A TIMELY SOLUTION TO THE MILLENARY PROBLEM OF MONEY'S CORE MISREPRESENTATION

(An urgent communique to all economic agents public and private, particularly all levels of government, public administration, public and private financial entities and institutions.)

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As a matter of utmost urgency we call for the adoption of the MSTA Resolutions (Annex I), for which we summarise the salient facts and consequences as follows:

1) Money/currency unit symbols are not formally defined as required for any determinate application of any mathematical expression in terms of said units to any independent common reality.

Consequence: *Financial system imperatives are at best indeterminate vis a vis any real world societal needs and to claim any scientific/rational imperatives of these is* ***a serious and perilous error.***

2) By conflating the concepts of measure and commodity without consideration of how and/or when these two concepts are mutually exclusive, the colloquially and commonly assumed informal notion of money being used in lieu of any requisite formal definition, constitutes a logical incongruence. Such inconsistency is referred to as money's core misrepresentation (Annex II).

Consequence: *Any process no matter how compelling that in any way incorporates what can be shown to be invalid, cannot itself be considered valid*.

3) Given said misrepresentation has been assumed universally by rote in all manner of money contracts and agreements and according to formal systems theory and proven practice (Annexes III, IV), said misrepresentation can be shown to cause systemic instability ***by allowing incoherent relations whereby money is used as a unit of measure to determine its own unit value in terms of variable quantities of itself***, wholly invalidating any pretence of it acting as a valid measure/ record/reference of value.

Consequence: *Pursuant to formal systems theory and proven practice, imperatives that arise from using said misrepresentation by rote and as a foundational axiom, will lead to destabilisation of all concomitant processes and real world systems that incorporate the imperatives arising from said misrepresentation.*

Such instability incites all agents to adopt evermore extravagant and otherwise unconscionable strategies, measures and policies, exacerbating overall systemic instability and risk (Annex IV). Thus leading to increased risk of harm, suffering, deterioration of life support systems and unwarranted exhaustion of vital resources.

4) The MSTA Resolutions provide an immediate remedy to all the above not only without cost or penalty to anyone but eliminating the vast majority of current financial risk [3]. By framing the money system in terms of formal control and stability theory and adhering to proven requirements for system stability, monetary stability is shown to be attainable by ***correcting money's misrepresentation, formally defining currency symbols as only arbitrary units of value measure and strictly operating on them accordingly*** (Annexes III).

Consequence*: Adopting the MSTA resolutions offers an immediate avenue to* ***monetary stability validating its use as a reference of value and without any cost or penalty to any agent yet eliminating vast amounts of risk to the whole economy (Annex III)****. By money no longer acting as an article of trade, thus freeing the real economy from perilous financial cost and otherwise*

arbitrary risk, ***competition in terms of quality over quantity will be enhanced, while enabling a greater and more flexible inclusion, diversity of production, made impossible under money's misrepresentation.***

5) Principles of legal validity such as ***"Quae ab initio non valent, ex post facto convalescere non possunt"*** *(what is initially invalid cannot be made valid by subsequent acts) [1]* must supresede all considerations in order to determine justice. (Annex V)

Consequence: *Common practice can only serve as a source of law if and only if said practice is not shown to be invalid and/or to contravene fundamental principles of law (truth, logic, natural law) (Annex V).* ***Thus, the use of money's misrepresentation as a foundational premise cannot be validated by appealing to "common practice" no matter how long standing that practice might be.***

6) By logic and as explicitly set out in Anglo/American law [2] misrepresentation carries three levels of liability:

a. Innocent (didn't know) e.g. most lay people;
b. Negligent (didn't know but it is my job to know) e.g. all economic and financial experts and;
c. Fraudulent i.e. all those with a reckless disregard for the misrepresentation.

Consequence: *All those alerted to the existence of any claim of misrepresentation and who do not act to determine the truth of such a claim, are acting recklessly and therefore become potentially liable for fraudulent misrepresentation and any subsequent civil and penal charges.*

Conclusion:

From the above, it follows that it is the responsibility of ALL agents public and private habitually operating under money's misrepresentation, to attend to the formal claim and proof of said misrepresentation and to either provide proof (of commensurate rigour and detail) to the contrary, or act in good will to remedy it by calling for the adoption of the MSTA Resolutions or their logical equivalent. To do otherwise, is to be delinquent in one's civil duty and to become liable for "reckless disregard" as outlined in point 6) above. With respect to public entities, given their mandates to represent, serve and protect their constituents and their legitimate interests, any such reckless disregard is most harmful.

We therefore call on all to respond appropriately and consequentially by alerting others to the contents by sharing the link to this document as widely as possible.

References:

[1] Black's law dictionary. HENRY CAMPBELL BLACK, M. A.. 1990.
[2] 2023 - Thomson Reuters Practical Law
[3] A WORLD AWASH IN MONEY Capital trends through 2020 Bain and Company. 2012 fig. 1.1. page 7.

Annex I

MSTA Resolutions V.1.0 (rev.3)

Editors: Marc Gauvin, Sergio Dominguez, Mark Heffernan, Jordan Soreff, Jorge Meira, Rúben Arranz. January 2020 rev. April 11 2020 /June 30 2021/July 2021

Preamble

More than ever, "money" is being questioned. While there exists a familiar common notion of money inherited for millennia, "money" has never actually been formally defined nor specified. Indeed, although intuitively compelling, our currently assumed notion of money is flawed (see: "Money's Core Misrepresentation" below). In light of that flaw and given the many adverse effects of using this erred notion has on society as a whole, it is imperative that money be formally defined and specified, without disrupting our current day-to-day ability to operate nor sacrificing our core rights and freedoms.

Consequently, these Resolutions call for two concurrent actions:

1. That money be formally defined and specified by all interested parties and stake holders through the appropriate open multidisciplinary international forum;
2. As an immediate interim measure, that current money practices be rendered "passive" in the formal scientific sense of the term. Passivity of our money system will ensure money's function as a valid record of value, without in the process producing ANY adverse effects.

Just as the scoreboard of a sports event "passively" and accurately reflects what transpires on the field, without determining how the players play to achieve their "goals". So too, having our money system fulfil the formal requirements of "passivity", will allow us all to obtain valuable information, without interfering with what we choose to do or how we choose to do it.

Key Concepts

Money's Lack of Definition:

Absent any formal definition of money and respective symbols (e.g. "$") used in a wide array of contexts (e.g. dollar bills, checks and account entries) on similarly varied set of physical supports (e.g. paper, computer memory) and as an object of different contracts (e.g. mortgages, loans, derivatives, etc.), it is impossible to identity any determinable relation between money denoted by such symbols and the value inherent in goods and services money represents. As a consequence, obligations, agreements or contracts in terms of such "$" units are commensurately indeterminate such that a logical, fully reasoned and hence just rule of law is impeded.

Just as any mathematical expression is rendered indeterminable if its variables are not fully and unequivocally defined in terms of the reality in which they are to be applied, so too mathematical expressions in terms of units of money are rendered indeterminate in terms of the real economy,

unless those units are unequivocally defined in terms of that common reality to which they are expected to be applied.

Money's Core Misrepresentation:

Common practice has adopted a notion of money where it is implicitly and explicitly assumed to be both a record/measure of value AND a commodity/tradable good without noticing how these two notions (measure/commodity) are, by logic, mutually exclusive. Such a logical core misrepresentation, once identified and by the most fundamental principles of law and justice, must render any contracts in terms of such a notion invalid.

To continue business as usual in spite of this revelation is to arbitrarily subject one or other parties directly or indirectly to unknown, incalculable and/or undeclared adverse systemic effects and imperatives, the most notable of these being the systemic distortion of the common perception of value by systemic compounding,

As a consequence of the mere knowledge of this common misrepresentation and the subsequent adverse effects and consequences, again by principles of law, it becomes incumbent on all parties to all contracts involving "money" to seek remedy by proactively assisting in providing a logical and independently evaluable (valid) definition of money for contracts.

