

Tokenization of Value, Private Money Supply and Impacts of Decentralized Competitive Protocols on Public Policy

In 1992 Francis Fukuyama imagined the “end of history” with the words “What we may be witnessing is not just the end of the Cold War, or the passing of a particular period of post-war history, but the end of history as such: that is, the end point of mankind's ideological evolution and the universalization of Western liberal democracy as the final form of human government”¹ yet as we have witnessed in the two and half decades since then, Fukuyama’s predictions did not quite hit the mark. In the wake of financial crises, growing wealth inequality and unequal redistribution of wealth and resources generated and made available through technological progress and globalization, Western liberal democracy has been confronted by what some would consider a populist backlash in recent years. Western democratic systems coupled with global social media coverage have become susceptible to disinformation campaigns and weaponized narratives,² while others touts “State sponsored capitalism” as a competitive alternative to the established Western liberal system. That is not to say the global capitalist system has failed, only the returns on capital have not necessarily been distributed based on merit to those who provide the labor (non-capital) inputs. In other words, Fukuyama’s “end of history” was more than premature and we now find ourselves in the late stages of the beginning of a new technical, legal, business and economic paradigm shift when it comes to the organization and our understanding of the global economy. This new paradigm shift has been brought about by blockchain technology enabling trustless, transparent and decentralized databases, applications, contracts, governance and digital tokenization of virtually any asset.

Taking into account other emerging technologies from autonomous vehicles to general artificial intelligence and the potential threat of technological unemployment, it is clear we are far from an end to history. As the economist Robin Hanson expands upon in the book *The Age of*

¹ Fukuyama, F. (1992). *The end of history and the last man*. New York : Toronto : New York; New York : Toronto: New York : Free Press ; Toronto : Maxwell Macmillan Canada ; New York : Maxwell Macmillan International.

² Allenby, B., & Garreau, J. (2017). *Weaponized narrative: the new battlespace* Center on the Future of War. Retrieved from https://azhumanities.org/wp-content/uploads/2017/08/WN-weaponized-narrative_final_compressed.pdf

Em: Work, Love and Life When Robots Rule the Earth,³ we could begin seeing in our lifetimes a transformation of the global economy from one where the long term production function ($q=f(K,L)$) of the economy is a combination of Labor (L) and Capital (K) inputs, towards an economy where capital (machines, computers, robots, artificial intelligence) are the dominant, or potentially the only input, leaving the majority of people unable to benefit from and monetize their labor. Under the current system of rapidly increasing wealth inequality—in 2010, 388 men and women owned the same amount of wealth as the bottom 50% (over 3 billion people) of people, by 2016 this number has according to some estimates fallen down to 8 men⁴⁵⁶—an economy consisting mainly of capital inputs exacerbates the current situation and benefits only those who already have access to capital. In Robin Hanson's own words, the only way to succeed in this new economy is to accumulate and own capital since labor will rapidly lose value. This may sound like a gloomy prospect, or the beginning of a Marxist argument against capitalism. It is neither. The fault I believe is not with capitalism per se, but with the exclusive and centralized nature of the system which has allowed corruption, cronyism and nepotism to flourish in closed circles. Arguably, and ironically, the solution may be more capitalism, not less.

If implemented with the above in mind, blockchain technology, tokenized assets, protocols and value networks may be able to fix many of those issues by democratizing access to capital in a decentralized and transparent global economy. A tokenized and permissionless global liberal order where anyone can have partial ownership of the information protocols and decentralized value networks underlying the new digital infrastructure, combined with transparent global frictionless markets will allow for a much wider and inclusive participation in the capitalist system. Transparency and prediction markets could make market failure much less common. And most importantly, the returns to technological innovation and the capital input driven economy from artificial intelligence and automation could be much more broadly distributed beyond the current networks of wealth concentration.

Now let us take a look at some of the components of how such a disintermediation of the global economy might look like at the open-source protocol level. From an economist's perspective, the role of governments is to provide goods and services that the private sector cannot provide reliably and effectively on its own without oversight. Regulation of various kinds falls under these services, but given the definition above, this regulation, goods and services will inevitably vary between regions, countries and cultures based on local contexts. Bitcoin arguably

³ Hanson, R. (2016). *The age of em : Work, love, and life when robots rule the earth* (First Edition.. ed.) Oxford : Oxford University Press.

