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Z-Efficiency

IDENTIFYING INNOVATION INEFFICIENCIES BEYOND XY

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Z-EFFICIENCY: Identifying Innovation Inefficiencies Beyond XY

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Introduction

One of the more remotely studied areas of economics is in the field of x-efficiency. X-Efficiency is the efficiency of operations of monopolies that is usually lost as a result of their incumbent status.

The idea is that the efficiency of a massive company that doesn't *have to* compete is by definition much less likely to be higher than one that does, and therefore its overall practical production efficiency declines in the process of its incumbency being increasingly assured.

The term was first coined in a 1966 paper written by the economist Harvey Leibenstein published in *The American Economic Review.* In postulating x-efficiency theory, Dr. Leibenstein broke convention with the assumption back then that firms no matter what competed in ways that were competitively aligned. In markets of less than perfect competition, argued Dr. Leibenstein, a loss in efficiency was actually the result of an increase in market share or overall resources. This loss he referred to as x-efficiency, where x- was the production efficiency factor.

Some years later, the concept of y-efficiency came into vogue as smaller firms such as Microsoft began using more efficient technologies to exploit profitability by reducing overhead, particularly in the battle of hardware vs. software. Y-Efficiency is defined as the efficiency of the *profitable* exploitation of markets of monopolies that is usually lost as a result of their incumbent status.

Discovering Z-Efficiency Among Cryptocurrencies

In digital currency markets, I noticed how a form of efficiency reduction we shall call z-efficiency can be observed and in fact is a creeping problem in today's markets already.

Z-efficiency as I define it is the innovation efficiency of leading digital currency trading pairs on a technological basis that is usually lost as a result of their incumbent status. With the theory of z-efficiency I postulate that just as for production and profitability efficiency reductions in the case of monopolies in a given sector, so in digital currencies there is a loss in *innovation efficiency* that occurs with respect to the technology underlying digital assets *once a digital asset becomes a major trading pair*.

This loss in z-efficiency, which is the efficiency of the innovative trajectory of a technology that is also a major base currency trading pair on exchanges, is the result of the market incumbent status of the technology leading to an over-trading or inappropriately high trading frequency of the incumbent digital currency pair, reducing incentive for technological improvement on the part of the Foundation or corporation innovators.

Because z-efficiency, much like the position of it on a chart, is exponentially aligned with respect to x-, which is production, and y-, which is profitability, this means that as a result, dominant crypto trading pairs are more likely to have substantial network problems and clogged networks increasingly more frequently over time as the number of individuals of the network increases.

Since value networks are configured for expansion of the number of people on them, that means that these digital currency engineers are enormously less likely to make any significant technological breakthroughs even as their networks become financially more valuable and in turn, their Blockchains more populous.

Clearly, this dichotomy whereby more people use a network that is altogether getting much more expensive to be on at the same time as it is getting less innovative and thereby functional over time has a corroding effect on the evolution of Blockchain innovations as a system as a whole.

The result is to combine the side-effects of x- and y-inefficiency and compound them whereupon substantial systemic value erosion eventually occurs.

If you think carefully about it, this is the case with Bitcoin and Ethereum today. Specifically, despite maintaining a core development team going back 9

years, Bitcoin's team has still not added anything in core Blockchain innovation since the date of Satoshi's original White Paper.

There is no smart functionality, and the network was only relatively recently unclogged by the Lightening Network, and even then, that was not something undertaken without substantial controversy.

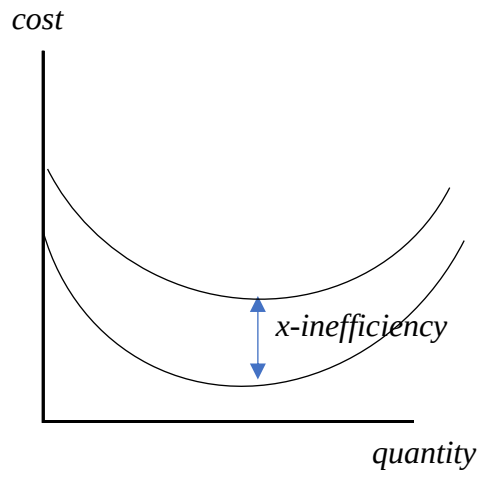
Similarly, Ethereum has yet to make any of the sort of breakthroughs that its competitors such as NEO, ICON etc. are proposing to try to do, despite its inordinate market share and the foundation's capitalisation.