Passivity:

System passivity ensures that a system cannot directly affect its environment, which by no means implies that the system necessarily ceases to be useful or functional. In fact, depending on a system's function and purpose, passivity can be mission critical. In the case of money and if it is to be used as a valid record and therefore measure of value, then system passivity is an indispensable core requirement. Thus, by merely rendering a money system passive, any direct (systemic) adverse effects can be avoided while improving money's utility at no cost or penalty to anyone.

Resolutions

Resolution 1 (Correction of Money's Misrepresentation by Legal Imperative)

We thus seek, as set out by the Money Systems Transparency Alliance (MSTA), to immediately set out to pursue and assist all technical and legal avenues to resolve the aforementioned logical anomaly, and to do so in relation with the highest monetary authorities i.e. Central Banks, leading banking and investment houses and related stake holders, by way of the necessary open ratification and publication of a valid formal logical definition/specification of money, its function, scope of use and corresponding logical requirements. This formal logical definition/specification of money shall be done in terms of independently determinable criteria. For example, money's definition cannot be circular (i.e. in terms of itself, also known as "false confirmation") but rather must be in terms of the reality in which it, money, is to be operated on and applied.

Resolution 2 (Immediate (Interim) Imposition of Formal Passivity):

Pursuant to the above and with the aim of eliminating all and any direct or associated adverse effects and consequences arising from implementing money under its commonly assumed current

misrepresentation, we move to IMMEDIATELY adopt an interim logical "Passive" specification of money's current use in the formal scientific sense of the term as follows:

1. That money's logical function shall be **strictly** limited to that of a record/annotation of the "value" attributed to goods and services transferred between parties in transactions and denominated using the common unit symbol "$".
2. Thus **money shall be created** on account to represent value given in the form of "goods and services" pending future reciprocation of "goods and services" of commensurate value and **money shall be cancelled** on account upon value being reciprocated.
3. Related Balances of such "moneys" shall be kept by all stakeholders (e.g. Central Bank, associated banking or credit institutions, public administrators and interested parties etc.) along with periodic issuance of statements as required.
4. In order to maintain a system of any number of such transactions "passive" according to the formal requirements of passivity the following shall be observed:
    a. Money is defined as an annotation of value expressed in currency units (e.g. $) and only comes about as a result of transactions after the fact.
    b. There is no prior circulation, supply or demand of units required.
    c. Each transaction generates its own independent units that are later resolved against existing balances (see creation and cancellation of money above).
    d. The sum of money in a system of any number of such transactions at any given point of time, represents all non reciprocated value (risk measured in currency units) and at all times is equal or less than the sum of input "cost"/"prices", thus conforming to Passive BIBO criteria for sampled LTI Systems.
    e. Value transacted may never be unilaterally determined.
    f. To avoid systemic distortion of the common perception of value by systemic compounding, the cost/price of all associated money (banking) services (e.g. maintaining of accounts, risk consultancy, etc.) must be attributed solely in terms of their own value and **never** as a percentage commission of the sums of value attributed to other transactions.

Annex II

The Misrepresentation of Money

Core misrepresentation (See: Video)

If money is a measure it cannot also be a tradable commodity and if it is a tradable commodity, it cannot also be a measure.

Colloquially, we say **"so many dollars worth"** of this or that, implying money is a measure of value. However, we also say **"I'll give you ten dollars for that…."** which implies money is also a tradable commodity, but is this logically sound?

While a bag of flour in my kitchen has a certain weight, that measure cannot represent the weight of flour in your kitchen. If both of us have a kilo of flour, then although equal in magnitude, each measure is distinct in that they refer to different instances of flour. Measures are always "of" other things never of themselves. That is, while it makes sense to say a 'kilo of flour', it doesn't make sense to say a 'kilo of kilos'. Similarly, it makes no sense to say a 'dollar's worth of dollars'. That is, money cannot be priced in terms of itself. So, when someone gives you an annotation of a measure (e.g. a five dollar bill) they are giving you a record of value not value itself, as all measures are always of something other than themselves.

The concepts "measure" and "commodity" are mutually exclusive, if money is a measure, it cannot also be a tradable commodity and if it is a tradable commodity, it cannot also be a measure.

See: (**Formal proof**)

No Expert Consensus on Money's Definition

In expert mathematical terms, Narayana Kocherlakota former President of the Federal Reserve Bank of Minnesota (2009-2015) in his 1998 paper entitled "The Technological Role of Fiat Money", shows how the standard 'definition' of fiat money as a "store of value, medium of exchange and unit of account", is "proven to be vacuous" (empty) and that the only "technological role of money" is that of a "record keeping device". Similarly and according to the semantic analyses of the same definition in this paper that same standard definition logically reduces to money being defined as only a "record of a measure of value", not a store nor a medium of exchange. This is wholly consistent with Kocherlakota's findings although more specific as it says what the "record" is of i.e. it is of "value".

Another example of a different authoritative definition of money, is to be found in some civil codes such as the Spanish and Portuguese ones, where money is referred to as being an example of a "fungible" thing, where repayment is to be in the same "species", "quantity and quality". The only way to determine that the "quality" of something is "the same", is if and only if a given quantity of that thing, maintains the same quality over time. But we all know that in the case of money as conceived today, that is never the case, as any quantity of money always changes value over time.

All the above, goes to show that currently, there is no consensus on any clear and unambiguous logical definition of money, which is required in order to determine the validity of contracts in which money is an object. When, even leading experts such as Kocherlakota and others dispute what money is and the *de facto* assumption adopted in practice, of money being both a commodity and a measure, is logically inconsistent, then it becomes clear that money is neither defined adequately nor is being represented correctly in practice.

MSTA Resolutions

Technical Curriculum

Legal Curriculum

Annex III

A Systems Engineering Approach to Formal Monetary and Financial Stability Without the Vagaries of "Austerity"

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Abstract

Currency units ($, €, ¥, ₩, etc.) are not specified nor defined formally. Nonetheless, account entries and balances in terms of such units are routinely assigned the role of records/measures of the "value" of "assets", without any formal adherence to the requirements of the most elementary logic and math of "measure". In all domains other than finance and economics, the application of mathematical expressions in terms of units that are not both conceptually defined in valid logic and mathematically specified unequivocally with respect to the reality to which such expressions are expected to be applied, are necessarily in all cases indeterminate (i.e. inapplicable). This paper establishes how such indeterminacy is translated into systemic "financial" risk in terms of formal stability as defined in dynamical systems theory and engineering.

The real economy is made up of goods and services (factories, farms, infrastructure, intellectual property i.e. non-financial assets on balance sheets) all of which are dependent on the independent physical nature and properties of real material and human resources. The "financial economy" on the other hand, is made up purely financial assets (securities, mutual funds and other financial instruments in the hands of households, corporations, governments and other direct owners).

Economic risk and liability is determined predominantly according to the mathematics of finance as applied to both the financial and real economies that determine the dynamics of account balances over time in currency units. While all economic accounts are ultimately resolved in terms of real assets, outcomes are determined by both the real and financial economies. The real economy being ultimately dependent on objectively determinable physical/scientific criteria while the (predominant) financial economy on purely (arbitrary) mathematical criteria with, as mentioned above, no determinate relation to any reality other than itself (i.e. according to circular logic).

This paper explores how the current state of affairs described above is logically and mathematically unresolvable and hence wholly unmanageable, precluding any rational judicial solution and thus requiring ultimately arbitrary, unknown and/or occult criteria for "resolution" as in the application of penalties and losses under the guise of "austerity".

The paper also demonstrates how at no cost or penalty to any agent public or private and by merely defining currency formally as an arbitrary unit-measure of "value" and strictly adhering to the math of measure, the financial system can be rendered "Passive" pursuant to dynamical systems theory with increased transparency and functionality.

Finally, the paper illustrates how by virtue of the aforementioned principles of a Passive financial system, all risk inherent in the real economy, can be mitigated by optimally and judiciously managing the relations of the aggregate "system balance" (aggregate risk) in terms of the full array of possible transaction type permutations, without any need for "controlling" access to or "circulation" of currency that lead to the vagaries associated with the politics of "austerity".

Preliminary Considerations

Unit Definitions and Currency Units

Mathematical expressions in terms of units that are not unequivocally defined and specified are indeterminate in any independently observable and quantifiable reality.