⁴ Slater, J. (2016). *62 people own the same as half the world* Oxfam International.

⁵ Ratcliff, A. (2017). *Just 8 men own same wealth as half the world* Oxfam International.

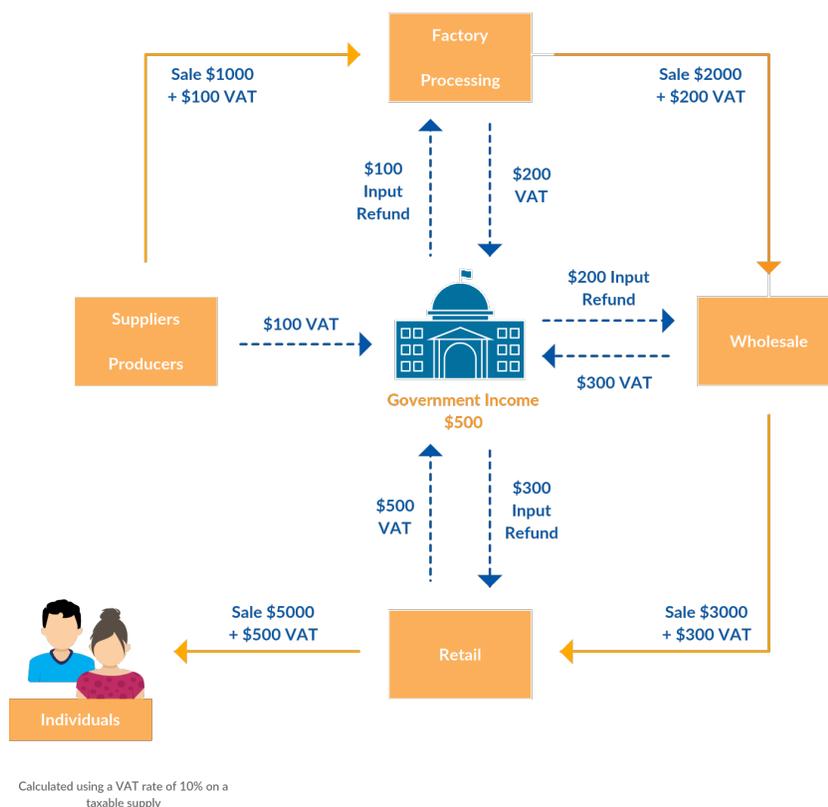
⁶ Credit Suisse. (2016). *Global wealth databook 2016*. ().Credit Suisse.

created a working proof of concept of a private currency and privately regulated money supply, a feat that had never been accomplished before, though many had tried and failed.⁷ Discussion of the Bitcoin protocol is beyond the scope of this section, the important takeaway is however that due to technical, design and philosophical limitations, Bitcoin is not particularly well suited to actually function as a currency. What Bitcoin has done is open the doors to the possibility of managing goods and services long thought of as exclusive to governments in a private, decentralized and disintermediated form. If designed correctly, we can imagine that privatizing services such as taxation and wealth distribution on competitive open-source protocols could greatly reduce the deadweight loss and “leaky bucket” inefficiencies created by intermediary institutions while making wealth distribution more equitable and merit based.

⁷ Narayanan A., Bonneau J., Felten E., Miller A., & Goldfeder S., (2016) *Bitcoin and cryptocurrency technologies*. Princeton: Princeton University Press 10.1016/S1353-4858(16)30074-5

Value Added Tax - VAT

To give a concrete example, let us take a look at how we could implement a Value Added Taxation (VAT) protocol on top of supply and production chains to create an open-source, decentralized and competitive wealth distribution protocol. As the name suggests VAT taxes each step of the value added process in a production chain. As