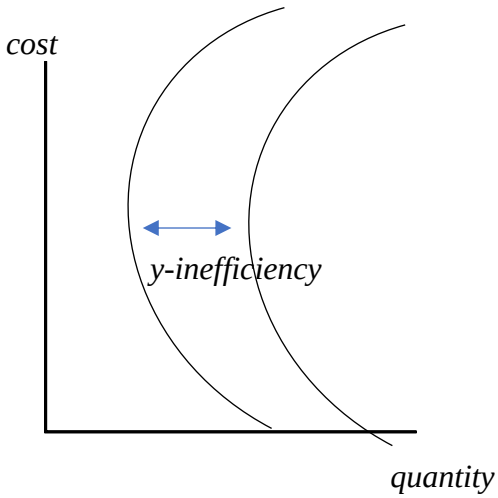
In fact, Ethereum hasn't even delivered on its promised Proof-of-Stake protocol which was meant to arrive earlier this year.

It appears pretty much as if the Ethereum Foundation is doing nothing innovative, merely leaving the developers of dAPPs to innovate on top of its network on its behalf.

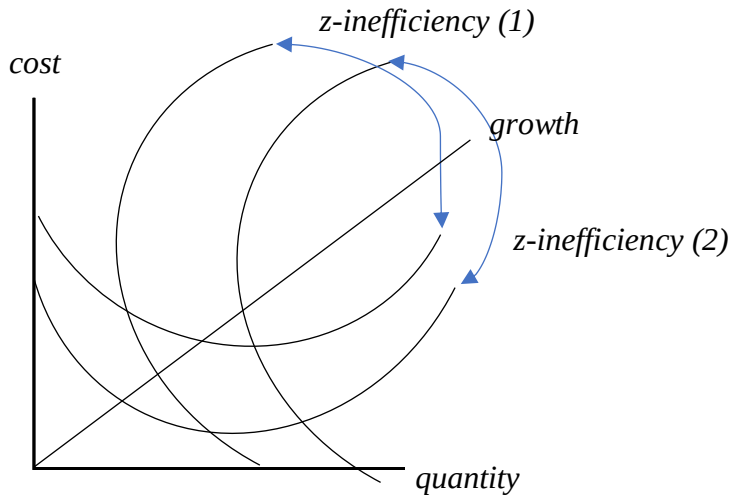
Applying Z-Efficiency Theory To Real World Economies

In classical economics, X-**inefficiency** is the difference of production (quantity) output that is lost as a result of a market of imperfect competition arising due to a net reduction in cost-maximisation. **Y-inefficiency** is the resultant y-curvature which leads to a reduced output as bottom-line margins begin to disappear as a result of the x-inefficiency.





I contend that in sovereign economies, that where product and cost are the same source of manufacture (money) the monopolies cheat, and begin to manufacture their own money / credit. As a result, a greater supply of currency exists. Due to this, currencies become base pairs for pricing world goods and services. As a result of the erosion of affordable sustainability, growth is compromised leading to **z-inefficiency**, or innovation / growth inefficiency.



There are two types of z-inefficiency:

1) Higher cost => lower allocative output

2) Higher quantity output => lower profitability *(-z)*

In the case of Z(1), innovation is made practically impossible, as more money must be invested in R&D expenditure that has overall less growth impact than the year before.

In the case of Z(2) higher amounts of growth lead to rising costs which forces a country to print a surplus of broad cash which leads to Z(1). Therefore, unlike x- and y-inefficiencies, z-efficiencies are perpetual closed-loop inefficiencies, meaning that they perpetually trap an economy within a sub-par rate

of both production and profit efficiency so that such economies are bound towards total disruption.

The reason that this z-inefficiency occurs is predominantly (though not necessarily exclusively) because of the establishment of the domestic currency as a base trading pair (meaning that it is an international reference point for overall purchases of internationally in-demand goods and services).

The wider utility incurred in establishing a currency as a base pricing mechanism is what gives rise to Z(2) which then causes systemic growth erosion (Z1).

This dual-inefficiency can also be understood to be a **bipolar market equilibrium**. In classic supply-demand economies both supply and demand meet at a point of natural equilibrium around which production and profit are normally most presently observed leading to reductions in xy-inefficiencies.

In a monetary economy where substantial z-efficiency is present however, there is constant growth in supply for demand and demand for supply, resulting in a bipolarity wherein there is substantial capital asset price appreciation (with excessive demand of assets than is supplies) at the same time as stagnating wage growth (with excessive supply of labour for utility).