Definition of unit symbols in terms of a common reality or domain e.g. the physical world, require being assigned the role of representing some or other independently observable phenomenon of that domain and mathematically specified in terms of other relations of the domain[1].

For example, mass is defined as the commonly observable relation of resistance to acceleration (aka inertia) that material objects are observed to possess. The SI unit of mass is the kg specified in terms of other observable relations in physical reality, i.e. 1 kg corresponds to the unit of mass (inertia) in terms of the volume of a compound (1 litre of H_2O), at a particular temperature (4ºC) and at a certain pressure (1 atmosphere).

While currency units are not formally defined/specified there nonetheless exists a commonly assumed notion associated with the day to day use of "money" denominated in those units. This notion conflates money as an annotation/account/measure of "value" [1][2] and as a tradable commodity carrying its own independent value in transactions, without noticing how and when these two concepts are logically mutually exclusive.

This logical incongruence referred to herein as "money's common logical misrepresentation" or simply "money's misrepresentation" is illustrated as follows:

> Let $A \geq 0$ be the annotated value of goods/services transacted
> Let $B \geq 0$ be the independent value attributed to the annotation of value as an object of trade.

For the annotation of value to represent the value of goods and services in transactions and not have its own value as an object of trade ignored, then A + B must equal A. But,

> If $A > 0$ and $B > 0$, then $A+B \neq A$
> Therefore for any A, $A+B = A$ if and only if $B = 0$!

That is, the value B of the object annotating/recording the value of some other object or thing A, cannot have or be ascribed any value other than zero in the transaction, otherwise the total transacted value would no longer coincide with the value of the goods and services being represented. [3]

The cubit was a conceptually valid unit of measure and its use was consistent with that notion as it was specified i.e. cubit rods. So too with the different other measures of old of lesser precision and scopes as standards. The question with currency units is that they are not defined conceptually in valid logic let alone specified to render any calculation in terms of them in any way determinate.

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[1] Note, the requirement to express one phenomenon in terms of other relations in a domain precludes circular logic.

This indeterminacy is not just due to the imprecision or lack of specification but due to its conceptual logical inconsistency leading to its conceptual misuse i.e. if money were only defined as a record of measure of the relative value of goods and services transacted and pending reciprocation, with no specification, but ONLY used according to the logic of its conceptual definition (unit of measure) i.e. not also as a tradable commodity, then it would serve as a valid albeit imprecise reference of value over time.

There are different related issues/questions:

1. Conceptual definition: Establishes a dimension that can be commonly assessed without any unit. E.g. distance, mass and relative value (estimated utility or importance).

2. Specification: Given a valid conceptual definition the precision and scope of units are determined, i.e. at one time people measured their horses by "hands", while of lesser precision to metres, hands are still conceptually valid as there does exist a bounded range of sizes of human hands that all can more or less estimate to some or other precision.

3. Use: The use of the unit must be logically consistent at the very least with the conceptual definition in the first instance and to some or other minimum specification in the second instance.

The most fundamental problem with currency units is that there exists no valid conceptual definition of currency units to begin with, rendering any consistent specification and use of units impossible.

Systems

"A set of elements in interaction" [4]. Here we refer to "system" as any set of logical and/or physical entities (elements) whose interactions represent a whole that performs a coherent set of at least one function.

Stability

For Linear Time Invariant (LTI) systems, stability of a system is determined by the bounded nature of its inputs and outputs measured in some or other (valid) units, such that if for any bounded input the system produces a bounded output the system is determined to be BIBO stable. While any system that produces an unbounded output for some bounded input is BIBO unstable. [5]

Passivity

Passivity refers to the special case of BIBO where not only is the output bounded for any bounded input but output is also less than or equal to input. [6]

Some Common Misconceptions:

A: For a linear system, is an output of constant slope stable? No, stability for linear systems is not determined by the type of function nor its sign but by whether or not the function is bounded or not.

B: If the unbounded output of system A is dampened by some external element B, does that render system A bounded? No, system A continues to be unbounded the combination of A plus B represents a new different system say W that cannot be evaluated in terms of A alone. [7]

C: Is the bounded output of a system sufficient to determine its stability? No, stability requires knowing that the inputs are bounded.

The Money System

The "money system" is a logical system made up of relations between entities in terms of mathematical operations over "balances" in currency units ($, €, ¥, ₩, etc.) related to a broad domain of commonly and independently observable "transactions" of goods and services and financial instruments within both the "real economy" (factories, farms, infrastructure, intellectual property i.e. non-financial assets on balance sheets) AND the "financial economy" made up purely of financial assets (securities, mutual funds and other financial instruments in the hands of households, corporations, governments and other direct owners).

Risk

Currently, economic "risk" refers to the probability of "obtaining" sufficient quantities of units over time, according to both determinate and indeterminate criteria related to both the so called "real" and "financial" economies. While both sharing common (arbitrary) financial criteria the "real" and "financial" economies each ultimately respond to different sets of risk criteria. That is, while the real economy is constrained by both real world material/physical constraints and imperatives, the financial economy is not. Yet, all risk in the system is expected to be ultimately resolved in terms of real economy assets (goods and services) even though the real economy typically only represents about a third of all financial assets [8].

Currency Unit Stability

Since money is used as an annotation/record of value and indeed that role being its only rational role [9] [10], we can determine its stability or lack thereof with respect to that role as well as determine the effect of money's misrepresentation as discussed above. Because, in absence of any formal definition and specification of currency units, "money" denominated in such units is commonly conceived as both a record of value AND a "commodity" or object of trade subject to "supply" and that notion is what conceptually underlies ALL math of finance as commonly applied today.

As a consequence, ***each unit of money within any sum is rationalised as a marketable "product"*** like a glass, pencil or eraser. Thus, "cost" for the "use of "money" directly in currency units and/or indirectly in quantities of goods and services evaluated in said currency units, is rationalised to be proportional to the quantity of units used and or required resulting in charges on a percentage bases of the value being measured - either as a one time percentage commission "service charge" over sums of units used in a transaction, or as a product of time based (geometric/exponential) functions over outstanding balances as in the case of mortgage contracts.

While it is trivial to conclude how time based positive exponential functions are unstable and by the principle of superposition, so too any system made up of n such functions [9], the case of n percent based service charges is not so trivial, as for this, certain observations often overlooked must be made. Namely, the effect of applying percent charge costs over balances that are passed on, both over links within value chains as well as over reiterations of value chains [3][12][13]. Thus, since this latter case can be considered more fundamental and not so trivial, we illustrate it here as follows:

Let G be any object of trade, let "a" be the cost of G in currency units and "u" the per unit cost for each unit used to represent the value $V_{i,\ i\ =\ 1,\ \ldots,n}$ of G in any of n transactions of G.

Then,

$$V_1 = a(1 + u)$$

$$V_2 = a(1 + u)^2$$

$$V_n = a(1 + u)^n$$

$$\textbf{And}\ \ V_n > V_{n-1}\ \ \textbf{for}\ u > 0$$

Since increase in value attributed to G requires the arbitrary summation of units independent or exogenous of the measure of value of G, then it can be affirmed that any such exogenous "interference" is the sole cause of instability of value measure in the system because in the absence of such interference i.e. $u \leq 0$, the system is stable by default! And the Stable Currency Unit Theorem holds [3]

The above demonstrates how a system founded on money's misrepresentation will by superposition render the whole system unstable. But more importantly, because of how such an error produces/imposes an "interference" exogenous to the sum of the value of goods and services[2] transacted, we see exactly how to resolve the current otherwise irresolvable systemic instability.

As explained in the "The Beast of Compounding You Might Not Have Noticed" [13], the afore mentioned instability is due to:

"...applying the notion that each unit of the numbers that represent the value attributed to those goods and services are products in and of themselves and thus have a unitary value if not cost, such that their use can be charged:

1. Not based on the measure of value of the service of providing the units, but on the value of the object being transacted measured by those units.

2. And applied over several subsequent transactions."

Thus by simply preventing the first bullet and by conceiving money as a mere record of value not subject to "supply", the entire system can be rendered BIBO Passive stable by virtue of eliminating the unitary cost of each currency unit and instead, accounting solely for the service of annotating money as a finite (bounded) measure of the "value"/"merit" of that service on its own, just as is the case with all other goods and services.

