A Note on Digital Land Banks

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Figure 1: Courtyard of the Amsterdam Stock Exchange by Witte

1 Summary

In this piece, I discuss John Law's book on land banks. He argues that land banks are a potential minimal viable issuance authority required for a functional currency. First, we will explain why issuing currency is inherently valuable. Next, we define an issuance authority as it relates to the creation of currency from demand. Next, we explain why Law was thinking about land banks at the time. Further, we extend the land bank for digital value by defining an issuance authority called a **"digital land bank"**. These issuance authorities can bootstrap a functional hybrid equity-currency using well-defined market rules and some amount of value entering the system due to long-term belief. This system is usable by any issuance authority, such as publisher exchanges or ecosystems, to capture value while aligning incentives long-term with the value creators who use the platform to issue assets in the ecosystem.

2 Introduction

Bootstrapping a currency has traditionally been impossible to achieve because of the incredible coordination costs required to use a new currency. We argue that many of the coordination challenges can be abstracted by guaranteeing a link to the wider economy, through some type of liquid pricing mechanism that is guaranteed to always be available (like guaranteed liquidity in an automated market maker), but the execution price may vary.

However, market structures must be put into place to slow down the price evolution and ensure there is not a mismatch between expected vs. actual value in the system. A mismatch could cause a quasi-bank run on this value or a rapid leverage collapse, hurting the long-term outcomes of the ecosystem. Mechanisms like PID controllers to absorb shocks, stakeholder bank, or long-term focused price evolution could be used to minimize this loss (with caveats)

Currencies, during their use, naturally create value, due to seigniorage. I argue that the right to determine which currency an asset must be purchased in - which I refer to as **issuer monopoly** - allows the capture of this excess return as a direct extension of seigniorage. This allows a local currency (a currency designed for a specific ecosystem) to function in the wider economy while capturing some of the excess return when used as such.

Traditionally, exchanging between currencies requires an immense amount of coordination, as there must exist some intermediary (generally a bank) willing to custody and exchange currencies. These entities are generally known as correspondent banks. However, by using guaranteed liquidity in automated market makers, these ecosystems can create a similar outcome to narrow banking by outsourcing some of the complex properties of managing a non-local currency (i.e. the US dollar)

Additionally, as the issuance authority gains liquidity, belief in the system, and (hopefully) value generated in it, this is enough to form a sufficient and deflationary currency which may form a type of hybrid equity/currency. We argue that a new economy may want to utilize a new currency to benefit from the wealth effects, incentive alignment between different users in the ecosystem, and specialized market rules for that economy.

3 The Value of Issuing

The value of issuing money is a well-studied phenomenon called seigniorage. It has referred to many different actions that all result in some positive carry for the issuing entity. Some examples are the tax added by lords for minting and backing money, the profit a bank makes when lending out others money, and the profit a central bank makes by buying assets with money it just created.

While banking has changed a large amount over the past 500 years, the core mechanics have remained remarkably similar. What was once gold in a vault held by a monarch has turned into numbers in a digital database. Despite all of this, money serves a purpose of replacing barter by creating one layer of value that users desire. However, while banking has changed, been optimized, and is now one of the largest industries in the world, creating money is still an incredibly valuable asset. For example, the US government captures significant rents from the dollar, both through its use as a political and economic tool.

Despite entire industries created to commodify creating money, this has almost only increased the value of being the monetary sovereign. Central banks largely exist to manage the interaction between money creation and its usage with commercial banks. On the other hand, in the early days of currency, the issuing authority had to manage significantly more operations, adding overhead.

This could be physically minting coins, managing foreign exchange reserves, and keeping faith in the currency. Largely, these operations have been commoditized by a convergence and improvements in the technology underlying banking. In current times, banks exist to take the free money from consumers and place it into the Federal Reserve or buy treasury bills (which functions similarly with a few extra steps).

This free money loop has been pushed to its very extreme by joint interaction between narrow banking and stablecoins. Stablecoins exist to function as a skeuomorphic representation of money on blockchains. By issuing these synthetic dollars and purchasing treasury bills with the proceeds, these stablecoins push the limit of servicing as a currency to their extreme. The natural next step will be to return some of this interest to their users, potentially even at a loss, but this leads to other systemic concerns for the banking system.