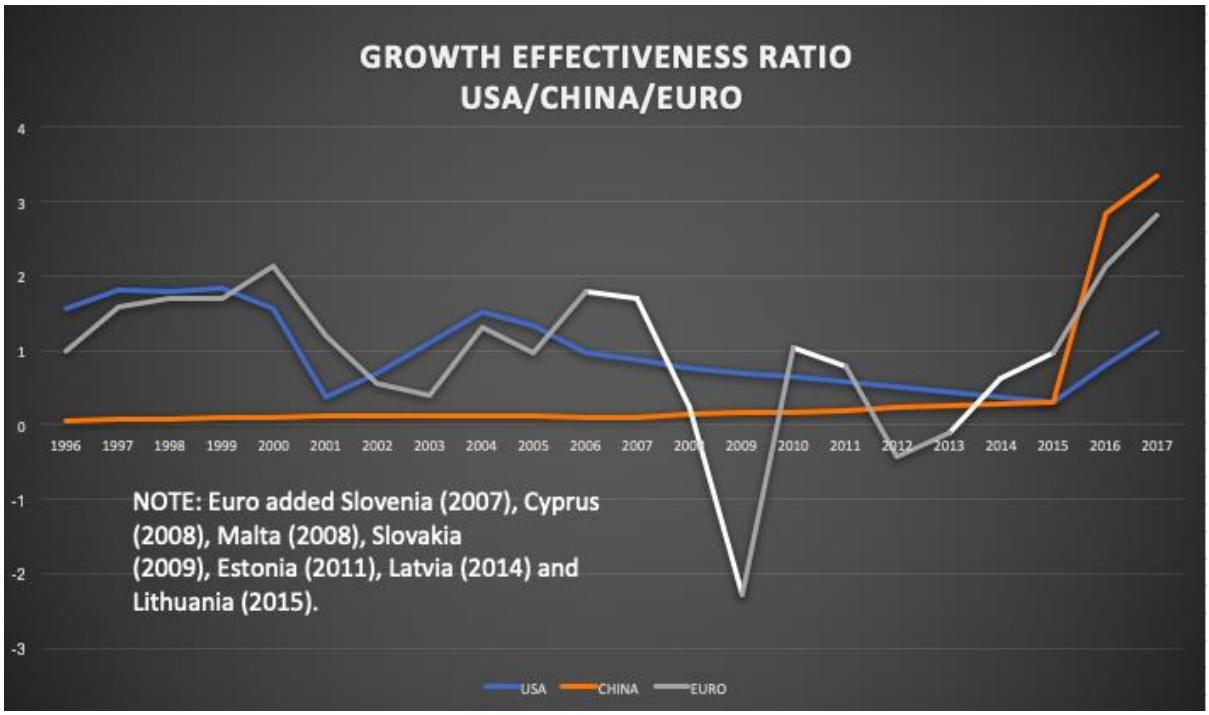
I contend that z-inefficiency is a fundamental inefficiency that cannot be remedied without permanent alternation to the fiscal monetary supply and utility that will either harm costs or supply in the short-term.

Z-Inefficiencies are easiest to see in currencies with major base pairs such as Euro and USD versus ones with large domestic economies (i.e. high utility) but without base pairing.

One measurement of innovation is R&D Spend / Revenue Growth. We can perform such an equation just as easily for countries as we can for companies using GDP. This chart maps growth effectiveness of R&D spending on different region's GDP. Z-inefficiencies are clearly represented here. In the chart above it is clear how the European Monetary system is using the strategy of acquiring lower cost of

capital countries such as those listed to increase overall growth versus expenditure (Z-Inefficiency 1).

Meanwhile, the preponderance of the US dollar globally in terms of being pivotal to the pricing of goods such as oil and gold is hampering overall profitability (Z-inefficiency 2).