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[2] Note that while G is a constant i.e. all real goods and services summed into a value chain's final product cost are constants (bounded sums) for any given value chain instance, the cost of using money $(1 + u)^n$ represents an ever increasing variable (unbounded) sum over time.

Risk Without Austerity

The instability of the system as described above ultimately renders debt and liability/risk unmanageable over time. This in turn leads to last ditch dire measures in the form of extreme across-the-board contraction of economic activity and diversity in the real economy. Such "austerity", leads to serious real world consequences, that in the light of the revelation of money's misrepresentation are wholly unnecessary and therefore cruel and unusual, constituting a powerful legal imperative to correct said misrepresentation [10] [17] [18].

Moreover, this risk is mostly associated with arbitrary financial criteria without which, the "real" economy would only bear real world material and physical risk criteria, keeping in mind that typically purely financial assets represent two thirds of the total financial risk in the economy [8]. Finally, ***all financial risk is ultimately founded on the misrepresentation of money in that without it, financial mathematics as we know it would be impossible and so too would most of the "financial" economy without any harm to the economy.***

However, in a scenario where as explained previously, money is defined logically as SOLELY the annotation of sums of value in terms of a common (arbitrary) unit attributed to each instance of goods and services, by judicious management of the different permutations of transaction types that we illustrate below, we can illustrate how such severe "austerity" measures are not only not required, but ultimately increase risk over time towards total system failure.

Transaction Type and System Balance dynamics

As explained above in a Passive BIBO stable system, "currency" units arise as mere annotations of the absolute value attributed to goods and services in transactions, where the positive and negative signs applied to account entries, serve only to determine the direction of value (goods and services) transacted between parties.

That is, all parties/agents are initiated in the system with zero balance and only by participating in one or other transaction of goods and services can any balance in the system be altered in either the positive or negative direction as the case may be.

To better understand this, consider the very first transaction in such a system for a population of two agents "U" and "I":

"I" provides a horse to "U" with a mutually agreed upon value of 100 units. Since I provides the horse, I's account goes from zero to +100 and since U receives the horse U's account goes from zero to -100. Units do not precede the transaction but arise out of the transaction. In such a system only U has received value corresponding to the exact same measure of value relinquished by I. Clearly, the total measure of value pending reciprocation i.e. "risk" recorded in the system at this point in time is 100 units or:

Total System Risk (System Balance) = ***the absolute value of the sum of either all positive or all negative balances in the system.***

This "risk" represents "credit" for the estimated value pending future reciprocation of goods and services and NOT for currency units as tradable objects. That system risk, remains until U reciprocates in the future with some or other good or service of equivalent value, at which point all accounts including the System Balance return to zero.

In such a system, there are only four possible permutations of transaction types as follows:

A. Positive buys from negative (reduces system balance)
B. Negative or zero buys from positive or zero (increases system balance)
C. Negative or zero buys from negative (system balance unaffected)
D. Positive buys from positive or zero (system balance unaffected)

To understand how this is the case, we can contemplate the following example of a community whereby positive and negative balances are generated as a function of solely transacting goods and services between agents:

Transaction	Type	Mary		Jim		John		Julie		System Balance (Total Value "Risk" pending reciprocation)
		Entry	Balance	Entry	Balance	Entry	Balance	Entry	Balance	
			0		0		0		0	0
1	B	-30		+30						
			-30		+30		0		0	30
2	D			-10		+10				
			-30		+20		+10		0	30
3	B					+10		-10		
			-30		+20		+20		-10	40
4	C	-10						+10		
			-40		+20		+20		0	40
5	A	+20		-20						
Final Balances			-20		0		+20		0	20

Fig. 1 Transaction Type Dynamic

All agents begin with a zero balance. Transaction 1 of value from Jim to Mary necessarily corresponds to type B (negative or zero buys from positive or zero), as a consequence the "System Balance" (total value pending reciprocation in the System) is the absolute value transacted (30 units). Transaction 2 is type D (Positive buys from positive or zero) from John to Jim while decreasing Jim's positive balance by 10 units it increases John's by that same amount such that the total sum of positive balances remains unchanged and equal to the sum of negative balances in the system (Mary's -30) The third transaction is again type B (negative or zero buys from positive or zero) from John to Julie, adding 10 units to the sums of positive and negative balances in the system, thus increasing the System Balance (total absolute value pending reciprocation) to 40 units. The fourth transaction of value is of type C from Julie to Mary both with negative balances, as a consequence and similarly to Transaction 2 (type D) the absolute value of the sums of either positive or negative balances i.e. the System Balance remains unchanged. Finally, Transaction 5 being of type A (Positive buys from negative) from Mary to Jim reduces the System balance by 20 units.

Notice that of the four types of transactions, only type B increases the net system balance or level of unreciprocated value or measured risk in the system while in all other transaction types, no risk whatsoever is added to the system. [14]

Understanding the above in a system so defined to be Passive (stable) by virtue of money being defined as ONLY a mere record of value in terms of a common arbitrary unit (e.g. $, €, ¥, ₩, etc.), avoids any need to ever paralyse or exclude any agents from the system, because as long as overextended agents are capable of generating and trading new goods and services, ALL can continue to operate with unlimited C, D and A type transactions, not only without ever increasing risk in the system but reducing risk progressively over time with any number of type A transactions as required.

Finally, although transitioning to a Passive money system from current practises will no doubt evolve the nature of agent roles and even system topology, immediate uptake requires no penalisation nor sacrifice to any agent or entity in the system nor any cost or loss. The reason this is certain, is because the change is at the conceptual rather than the mechanical level. That is, once the conceptual change is assumed and requirements for Passivity satisfied, the same principles illustrated above will apply no matter what the initial starting balances are. The topic of transition to and parametrisation of a Passive BIBO system will be fully explored and discussed in a subsequent paper.

Requirements for a Passive Money as a Record/Measure of Value

Definitions

Account: A record of positive and negative entries of currency units and the corresponding Balance resulting from currency unit Transactions of Wealth.

Balance: The net value of currency units in an account at any given point of time. This value can be positive, null or negative.

BIBO stability: A system is said to be BIBO Stable when for any bounded input the output is also bounded. For continuous Linear Time Invariant systems, a system is considered BIBO Stable if the input response signal is absolutely integrable for t = 0 -> ∞.

Bounded: Any function f(t) where there exists some value B > 0 such that $|f(t)| \leq B \; \forall \; t \in \mathbb{R} > 0$.

Community: A set of two or more Members.

Credit: The adding to one's Balance of currency units's resulting from delivering Wealth in a transaction.

Currency (aka money): Unit measure of value attributed to independent instances of goods and services pending reciprocation and denominated in a common arbitrary symbol e.g. $, €, ¥, ₩, etc.

Currency-System: A set of one or more Transactions adhering to particular rules and definitions that determine the behaviour of Balances in Accounts.

Debit: The subtracting of currency units from one's Account Balance resulting from receiving Wealth in a Transaction.

Debt: A commitment vis-à-vis the Community resulting from a negative Balance, to continue delivering Wealth in the Future through Transactions Accounted in currency units until the Balance is no longer negative.

Input: Aggregate value of Currency System Wealth in Transaction measured in Currency.

Linear System: A system is considered linear, if it satisfies the principle of superposition and scaling.

Given a linear operator H {x(t)} with inputs $x_1(t)$ and $x_2(t)$ and corresponding outputs $y_1(t) = H\{x(t_1)\}$ and $y_2(t) = H\{x(t_2)\}$, then for any scalars α and β, $H\{\alpha x_1(t) + \beta x_2(t)\} = \alpha y_1(t) + \beta y_2(t)\}$.

Member: Any uniquely identifiable human or group of humans holding one or more Accounts in currency units.

Output: Aggregate Currency System Debt.

Passive: A system or process where output ≤ input.

Passive BIBO Currency: A Currency system where the absolute value of the sum of outstanding Debits is less than or equal to the sum of input Prices.

Price (Input): The number of currency units recorded in Accounts representing the Value of Wealth in any given Transaction.

System Balance: The sum of unreciprocated value in the system, note this balance is either negative or zero never positive.