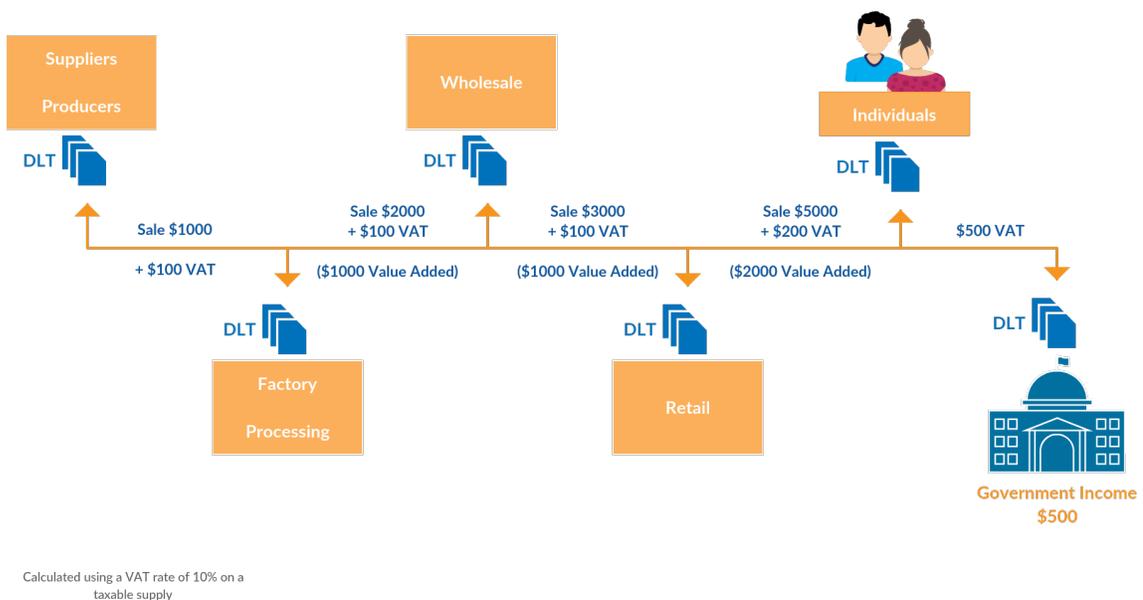
production chains become ever more integrated with transparent distributed ledger technology (blockchains), the accounting aspects of VAT become easier to implement. With all this information digitized and available in a global transparent database that any application can tap into, we can design a protocol where instead of a government intermediary capturing and re-distributing a percentage of each value-added step, this percentage could be woven directly into the protocol itself. Our goal here is to prevent the accumulation of wealth at the end of a production chain which stifles progress, innovation and investment and plagues current economic systems, while making the accounting process of taxation and wealth distribution more efficient and transparent.

As such, the first step of such a protocol does not present a radical change from the model illustrated above. Instead of each entity having to keep their own records which have to be audited, reconciled and actively filed with the government, we can imagine all the participants in a production chain sharing encrypted information on a decentralized ledger. From raw resource to final product and sale, the entire production process, its inputs and outputs are recorded on the ledger which all participant can see. Instead of filed with the government, the records are filed on this ledger and the government only collects the final VAT revenue at the end, when the concluding sale or transaction happens, or only collects the

appropriate amount at each step without having to refund inputs down the chain. Oversight and auditing can similarly be outsourced or auctioned off to an external entity which now has a comprehensive real time view and understanding of the entire production process. As we can see in the diagram below, the outcome of this process is exactly the same, but with potentially a much lower administrative and accounting costs on the part of both the production chain participants and the government.

Value Added Tax - VAT

Using Distributed Ledger Technology (DLT)



As the inputs, outputs and value-added are accounted for directly on-chain, each participant can only pay the actual percentage of the value-added directly to a government VAT smart-contract.