Stablecoins are not the problem, as they simply exist to service an existing market demand for US dollar denominated assets. Users are willing to forgo the inherent carry captured by stablecoins to utilize the currency against the pegged value they want. Stablecoins are a natural extension of simplifying the connection between the issuance authority and the users of that currency.

In reality, it is unclear who benefits the most from stablecoins - commercial banks or the government. Commercial banks benefit from housing the liquidity for the stablecoins (likely a few bps) and are protected from competing on yield by the GENIUS act. The government also benefits from lowering the cost of government debt due to the inelastic demand for treasuries from stablecoins. While a very rough estimate, stablecoins could be lowering the cost of all government debt by 25 bps.

The ability to coordinate value in the form of a currency naturally creates demand for that currency and there seems to be no arbitrage that can close it (except by the issuance authority). Historically, the issuance authority has been a monopolist, due to the trust assumption, meaning that the authority is the only one who is able to close this loop. If the authority does not close it, the currency is deflationary, which creates wealth effects while slowing down velocity over time. This is normally referred to as the Cantilion Effect.

However, the problem still exists of entering and exiting the system. To this end, we argue that guaranteed liquidity provided by protocol-owned liquidity via automated markets can facilitate transfers into and out of the system. This exchange rate may fluctuate depending on market forces, but as liquidity rises, the impact from noise should decrease. Systems must be put in place from short-run fluctuations in the price that cause bank runs. By increasing liquidity, it takes a larger and larger "shock" to break the buck in the system. Additionally, there is added value from transparency and ease of due diligence in the system. Potential market participants can read the code itself (or benefit from the ability for others to verify it for them)

We would argue that fungibility between individual pieces of the same currency is one of the places where seigniorage accrues value. However, it has been difficult to enable frictionless asset exchange in a system with a brand new currency due to the coordination costs and fixed cost of creating the system. This cost makes it simply not viable to ever create a new currency.

However, by solving the complex coordination problem between market participants wanting to purchase different types of goods and services, the issuance authority within the system is able to capture value. By making the issuance authority in the system be a permissionless, self-executing, and auditable protocol, users are able to verify the code is running as expected. This is a completely new phenomenon and has never been possible before.

Providing liquidity within a system is one place where the issuance authority generates seigniorage.

Examples would be the TALF (consumer credit) and SMCFF (corporate credit) where the Federal Reserve actively bought assets in the open market during times of financial crisis, providing significant liquidity to these assets. In doing so, the Fed generates significant profit while steadying out the volatility.

By utilizing an automated market maker, this ability to service liquidity demand can be enshrined into the market model itself. Additionally, the rules are provable, meaning there is less information asymmetry as all market participants are guaranteed to know how the market functions over time in various states. The challenge now becomes pricing these assets within this model and the quality of the market model over time. Additionally, more liquidity can be provided by users (who are not the system). This improves the capacity of the system and the liquidity provided by the system itself becomes useful as a lender of last resort.

4 Land Banks

Originally, described by John Law in his "Essay on a Land Bank", Law argues for land banks, which are currencies where all of the money in circulation is backed by the physical land that a country has.

In his system, the land itself has a market-derived price ascribed to it. The summation of all the land in the system is the monetary base of currency in the market. This bucked the trend of using hard assets like gold and silver to use.

This was quite novel at the time, because there really weren't even unified monetary systems within a given area. In an area, there were many local independent banks, many of which were not fungible for each other. Early experiments with central banks were ongoing, but many were distrustful for various reasons.

Law was attempting to achieve an early type of "fiat money" unlocking "functional" money while simultaneously unifying currency in the land, solving two of the largest challenges in currency to date.

While land is a commodity, I also argue that the state is commanding value into the money by making it backed by the land and its rents. It was not possible to redeem the land, and thus it was backed by the idea and demand for that land rather than the land itself. This is somewhat similar to a fiat currency, where the value of that currency accrues from the demand that the currency be used to pay for taxes and paid for government bonds.