Time Invariant: A system in which all parameters governing the system's behaviour remain constant with time, so that the system's response to a given input does not depend on the time it is applied. If the input signal x(t) produces an output y(t) then any time shifted input, $x(t + \partial)$, results in a time-shifted output $y(t + \partial)$.

Transaction: The process by which Wealth is transferred and Accounted for in a finite sum of currency units resulting in a Credit to the provider of the Wealth and a Debit of equal magnitude to the receiver(s) of wealth.

Value: The relative worth, utility or importance attributed to any given instance of goods and services.

Wealth: Any discretely measurable goods and services whose value can be transferred between two or more parties.

Premises [15]

The following list of affirmations that serve to scientifically define and delimit the generic notion of "money"/"currency" or any other means of representation of value requiring the annotation and communication of records of stable measures of the value attributed to unique instances of goods and services.

1. “Money” (currency units) is an output of a system that can be represented by “Sampled Linear Time Invariant (LTI)” processes and therefore the stability of such systems can be affirmed by the BIBO criteria (Bounded Input Bounded Output).

2. Money has the function of measure for which it is required to satisfy not only BIBO criteria but it must also be Passive.

3. Money cannot be both a measure and a scarce commodity, given that these definitions are mutually exclusive. Logically, money cannot be scarce given that it is nothing but the measure of the value of goods and services in transactions.

4. There is no need for money to be a physical object given that it is a logical entity, its only rational function being to measure and record value.

5. According to the “Stable Currency Unit Theorem” and for there to be stability in measure it is sufficient that: A) All units arise out of transactions of goods and services. B) All transactions are Passive BIBO processes. Nothing else matters.

6. Previous “circulation” of money is not a requirement for the realisation of transactions but rather money is a subsequent result or product of transactions. Such that the dependence over previous “supply” and “circulation” is as delirious as the transfer of a score between athletes.

7. The stability of money does not have to do with whether or not debts can or cannot be paid, but rather it has to do with the rules that govern transactions and corresponding balances. For example, the unbounded growth of debt as a function of time. Another example is the increase of value of an obligatory unit as a function of its relative inaccessibility or scarcity, given that a withdrawal from “circulation” of “scarce units" (technically an oxymoron) would result in an unbounded increase of value in the unit as a function of that relative scarcity. For which it becomes clear that the value of money must not be subject to the law of supply and demand because it is not a commodity but rather it is a logical entity.

8. The circulation of the support of an account entry (cash) does not alter the locality and value relation with the corresponding good/service the value of which the account entry is a measure of and if it does alter it, then the original measure must also be altered.

9. The agent that implements a money system, public versus private, is irrelevant to the issue of credibility of the money system mechanism and function, which is entirely dependent on the practical nature of and adherence to logical and mathematical definition.

10. Passive money systems cannot compete with non passive systems for a common resource base. The latter will starve the former.

Normative Requirements:[16]

1. The Currency shall be Abundant (unlimited): A Currency unit is an abstract unit of measure of value with no necessary or particular physical properties and therefore has no physical limit i.e. it is absolutely abundant and units are generated solely by transactions of Wealth.

2. The Currency System shall be Passive Stable:

3. Magnitude of unit Debits at all times is equal to that of unit Credits and the sum of all existing Balances equals zero at all times.

4. The Currency System shall serve Transactions not determine them: A Passive BIBO Currency System is inert as it has no effect on the creation of Wealth, i.e. its use cannot deter or provoke the creation of Wealth, rather it is the creation of wealth and the free spontaneous desire to trade that wealth that generates unit Debits and Credits.

5. Transactions shall be free of coercion by virtue of monopoly of units: No side of any Transaction may derive an advantage over the other by virtue of availability of currency units. No Member can exercise control over access or use of currency units by other Members. Both sides of any Transaction have equal and opposite influence over Price in terms of availability of the currency units. All Transactions in units are fully voluntary and free of any coercion.

6. Units shall represent not determine the value of Wealth in Transactions: Creation and transfer of Wealth does not depend on units but rather use of units depends on the previous existence of Wealth. Therefore, it is the value that determines the quantity of units not the units that determine the value.

7. Units shall be accessible to anyone or any entity: Anyone can open an account with zero balance.

8. Units shall be accessible to any location: Any Passive BIBO transaction that can be recorded is valid.

9. Units shall not be subject to counterfeiting or falsification: Only units resulting from identifiable transactions by authenticated users are recognised.

10. Units may only come into use as the direct result of representing Debits and Credits in Transactions.

11. A Member may open and hold one or more Accounts in units.

12. A Member may close an Account in units provided the balance is null.

13. An Account may exist without an Account holder (i.e. a deceased member's account).

14. All Members' Account Balances as well as the System Balance are public.

15. All Transaction details are private (unless required to be divulged by law).

16. Any consenting Member has the right to freely partake in any Transaction of Wealth denominated in units.

17. A Member is free to deny performing a Transaction with another Member.

18. The Price of a given Transaction can only be determined by Members who are parties to the Transaction.

19. A Transaction may involve any number of Members.

20. Units are equally available to any Member at any time.

21. Units may not be assigned a Price in units.

22. Units may be donated.

23. Wealth is represented in Transactions only as positive unit numbers (i.e. you may not buy wealth by adding a Debt to the seller).

24. No function may be applied to any Balance other than subtraction and addition.

25. No entity may operate within the Currency System other than as determined herein.

26. Currency System administration service rates cannot be charged as a percentage of the Price of transacted goods and services, but rather any charge must be related to the cost of service delivery.

27. Currency unit symbols shall be used exclusively to represent the absolute value of goods and services transacted and pending future reciprocation in future transactions of goods and services.

28. Each transaction shall generate its own independent units to be subsequently resolved against existing balances.

29. Signs shall be used to represent the direction of transacted goods and services, positive account entries applied to the balance of the party providing the goods and services transacted and the negative account entry to the balance of the party receiving the goods and services.

30. At all times the sum of the absolute value of all positive balances in the system shall be equal to that of the absolute value of the sum of all negative balances and shall represent the sum of non reciprocated value (risk) in the system.

31. The absolute value of all unreciprocated value at all times shall be equal or less than the sum of all prices (inputs) conforming to the criteria for Passive BIBO stability of sampled LTI Systems.

32. Value expressed in “Prices” shall be determined by all parties to any transaction.

33. Relative value is determined by the sum of transactions within the collective.

34. Possibility of any unilateral systemic manipulation of value attribution shall be precluded.

Discussion

To Control or to be Controlled

Control only makes sense for dynamic systems, weights and measure are not dynamic systems but constants by definition. Thus control should not be applied to measure systems (i.e. meters or seconds need not be controlled) but on the functions and agents operations subject to measure (e.g. drivers exceeding speed limits). Therefore, no control should be applied on currency as a measure, but rather on the behaviours of agents and functions that determine the value of assets to be recorded.

The prevalent (purely intuitive) assumed notion of “control” as when “austerity” is imposed, is one where “credit” as in “trust” “confidence” or “credibility” is allocated in terms of the ability to recuperate or generate money denominated in units and as currently misrepresented (see above) over and beyond any real world ability to produce value. Said “control” is manifest through exclusive authoritative prerogatives of allocating a said “money supply”.

The problem with this approach, is that given money is not properly specified as required by fundamental requirements of applied mathematics, the real world economy becomes subject to unknown, undeclared or occult financial criteria with no determinate relation to the real world economy.

If there is no clear separation between the real world economy and the financial economy at the conceptual level[3] then circular or self referential effects become unavoidable such that the “remedy” becomes the cause of what is to be remedied, requiring more remedy and so forth until the system collapses. That is, when credit is denied, by applying austerity that in turn weakens the ability to operate in the real economy, the subject becomes progressively less credit worthy. Such a scenario creates a nightmare for those “controlling" credit and goes a long way to explaining why the financial sector itself, has fallen prey to its very own paradigm, requiring it to be bailed out of the very system it itself is charged to oversee for those it ostensibly serves.

The indeterminate relation between real world and financial risk, with the unseen or untracked systemic compounding of financial costs predicated on money’s logical misrepresentation and rendering the system exponentially unstable, is central to the challenges faced by the world today. Current political economy responses to these challenges differentiate themselves across a spectrum of an intuitive and scientifically flawed notion of “control”, based on constraining behaviour of the agents using the system without any consideration of the systemic effects of the system itself that are independent of user behaviour.