In this context, VAT can function as a useful tool to internalize the true costs of production. Many of the problems we deal with today (pollution, climate change, associated damages or health impacts) are externalities that are not accounted for in production. These externalities may be possible to account for with the proliferation of IoT devices such as cryptographic anchors proposed by IBM “cryptographic anchors — such as ink dots or tiny computers smaller than a grain of salt — will be embedded in everyday objects and devices. They’ll be used in tandem with blockchain’s distributed ledger technology to ensure an object’s

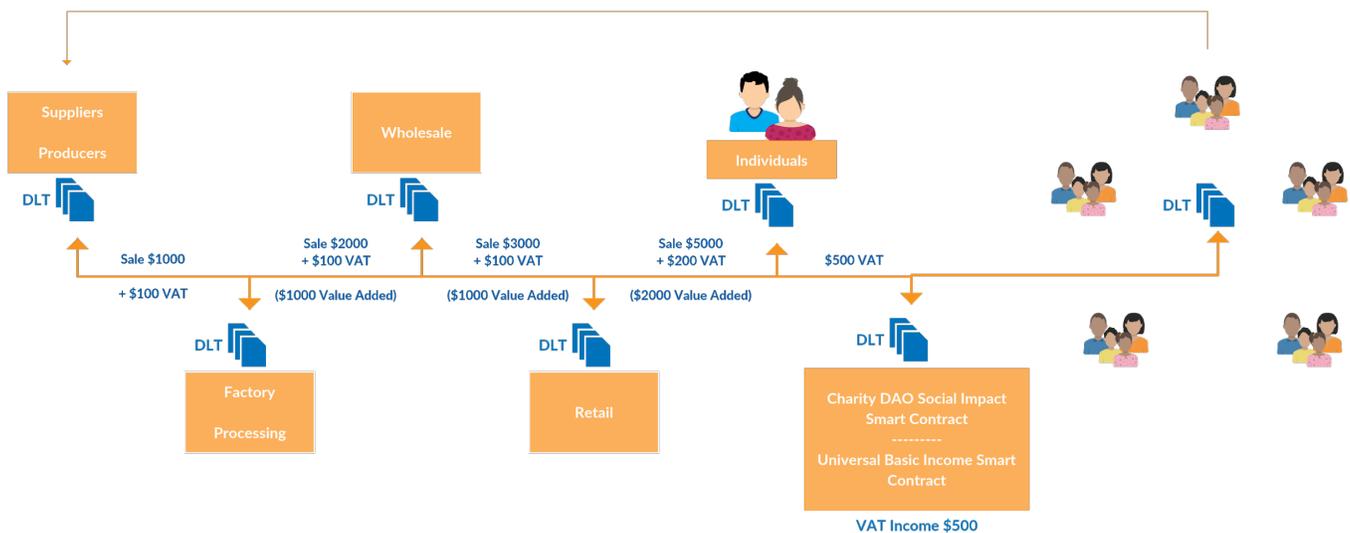
authenticity from its point of origin to when it reaches the hands of the customer”.⁸ With close monitoring of production chains of all kinds with IoT and tiny embeddable sensors with data recorded in a public tamper-evident decentralized database - many such externalities can be internalized much more easily and the costs of these externalities thus accounted for in the production process rather than being passed onto individuals and tax-payers as is often the case today.

⁸ Krishna, A. (2018). Changing the way the world works: IBM Research’s “5 in 5”. Retrieved from <https://www.ibm.com/blogs/research/2018/03/ibm-research-5-in-5-2018/>

The next step in the evolution of such a protocol would be to attempt to minimize the role of the government in the final step of collection and redistribution of revenue generated by the production process in order to eliminate the administrative inefficiencies inherent to this process. With a distributed and transparent ledger in place recording the entire production process, we can now imagine the taxable revenue at point of sale going more directly to the final recipients, whoever those might be. There are a few mechanisms by which this redistribution could happen, including the decision making process of who receives these funds. A variety of stakeholders could be included in this decision making process through direct or

Value Added Tax - VAT

Using Distributed Ledger Technology (DLT)



Calculated using a VAT rate of 10% on a taxable supply

delegative democracy, from the production chain participants, to all the individuals, communities and organizations affected by the production process as recorded in the ledger, to all of society. A decision could be reached for example to pool all the taxable funds in a “Universal Basic Income” contract which would automatically distribute all collected revenue directly to everybody in the system. Another alternative could be to route these through a decentralized social impact platform such as a Charity DAO where global voting input could be received to on how to best distribute these funds.

I. References

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