First, the money was "functional" because the land (presumably) will increase in value period to period, due to improvements made onto the land. The land itself was also "provably scarce" since that exact piece of land was unique and clearly definable. As the land improves, the value is recalculated and more money is "minted" to expand the monetary base.

At the time, functionality and scarcity were two missing properties in money, as the world economy was undergoing the "Price Revolution" - a period of extreme inflation caused by the increased gold inflow from the Spanish colonies. Interestingly, inflation was only around 1-1.5% annually (less than Federal Reserves target inflation of 2%), but due to less growth in the economy, this was devastating. Kings were also aggressively debasing the currencies of their country to fund ongoing wars and their court life.

Finally, as an entire area would utilize the same money (due to land backing the currency), this would (theoretically) solve fungibility issues naturally present in some money at the time. At the time, local goldsmiths or individual early banks would issue bills and certify the quality of the

money. The quality and underlying value were different from these different issuers, leading to issues with exchanging and added friction during their use as money. By enforcing that all land in an area utilized the same currency, this would naturally unite a given area to using the same currency.

While many currencies were not a problem in some countries like Great Britain (due to the bank of England's issuance monopoly), many other countries mostly consisted of either goldsmith banks or "Wildcat Banks". The most prominent were in the US where wildcat banks would eventually collapse and were a leading cause for the Panic of 1837.

5 Digital Land Banks

Just like land is productive, scarce, and valuable, assets within a digital economy could be seen as the same. This could be content, property rights, or access to an immutable value stream. The land in land banks can be swapped out for "digital land" which could be assets of any type. A close mental model could also be a commodity money, but there are a few differences with these new digital currencies.

While land is a commodity, it is also something valuable that cannot (mostly) be created anymore. Most commodity money was historically problematic (gold, silver) because this made the commodity valuable and thus a huge monetary incentive to create more of it. Land does not have this issue, because the nicest and most popular pieces quite literally cannot be recreated, making it durable. This makes this currency more of a hybrid fiat-commodity where some of the value comes from the ability to use that currency in the future (thus creating fiat value) and

Programmable blockchains uniquely enable permissionless creation for new assets while also retaining provably scarcity. However, provably scarce assets are not necessarily valuable exclusively from their scarcity - the wider market must value the asset in some way. While there may be functionally infinite digital land, not all (or even any) of that land may be valuable. However, by attaching a market (and thus a value appraisal mechanism) directly into the creation of the digital land itself, value creators can enable the valuable pieces to be priced (and thus valued). The problem is that the market structure of this land may be incredibly complicated and varied, which leads to market inefficiencies or market failure.

Automated and programmatic widespread issuance is well-supported by the near-zero cost of creating new assets on an issuance platform like Doppler Protocol. This is because Doppler defines provable rules for both the short-run and long-run assets. This leads to less information asymmetry and more complete markets. It also allows the creation of trustless issuance authorities. Doppler is also optimistic, meaning that users are able to maintain liquidity and a price without constant support from market makers or financial institutions. The price is presumed to be correct until someone takes a stance against it. Because users can trade at any time to take a stance due to guaranteed liquidity, there is no negative liquidity spiral from traditional market makers.

By aligning incentives through social authority and market design, better incentive alignment can be created while also driving value to members of the system. There are many different ways value could be generated, such as digital property rights, social consensus, or direct protocol enshrined revenue generation.

The benefits of the system are the ability to create liquid markets for arbitrary assets - allowing capital to flow to those who create valuable assets without any intermediaries or middle men. This opens up a vast design space for value creation, and directly connects capital markets to the innovation economy. This system also allows a much larger set of market participants to engage

and profit from the system, lessening the information problem in a centralized system as described by Hayek.

This is not without cost. There are challenges in the system as the guaranteed liquidity and speculation enables the users to both enter and exit the system at any time. This could result in something akin to breaking the buck in mutual funds or a bankrun where users run on the currency destroying value inside the ecosystem.

On the other hand, this could be just seen as a rapid devaluation event. However, the importance of noting this is that these rapid devaluations will unwind leverage in the system from either the bank or users in the system. This will cause a socialized loss from the destruction from leverage, which has similar welfare effects as a bank-run. External leverage from market participants effectively outsources the risk from the issuance authority to the external party.