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[3] Note: while Glass-Steagall attempts to make such a distinction such is conceived on top of and in terms of money’s misrepresentation and therefore cannot stabilise the system as it intends to.

It is like trying to prevent an expanding balloon from bursting by applying counter pressure on all points of its surface area without any awareness of how to limit the air input (systemic risk) in the first place. The problem with this approach, is that without regulating the systemic risk, regulation of each point on the surface must always equal or exceed in force commensurately to the force of expansion, rendering the whole exercise unfeasible.

Given the ubiquitous nature of money's misrepresentation due to it being universally assumed by all active agents, the sources of systemic risk become equally ubiquitous. Moreover, the more each entity no matter how big or small struggles to counter mounting risk under money's misrepresentation, the more risk is added to the system. This leads to a hyper competitive non cooperative environment of unenlightened peer interaction wholly predicated on the fear and distrust seeded by money's logical misrepresentation as opposed to real world conditions, requirements and any measured value potential.

Enlightened Peer Interaction

In systems where money is no longer misrepresented, i.e. where 'currency' cannot effectively be used as a surrogate to the value it represents, but rather is limited to recording the value of transacted goods and services pending future reciprocation and as outlined in the requirements above, there exists no possible means for systemic compounding of risk (see Currency Unit Stability above). Thus constituting a "by default" Passive BIBO System.

By virtue of this, no control over money as an object is required to preserve its role as a valid stable record of value provided [12]:

- All money on account is the product of transactions of discrete measures of goods/services.
- All transactions are passive in nature.

The above in no way affects the incentive on the part of most, if not all agents, to continue to limit real world risk in their interactions with each other. Such can be achieved by all peers having access to both the knowledge of each others balances in conjunction with the aggregate system balance at any point it time (see requirement 14 above). Thus and in combination with particular knowledge of the nature and quality of habitual social, business, and trade relations, peers can organise themselves to self regulate risk, by being able to identify and avoid if required, Type B transactions.

Essentially, when currency function is purely that of providing stable and reliable information that all have access to vis a vis how agents attribute "value" to goods and services, users will have an incentive to use that information to curtail risk rather than multiply it as is the case with the current paradigm where currency is a commercially negotiable exclusionary commodity.

Note, that to the degree users of such a Passive currency are exposed to non passive systems (in terms of access to resources), such sound peer control becomes increasingly undermined.

Conclusion

Currency units and "money" denominated in said units are not defined nor specified as required in order for mathematical expressions denominated in said units to be determinate when applied to the real economy or any common reality for that matter. In common practices, two mutually exclusive concepts are conflated to form an informal unreasoned de facto notion of "money" denominated in currency units namely money as a record of value AND money as an object of trade (commodity) with independent value on par with any goods and services, constituting a logical misrepresentation. This misrepresentation assumed as a foundational axiom, renders the financial system inherently unstable by creating the pretext for the application of a unit cost factor $(1 + u)^n$ without which, the system is Passive BIBO Stable by default. Total

financial risk encompasses both risk inherent in real world economic activity as well as that corresponding to arbitrary financial imperatives of the so called “financial” economy said to represent two thirds of that total [8]. Yet it is the assets of the real economy that are expected to resolve all financial risk. The notion that judicial control of currency unit “supply” and “distribution” may serve as a valid means of financial “control” is shown to be untenable and to lead to dire “austerity” measures and subsequent extreme social and economic exclusion as a systemic effect (i.e. not caused by user behaviour). By defining money conceptually as a mere record of the value attributed to transacted goods and services and strictly adhering to the requirements of “Passivity”, the system is rendered inherently stable by default. In such “Passive” money systems aggregate economic “risk” is represented by the absolute value of either positive or negative balances in the system, such that when real world circumstances and conditions require, said risk (system balance) can be mitigated without any need for “austerity” but by virtue of the judicial management of four fundamental transaction types A,B, C, D, where only type B increases risk, type A reduces risk and types C and D, while permitting continued and unlimited participation have no affect on the aggregate risk. Finally, transitioning to a Passive money system from current practices, without prejudice to clear legal imperatives to do so, requires no penalisation nor sacrifice to any agent or entity in the system.

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Annex IV

THE POWER OF TRANSACTION TYPE "A" WHEN MONEY IS DEFINED AS ONLY A PASSIVE RECORD OF VALUE AND NOT ALSO A TOKEN OF TRADE

Marc GAUVIN, Sergio DOMINGUEZ, PhD Eng. www.moneytransparency.com: 7th Annual Monetary and Economic Scientific Conference "The New Normality After the Pandemic - An Economic Perspective". MRC UNWE Sofia Bulgaria Sept. 12th 2021 (revised Sept 8 2023)

Abstract

This paper explores the power of conceptually correcting "money's (current) logical misrepresentation" fully explored in the "A Systems Engineering Approach to Formal Monetary and Financial Stability Without the Vagaries of "Austerity" " and how that can be achieved without loss or penalty to any agent. We illustrate how according to control and dynamical system's theory, the instability of the money system due to its commonly assumed logical misrepresentation and as the most ubiquitous and interconnecting component of the greater economic system, renders the economy also unmanageably unstable. We explain how by money's perceived role as a sine-qua-non resource (object of trade) and tool of economic leverage over its more essential role as a valid stable record/measure of value, instability is further exacerbated by inducing users to accumulate positive balances to fend off the ill effects of the overall economic instability, perturbing all system components including individuals to produce what otherwise would be considered "unconscionable" behaviour. We then explain how by merely formally defining money as only a Passive measure/record of value, we can stabilise its function as a record/measure of value eliminating its destabilising effect to the economy while still being useful to inform economic governance. We show how the incentive for accumulation of money as a tool for economic leverage as well as any systemic bias towards type D transactions (positive buys from positive) over type A transactions (positive buys from negative) are eliminated and how economic activity and its governance, can be undertaken in terms of the the physical properties and virtues of goods and services, free of the ill effects due to monetary instability by our common logical misrepresentation of money.

Introduction:

The core problem we wish to explore are the systemic effects in the "real" vs "financial" economy by confounding systemic "financial" imperatives arising out of the commonly assumed logical misrepresentation of money fully explored in "A Systems Engineering Approach to Formal Monetary and Financial Stability Without the Vagaries of "Austerity" "[1]. As well as how, when that logical misrepresentation is assumed axiomatically, the money system becomes unstable by virtue of the compounding of financial "costs" exacerbated by it being perceived as a vital (pseudo) "resource" essential as a precursor to economic activity. The question to address, is what happens if money is defined only as a record of value and not also a sine-qua-non (vital) "resource" subject to "supply" and transfer at a per unit financial "cost"?

Many may ask "how is it possible, to make such a dramatic change without penalty or loss to anyone?" The answer is in understanding the transaction dynamics in a system defined to be Passive described in the paper "A Systems Engineering Approach to Formal Monetary and Financial Stability Without the Vagaries of "Austerity" [1]. In particular, how type A transactions the only transaction type that reduces the total amount of value pending reciprocation (System Balance), while at the same time removing all (current) incentives to maintain such balances as a means to leverage economic gain as well as guarantying stability of value representation over time.

Preliminary considerations for money as a Passive record of value :

1. A Passive system[4] is by definition a stable system [5].
2. There is no requirement to reset the system e.g. set all accounts to zero or adjust existing account balances in order to render a system Passive.
3. Passivity precludes systemic bias or any systemic effect.
4. A Passive money system has no effect on the magnitude of value attributed to transacted goods and services, therefore itself presents no risk to value reciprocation.
5. While accuracy requires stability, stability does not depend on accuracy. A stable system's precision is measurable while an unstable systems is not.
6. Transactions [1]:
    a. Money is an annotation of value expressed in common units and only comes about as a result of transactions of goods and services not a precursor of activity.
    b. There is no circulation of units.
    c. There is no supply and demand of units (therefore, money cannot be "charged" for in terms of the size of balances, so that ANY compounding of value in terms of money is entirely precluded).
    d. Each transaction generates its own independent units that are later resolved against existing balances.
    e. The sum of money in the system at any given point of time, represents all non reciprocated value and at all times is equal or less than the input prices, thus conforming to Passive BIBO criteria for sampled LTI Systems.
    f. Value expressed in "Prices" are never unilaterally determined.
    g. Individual perception of the unit value is determined by interacting with the collective and a common perception of fair costs.
    h. Relative value is determined by the sum of transactions within the collective.
    i. There is no possibility of unilateral manipulation of the value of the unit.
7. There are only four possible permutations of transaction types as follows [1]:
    A. Positive buys from negative (reduces system balance)
    B. Negative or zero buys from positive or zero (increases system balance)
    C. Negative or zero buys from negative (system balance unaffected)
    D. Positive buys from positive or zero (system balance unaffected)

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[4] A system that never adds (energy) to its environment i.e. output ≤ input.

