²⁴ THE ECONOMIST, *The Promise of Blockchain: The Trust Machine* (October 31, 2015) available at: <http://www.economist.com/news/leaders/21677198-technology-behind-bitcoin-could-transform-how-economy-works-trust-machine>.

discussion of sales suppression at point [10] classically illustrate how a single point of leakage can become a platform for wide ranging frauds pulling resources from many weak spots in the supply chain.

This analysis also offers extraordinary enforcement opportunities. For example, the CALCoin blockchain not only provides California authorities with a tool to identify where frauds are occurring, it would allow them to terminate an individual's or a business' ability to buy or sell marijuana by immediately extinguishing all CALCoins in their possession, as well as their ability hold or acquire more. This would effectively remove problematical parties from the supply chain.

Adopting CALCoin is not going to automatically bring success.²⁵ This is because FinCEN has determined that any administrator or exchanger of virtual currency is a Money Services Business (MSB). Also, according to FinCEN, any MSB is a "financial institution," and this makes it subject to the Bank Secrecy Act. Thus, if the State of California adopted the CALCoin solution, the State would need to comply with all federal AML-requirements (unless a limitation or exemption applies).

²⁵ Peter D. Hardy, David L. Axelrod, Marjorie J. Pearce, Terence M. Grugan & Andrew N. D'Aversa, *FunCEN Letter to US Senate Committee on Finance Purports to Thread Needle of Potentially Competing Jurisdictions by Regulators over Cryptocurrencies*, MONEY LAUNDERING WATCH (March 8, 2018) available at: https://www.moneylaunderingwatchblog.com/?utm_source=Ballard+Spahr+LLP+-+Money+Laundering+Watch&utm_campaign=943c4c5d8c-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_790b46fdeb-943c4c5d8c-73334677