We argue that this can be mitigated by an equivalent to open market operations, slowing down the impact of price evolution, and some buyer of last resort. While a devaluation event should not be slowed down, socializing less losses from the leverage unwinding during an unwinding event may be beneficial to slow down or be directed away from depository institutions (especially ones that hold consumer funds). On the other hand, this could lead to more losses from moral hazard, allowing bubbles to continue growing more than they would have without the system.

Readers will probably notice that this is functionally what a central bank does. Central banks are mandated to smooth out the business cycle. This is the natural push-pull of value creation and speculation which the issuance authority smooths out by acting as a counter-cyclical stakeholder bank. The design of the markets is to guarantee a price and liquidity to trade at all times. We argue that early and long-term believers in the ecosystem must backstop the springback of users exiting the system to avoid any spillover effects by utilizing excess system reserves generated during expansion periods (similar to banks).

Finally, new pricing mechanisms and models must be created to approach something more akin to a fair market global price. By definition, bank runs cannot occur if banks are about to liquidate positions at a fair market value instantaneously. The mechanics of a bank run occur because of liquidity drying up and a lack of short-run price discovery.

Most times when a bank run occurs, the deposits would be safe if the bank would be safer if everything was frozen in place and was able to be perfectly marked to the price. This means the "fundamental value" of the assets are not changing, but certainty and risk assumptions have rapidly changed, forcing banks to rapidly unwind into incredible illiquid markets. However, socializing liquidity could smooth out repricing events due to the unwinding of leverage.

By creating complete, well priced, liquid markets with well understood evaluation mechanisms, bank runs can be avoided by tempering expectations during the initial peak. This is easier said than done and cycles might be unavoidable.

6 Implementation of a Digital Land Bank

Notice that issuer monopoly only requires control over which currency an asset will trade it. While historically this has been challenging, on crypto rails, it is trivialized by atomic trading and issuance protocol like Doppler.

First, atomic trading trivializes several different exchanges between potentially disparate assets using automated market makers. Automated market makers support programmable execution which allows for the ability to daisy chain several swaps with conditional execution - executing all the

underlying swaps only when the entire path is successfully executed. Conditional execution allows swappers to travel through currencies they may not want to hold for any period of time, opening up more pathways to the desired liquidity. Additionally, because each individual swap is a graph traversal problem, adding additional hops is somewhat trivialized, allowing for nested currency value accrual as well. This solves an issue at the heart of traditional finance where exchanges between currencies is both non-trival and expensive as a result of vendor lock-in and lack of shared ledger.

Issuance Protocols, such as Doppler Protocol, allow integrators, such as publisher exchanges to set arbitrary pricing assets for their initial auction. By only changing the provided 'numeraire' and the calculated exchange rates (if required), publisher exchanges, such as Zora and Paragraph, are able to change currencies, allowing for this value accrual to be programmable as well. This trivializes a previously incredibly complex action.

Indeed, the previous two mentioned publisher exchanges utilize a "quote pair" model utilizing the unique properties enabled by 'issuance monopoly' to drive-value back to their unique economic models. By also supporting liquid routing between their currencies and the wider "liquidity network", these publisher exchanges are able to functionally support a type of social currency on their platform.

7 Conclusion

Onchain Protocols are able to trivialize previously complex financial actions by turning them into programmable code. Automated market makers enable programmable exchange and issuance protocols enable programmable issuance. With programmable systems, users and market designers are able to create unique economic systems that were previously too complex to practically implement. The programmability also enables a unique trustlessness in the system, as users are able to verify the code which is running, allowing other previously impractical systems to be feasible.

The automation of previously complex financial systems enables new types of systems to be created and overtake existing incumbents. This accelerates the unbundling of traditional industries, creating rapid turnover from innovation and technology. Currency may actually be the ultimate example of this bundling - both from horizontal bundling for all its uses in the wider economy and vertical bundling from the multiple functions of currencies together. For example, an optimal store of value and a medium exchange have directly conflicting designs. By unbundling these, we can create optimized systems that encourage completely new and better systems.