[5] A system is said to be BIBO stable if and only if for any bounded input the output is bounded as well.

8. Of all financial assets, about 2/3 are “financial” vs. 1/3 true assets (“accumulated tangible and non tangible assets” i.e. real goods and services is [3]

Money’s Purpose:

Money as a record (measure) of the generic value attributed to goods and services pending future reciprocation in the form of other goods and services of equivalent value, is only a requirement for trading divisions of otherwise indivisible (non fungible) goods and services e.g. an academic course, a house, a public work, ...etc..

Example: The value of a (non fungible) house cannot be represented proportionally in terms of any of its dimensional units (area, volume, mass, etc.), yet the total value attributed to the house is of course divisible. Thus, only by way of a common unit of “value” measure, can divisions of the house be represented in trade.

Under no circumstances does the unit of measure of value itself require being treated as an object of trade on par with goods and services. As previously shown [1] the concepts of measure and object of trade are mutually exclusive. Thus, it follows that when money is formally defined and specified as a measure of value, the only possible incentive for using it, is as a “record keeping device”[2] for recording value.

Once money is conceptually defined as a record of value in terms of an arbitrary unit, then the process of creating money (records of value), can only be the result of transactions of goods and services never the other way round, precluding its use as a tool of economic leverage and therefore eliminating incentives to accumulate positive balances.

Economic Control:

Control requires sufficiently accurate measures of all system inputs and outputs and all system imperatives must be expressed in terms of the such measures.

In this regard, today’s working finance paradigm uses currency units that are not formally defined and therefore cannot accurately represent parameters of the real economy [1]. Furthermore, common every day practices in which money is conceived as both a measure of value and an article of trade of variable value, establish the circular relation where the unit of measure of value is attributed “value” in terms of itself [1].

This leads to the introduction of compounding factors corresponding to financial “fees” in the calculus of overall “cost” across value chains [4] by applying per unit charges for the use of money and that introduces an “interference” exogenous to the function of recording value, thus destabilising what otherwise would be Passive by default.

Approximately two thirds of all financial assets are said to be “(purely) financial” vs only one third corresponding to “the real economy” [3]. Ultimately all three thirds of financial “value” at risk is expected to be resolved by the assets (goods and services) of the “real economy”, yet two thirds of that claim is of the “financial economy” that produces no real assets. Consequently, the real economy is burdened with risk beyond both the natural risk of real production to include 100% of all financial risk, for which it must either increase output commensurately or fail.

Dynamical Systems Theory:

A money system where the unit is conceived as a generic resource required to enable and maintain all economic activity by its “supply” and “circulation”, becomes an component of the economic system acting both on individual components as well as interconnecting all components by virtue of demand for money's “supply” and “circulation” as the predominant precursor of all economic activity.

The continuously compounding divergence between the value attributed to otherwise finitely measurable goods and services at the time of their transaction, from the final total cost once financial services are imputed, beyond any discretely measurable added value [4], is what necessarily leads to overall instability of the economy as a whole.

Fundamental control theory recognises how instability of a system component renders the whole system unstable as well as the difficulty of stabilising even relatively simple systems [5]. Such that in the case of our current "money" paradigm, producing simultaneous compounding factors across the links of countless value chains and their reiterations over time, any prospect of stabilising the system is made impractical. A primary effect of this instability is to create and exacerbate demand for money above and beyond any "supply", creating an incentive to users to accumulate positive balances for the purpose of providing leverage over the measure of value of goods and services beyond their non monetary properties and virtues, but predominately in terms of the demand for money, made insatiable by systemic compounding.

Thus and as long as the logical misrepresentation of money continues to be perceived as a valid and immutable fact of life, which it clearly is not, then by extension, imperatives that emanate from that misrepresentation will also be assumed as natural and unavoidable conditions. As a result, individuals also components of the economic system, suffering the most dire effects of those imperatives, will be given to rationalise otherwise unconscionable actions and behaviours as necessary for their economic survival and by direct extension their physical and material survival and/or general quality of life. If the money system as a component of the economy is unstable, then it stands to reason that if not resisted, the behaviour of users will become perturbed and eventually unstable too, with all the corresponding negative and indeed abhorrent social effects that brings and that we are indeed currently witnessing across the whole economic spectrum, in the form of escalating human corruption at all levels.

System Balance (SB) and Type A transactions:

Merely defining money rationally as a valid unit of measure without any need of redistribution of wealth or modifying current balances, the system can be rendered Passive without loss or penalty to anyone vis a vis their current balances. As money so conceived can only serve to inform economic activity without it itself producing any direct imperatives, as a result of system Passivity, any current disequilibrium in balances can be levelled out over time, through any minimum number of type A Transactions.

As described previously [1], in a Passive system the total sum of value pending reciprocation in goods and services is represented by the absolute value of the sum of either all positive or all negative balances in the system, called the System Balance (SB). Individual agent balances can only be modified by transactions of goods and services through either of four transaction types A, B, C, D, and where all transactions generate their own units, precluding any notion of supply, lending or money serving as a tool to influence prices. Economic governance therefore cannot be effected by arbitrarily altering balances to punish or reward economic activity. Consequently, economic governance must be effected in terms of the corresponding (non monetary) criteria and parameters.

Nonetheless, how SB is distributed throughout the positive and negative graph domains, can provide valuable information. That is, while we can speak of the SB in terms of its total magnitude in either the positive or negative increasing and decreasing as a measure of the total amount of value pending reciprocation in the system, we can also consider the distribution of that total balance throughout individual balances in each of the positive and negative domains. Thus, excessive accumulations of balances of different particular agents or sectors in the positive or negative domains, can serve to alert economic governance in the interest of all agents. Again, not in terms of manipulating monetary balances but in terms of non monetary economic criteria and parameters. For example, servicing a sector that has become obsolete and therefore unproductive, may require redirecting certain resources over others to that sector.

In this regard and since accumulation of individual positive balances do not represent any strategic advantage as leverage as money can only be generated after transactions of goods and wealth with each transaction producing its own independent units, positive balances represent the loss of value pending future reciprocation and a potential risk of future non-reciprocation. Since positive balance holders in general have no incentive to accumulate that risk, there exists no bias towards type D transactions (positive buys from positive no) over type A transactions (positive buys from negative) the only transaction type capable of reducing SB. Furthermore, since money is no longer the object of transactions as it is no longer subject to any "supply", transactions become focused on the real properties and virtues of goods and services. Thus, the monetary system ceases to be a systemic source of economic instability and ceases to provide incentives of excessive accumulation of positive and/or negative balances. Meanwhile, leaving economic governance free of monetary restraints, to resolve any excess accumulations through type A transactions, should they present a problem on the basis of real economic needs and criteria.