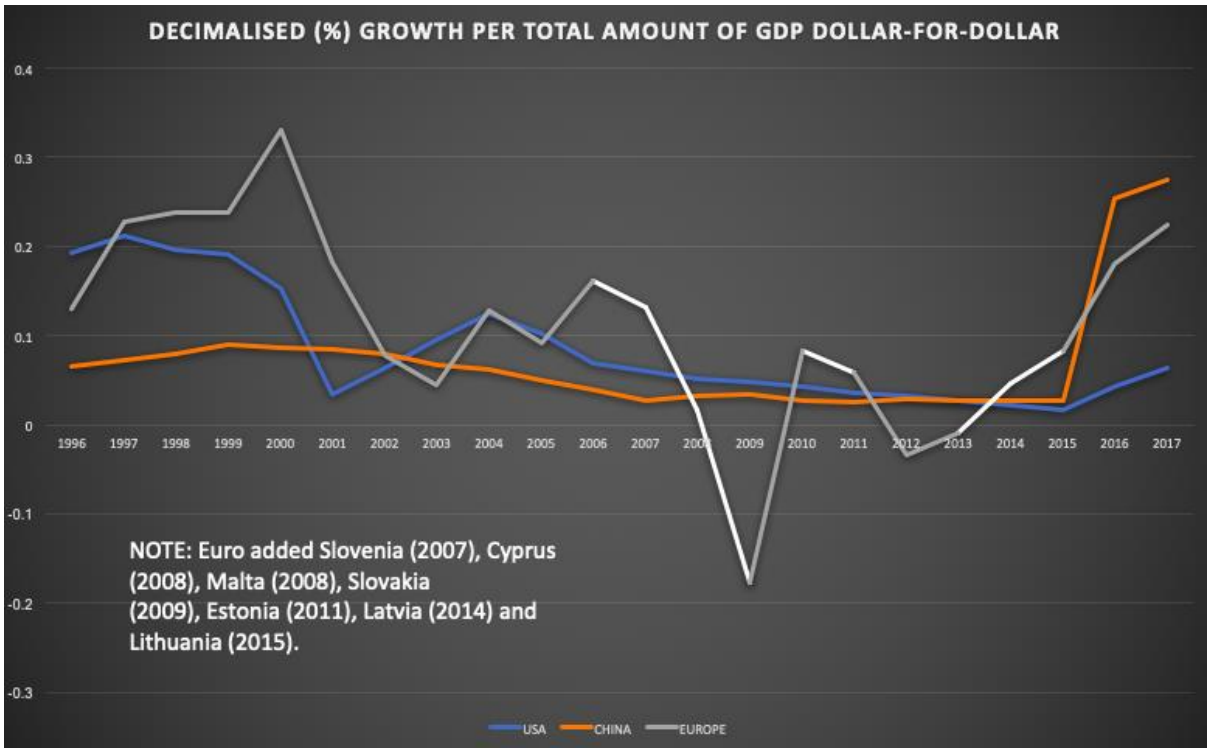


1) *Z-inefficiency 1: Higher cost => lower allocative output*

Therefore, Eurozone countries are in effect operating unsustainable strategies with respect to growth acquisition while the United States' apparent recent growth – although far behind China's on a dollar-for-dollar return quotient – will soon force it into similar strategies to Eurozone ones or to breaking up the dollar and applying it regionally throughout the United States.

There is simply no possibility that the US dollar has to compete with the countries that have elected to remain non-base pair currencies for global pricing of goods and services: cost of capital is too high, production too inefficient and profitability is scarcer every year.

Further, the more that R&D spend is increased the more the increase is offset as a competitive advantage for the non-base pair countries (some evidence for this exists with Thailand's recent growthspend for example). The reason for this is that as costs grow increasingly unaffordable those with preferential cost reap the benefit of consumers travelling overseas for certain benefits (e.g. healthcare).