Conclusion:

Common every day practices in which money is conceived as both a measure of value and an article of trade of variable value, establish the circular relation where the standard unit of measure of value is also treated like an object of trade subject to "supply" and "circulation" and valued in terms of itself as if it were just another resource. As a standard measure of value it is required for all economic activity to enable the transaction of divisions of otherwise non divisible (non fungible) goods and services. But, as a commodity like resource, it must be supplied prior to any economic activity taking place. As such, it acts as a universal economic enabler and charged for at a per unit cost as if it were another industrial product. Said charges compound across value chain links and reiterations, geometrically inflating overall production costs, independently of any discretely measurable corresponding added value. This leads to a system wide instability, with the principle effect of exacerbating the demand for money beyond any supply, converting it into the most ubiquitous component of economic activity. By virtue of its universal demand, the money system interconnects all economic components into a single system of interdependency on the basis of its supply, over and beyond any non-monetary value of the corresponding goods and services. Because of this unique role as a *sine-qua-non* universal precursor, agents compete and/or conspire to accumulate positive balances to be exploited as economic leverage in transactions of goods and services, again independently of any non-monetary properties and virtues of these. This tendency to accumulate further exacerbates the system instability. According to fundamental control theory any unstable component of a system destabilises the behaviour of the whole system and ultimately all components are rendered unstable. Therefore it follows that individuals as components of the economy, will have their behaviour perturbed and destabilised leading to increasing otherwise unconscionable (corrupt) behaviour at all levels.

When money is formally defined as solely a record of value and used accordingly, the money system is made Passive and therefore stable, only useful as a (stable) reference of value, required for representing divisions of value of otherwise indivisible goods and services. By virtue of money acting as a stable record/measure of economic activity, it cannot precede transactions and therefore cannot serve as leverage over economic activity. Thus, money only serves to inform control of economic activity without in any way imposing limiting imperatives exogenous to real world activity.

Moreover, of the four transaction type permutations, type A transactions (positive buys from negative) serve to defuse risk in the system by reducing the total value at risk of non reciprocation and since there is no incentive to accumulate balances, there exists no bias towards type D transactions (positive buys from positive). Finally, as a Passive stable system the money system no longer can systemically destabilise (corrupt) the behaviour of its

components, including individual agents i.e. you and I.

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Annex V

MSTA Legal Curriculum:

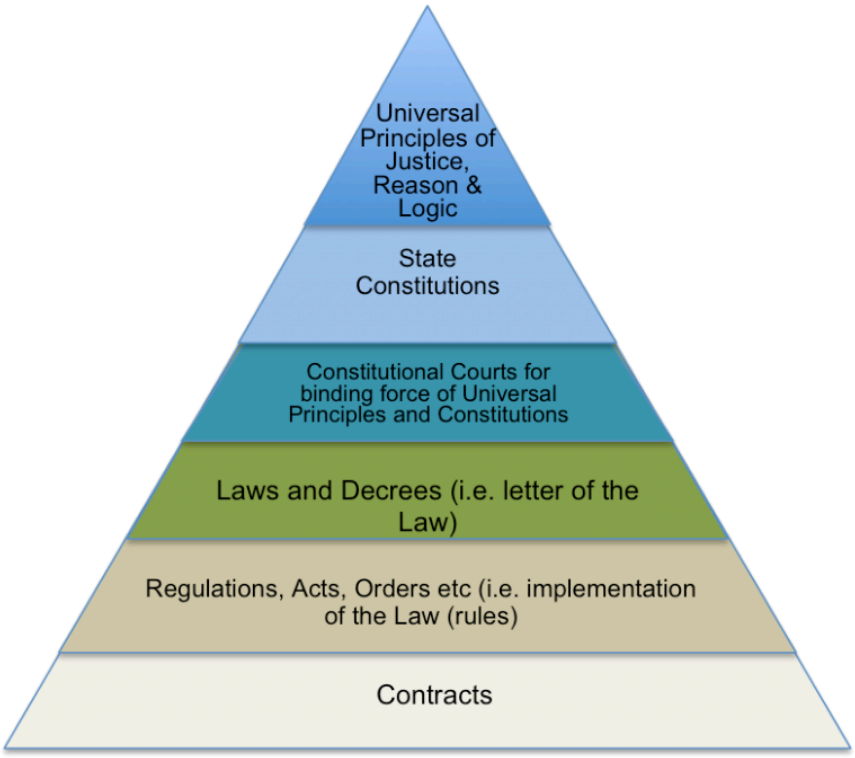

Fig. 1. Hierarchy of Legal Principles

The above Fig.1 illustrates how Universal Principles of Justice, Logic and Reason, expressed in State Constitutions are made binding by Constitutional Courts, overseeing that both the constitutions as well as the letter of the Law and subsequent Rules, Regulations, Orders, Acts and contracts are integrally consistent. This means, that the Rule of Law cannot tolerate, ambiguities and/or any other logical inconsistencies or misrepresentations in contracts.

Thus, the Law governing contracts is before all else subject to Principles of Justice that can only be determined through a consistent application of logic and reason. Such that any contract that can be shown to be logically inconsistent, ambiguous or ill defined, cannot be considered valid.

It follows then, that when on the basis of the language used the validity of a contract ceases, injustice and discontent inevitably ensues and fundamental principles/doctrines are susceptible to being contravened. Below are some key examples of principles that are jeopardised by vagueness or ambiguities:

1. *impossibility;*

2. *impracticability;*
3. *misrepresentation and non-est-factum;*
4. *duress and undue influence;*
5. *non contradiction;*
6. *symmetry of information and full disclosure;*
7. *contra-proferentem "interpretation against the draftsman" i.e. no party may benefit from ambiguity in the terms and language of contracts particularly those who draft them;*
8. *proportionality or just measure; impartiality, good faith.*

Thus, It can be affirmed, that any untrue claims explicit or implied, by commission or omission, that induce a party to enter into a contract, renders that contract invalid and hence null and void. So, when money as an object of a contract is misrepresented, that contract must be considered invalid.

While common practices whose invalidity is unknown may be deemed valid by error or ignorance, once the validity of such practices is challenged, then to ignore or in any way censure or obfuscate the facts, logic and reason supporting such challenges, becomes an act of manifest ill will or bad faith. Such obfuscation, on its own is sufficient grounds for invalidating all contracts that include the questioned practices and to which the censurer is party to. Also and according to the following universal principle of validity:

Quae ab initio non valent, ex post facto convalescere non possunt

(that which initially is invalid, cannot be made valid in subsequent acts),

it is evident that inherent validity must override all other considerations such that no circumstance such as common or habitual practices can "make valid" that which is invalid.

Breaches of this nature provide the conditions for the systematic erosion of the legitimate exercise of fundamental rights and freedoms as the misrepresentation of money, provides for the illegitimate transfer of goods and services in a broad systematic fashion.

Law, both natural and human when adopted by a State is known as the Rule of Law and requires being administered in a way that is wholly consistent.

A State without the Rule of Law is where the powerful proclaim themselves free of any legal limits/ principles, without being required to recognise the rights and liberty of others and that jeopardises one or more of the following principles where the Rule of Law is observed:

1. Fundamental rights and freedoms of individuals;
2. Normative, systematic and logical application of the law;

3. The letter of the Law is logical and founded on sufficient knowledge and facts so that all implications and inferences, legal concepts and propositions are wholly coherent and non contradictory;
4. The principle of proportionality or just measure is systematically applied;
5. The principle of lawfulness and sound administration is advanced;
6. The State is held accountable for its acts;
7. The independence of the Judiciary is kept;
8. The people enjoy security and trust.

Such that when said principles are in jeopardy, any of the following may ensue:

1. Arbitrary, cruel and "inhumane" treatment;
2. The subjective and unaccountable imposition of the will of the strong;
3. Uneven application of rules;
4. Untimely and biased delivery of Justice without fair representation;
5. Omission of rules;
6. Contradictory rules;

This often results in unbearable circumstances undermining the recognised universal principles of: equality, freedom, and human dignity, among others.

Only the exercise of the right of individual and collective resistance – *ultima ratio* or last argument or the last resort – can remedy unjust, vile or arbitrary rules.

With respect to the question of the definition of money. The definition of money in terms of two mutually exclusive assertions i.e. money as a unit of measure of value as well as a tradable commodity leads to a logical contradiction undermining both assertions. When a State under condoned practices assumes such logical incoherence as valid and, explicitly or implicitly, makes the realisation of either a requirement e.g. measure of value is compulsory, it is requiring or forcing an inconsistent application of its rules as the function of measure cannot be made subject to the limits and constraints applied to commodities. Thus and as of the key object of current money contracts, the inconsistency of the definition of money assumed in practice, violates logical and systematic legal interpretation by directly contravening or inducing to contravene, the higher principles mentioned above.