2) *Z-inefficiency 2: Higher quantity output => lower profitability (-z)*

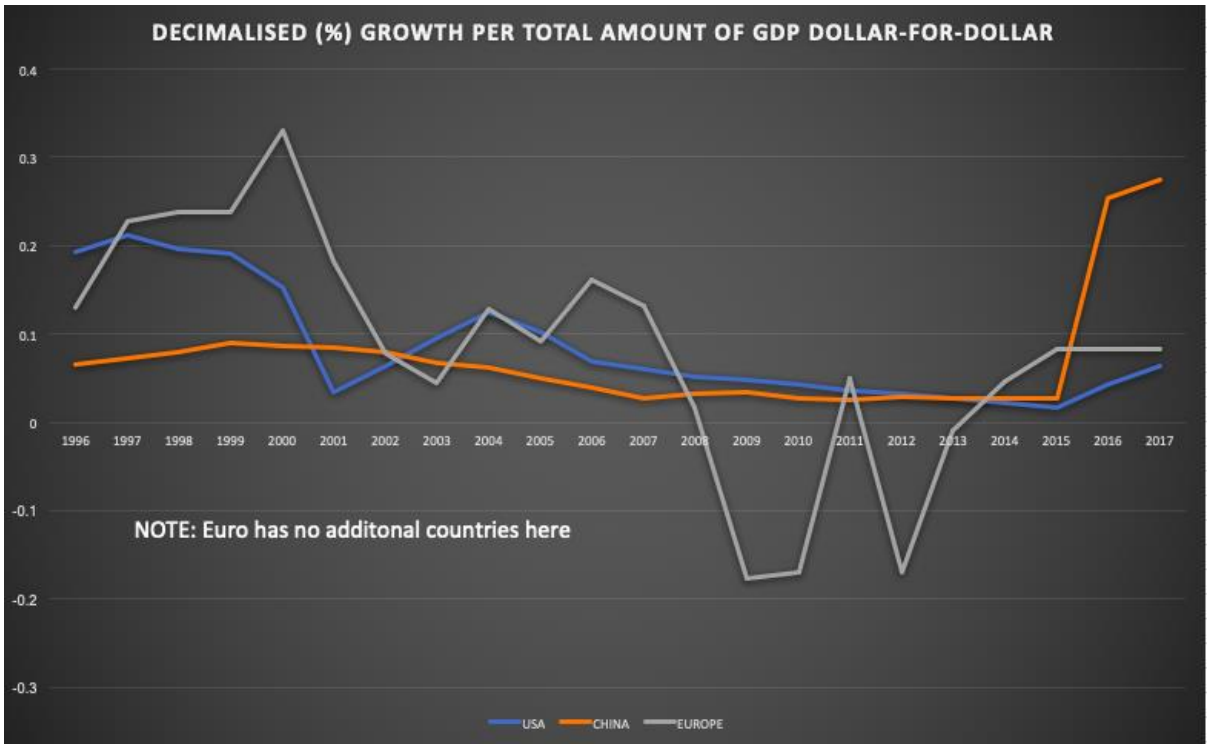
Another way to measure innovation is by its overall effectiveness. Effective innovation growth will show an increase in overall growth per resources.

What is interesting here is the Z-Efficiency loss that America incurs over China is significantly more pronounced, while it is clear that Z-Efficiency 1 is present in the case of Europe since the growth corresponds immediately and startlingly with the acquisition of new resources.

Innovation in the richer European countries used to be highly effective prior to the introduction of the Euro whereas almost all US innovation has been much flatter than the country has led the world to believe is the case. In fact, in the case of Europe, almost as soon as the Euro was introduced it became extremely

ineffective innovation-wise, so much so that it is negative in effectiveness in the present day.

This is most obviously displayed by taking out the acquisition countries:



We can see clearly the impact of Z-Efficiency in the Chinese economy here; where domestic growth began to overtake the USA growth on a per resources basis in 2012, three years later it had become altogether more effective too (chart 1). Thus, Z-Efficiency is about *maximum utilisation of resources* in the first instance for the purpose of value creation, followed by a harnessing of z-inefficient economic resources of other competing nations that become part of a z-efficient nation's z-efficiency.

This is very much in the same way that allocative x-efficiencies are divided among newly privatised/fragmented industry segments where perfect competition is suddenly introduced. In other words, z-efficiency is a form of competitive positioning that costs the z-inefficient nations the most of all and allocates such costs to the growth of the z-efficient ones.

Recall that the difference between z-efficiencies and xy efficiencies is that once they are lost, they are almost impossible to regain again, as z-inefficient economies keep giving up growth to z-efficient ones due to the impact of globalisation. The reason that globalisation has been so hard for America and Europe then, and so prosperous for China, is simply that the latter economy has no widespread currency base fragmenting its competitive innovation positioning, while the z-inefficient economies still have large consumer basis with huge demand and consumption quotas.

This is in a way the perfect storm for economies that are seeking to introduce new innovations. A similar thing happened in the early 2000s with the introduction of American technology to the Chinese markets where there was z-inefficient innovation growth at the time; the wide base of consumers simply lapped it up. Between 2001 – 2005 however this z-efficiency was eroded as a result of some exogenous shock to the US dollar.

The only logical conclusion given the socio-political framework at the time is that a sharp rise in credit, effectively diluting z-efficiency per resource combined with the widening use of the US dollar in invaded Middle Eastern economies and China's tight regulation of its own currency meant that this z-efficiency 2 quickly began to take root in the US economy.