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# QUANTIZING MONEY

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Summary: The marginal minimization of the reserve requirement on demand deposits is the single cyclical cause behind the long-term crises of the monetary production economies and progressively decreases the time value of money on economic productivity. The total economic cost of this monetary and banking system (fiat credit a priori via private commercial banks; fiat money a posteriori via public monetary police) is the loss of dynamic efficiency in the space-time production structure, i.e. the quantitative increase of entropic volatility in the monetary production economy equals the quantitative increase of the fiat credit quantum (mechanically and thermodynamically). A radical maximization of the reserve requirement on demand deposits is the basic economic remedy for the temporal monetary stabilization of the space-time production structure, according to the natural/physical laws of human economic productivity.

Key words: temporal value of money; space-time production structure; reserve requirement on demand deposits; radical maximization; total economic cost of marginal reserve minimization

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The monetary universe and its physical effects on economic productivity are a perfect accounting system and the systemic laws of monetary behavior are similar to physical events. Money behaves in the same way, somewhat quantum mechanically and thermodynamically by invariant effects, to similar complex sequences of economic events. The probabilistic and deterministic nature of money causes seemingly random effects as the successive values of all numerical and periodic functions are normally distributed; quantum monetary logic is the research into the relationships and quantities of monetary production economies invariant in time and space, that is natural-law monetary science or physics of monetary production systems. Monetary analysis is a powerful investment tool and quantitative monetary change leads to fluctuations in economic productivity and market prices; any pragmatic and cyclical market analysis points to movements of the monetary quantity and interest development, i.e. the amount of the reserve requirement on demand deposits is the single most decisive economic cause of productive and price behavior and the central bank command policy on reserves directs the commercial behavior of private banks, e.g. liquidity directly effects economic production via monetary time value. Every economic activity is governed by the temporal momentum and every investment is a temporal decision; saving and investment are economically limited by the natural laws of spatio-temporal entropy and progressive interest is poison for the markets. The exact collected knowledge of about 4000years documents that a run into precious commodities (e.g. diamonds, jewelry, art objects) always signals apocalyptic behavior and that a raising gold price works as a monetary value detractor; the price movements of gold do indeed reflect the political and economic problems of a country, i.e. it is a measure of social

instability and the game does not always stop before a fire in the casino breaks out; very few people will gain a chair when the music stops, says a Keynesian metaphor. Capital growth, the most important sole factor in a market economy, works only by the economic productivity of entrepreneurship/innovation and not by financial alchemy; in addition, the markets have no memory and an investment is no instant purchase of the future, e.g. a time series under 50 years is by all mathematical laws too short for a probability accounting and a stock market generation changes every decade. The inflationary temporary momentum always appears with progressive interest and both decelerate the replicative matrix of the markets; consequently, monetary behavior quantizes and dualizes the economic productivity of land, labor and capital via spatio-temporal entropy. The quantum leap from the professional religion of money to a natural-law monetary science is an iconoclastic research process, but we urgently need Occam's razor to quantize money and to work out the physical nature of monetary production economies which are a market-based social event. In any case, the natural laws of the monetary quantum on economic production are immutable physical relationships whatever technical form of money (technologically: from stones to electronic digits) evolves on the markets for human exchange and credit. The monetary evolution of the economic quantum system, of which our productive behavior is its time-dependent wave function, will surely correct monetary quanta that are not backed via a physical increase in voluntary saving, i.e. fiat credit cannot artificially reduce the natural length of the production time (for the consumption of valuable goods) as pricing relates physically to production time, e.g. money quantizes economic production time. Cost and value (utility) are quantum relationships and non-productive biases of the monetary wave function are an existential threat to the body economic and politic. Yes, money can be created at the expense of economic productivity; the multiple creation and expansion of bank money=credit=debt checks and depresses long-term economic growth by short-term prosperity. Only a 1:1

exchange of monetary quanta via full/maximal reserves can stabilize the economic production system and make deposits safe and liquid (payable on demand); under fractional or minimal reserves, it is not possible to police the artificial expansion of money and only the owners of private commercial banks are earning economic profits, i.e. the quantum wave function of checking accounts for customers is converted into a privatized income pool, e.g. this monetary wave mechanics and thermodynamics is an ongoing systemic economic error that depresses economic production ( empirical ratio:1% ‘earns’ and owns over 50% of human economic productivity, with progressive tendency). This economic paradox can only be resolved by analyzing the effect of the monetary quantum on human production systems in a market economy. The destructive Doppler-effect on economic liberty via collectivism and/or centralism (of property, credit and interest) is the main cause of radical social conflict, war and revolution in quantitative human history. The monetary quantum is the genetic code and cultural memory of a market economy and directs entrepreneurial activity, capital growth and human knowledge; ‘reality’ and its construction principles or physical regularities are of dual nature and inter-active origin .Even the most exact measurement is only a single event or point on a relative and reversible temporal chain, but ‘time’ is the difference between cause and effect (at zero-level energy, no time exists in space). The quantum monetary systems approach understands that all living organisms are temporal ‘clocks’ and that spatio-temporal entropy (energetic force of systemic disorder) drives the diversity, selection procedures and adaptive behavior of monetary evolution in human economic activity, i.e. we are facing a humanistic existential tech-know-logical challenge and scientific problem-generation that can only be solved by clear methodical thought, a liberal spirit and hard ethical work. Consequently, a new monetary species is in the making, but its future behavior will also be limited by the same physical properties of economic production; the evolutionary economics of money is a quantum paradox and it

cannot be grasped with the measurement methods of noncontroversial Aristotelian logic. Quantum monetary science, the approach to creatively combine economic, mathematical and physical knowledge (of socio-economics, measurement methods and biophysics) can eminently reduce systemic risk and professional managers and economists can further prove their technical artistry on market and/or specific risk. The economic and policy management of the monetary quantum surely involves hidden fractal dimensions and the Coasean paradigm clearly points to the total costs of the market (externalities) and the polity (institutions); what about the social costs of money and the monetary system? Traditional statistics/stochastics fails, if the fractal dimension reaches above  $> 1.5-1.6$  (e.g. 1995-2000/Dow Jones; 1998/Ruble crises) and also the extended tools (e.g. arch/garch; Hurst exponent; mf-dfa; wtmm) cannot catch up with the systemic entropic volatility of the monetary and market production economy (and: production is already scientific and tech-know-logical). It is this economic paradox of the monetary quantum that causes the effect of dynamic fluctuations on productive efficiency without being itself a production factor ('money drives production, but actually produces nothing; it is the non-productive cause of productive effects'). We would really prefer to look into P.Erdős' 'divine book of proofs' to find the instant earthly solution, but between eternal paradise and mortal men lies the economic time value and physical relationship of money and production (and: wo-men create money in their own image; has anybody counted the professional gender ratio in high finance?). An old Soviet joke tells that Breshnev sees good dressed civilians marching at the front of the annual military parade and he immediately asks the intelligence service for the explanation; the official elaborates: Leonid, these are monetary economists and bankers; they can easily destroy the economy of any country without using the physical force of military. In any case, the monetary detection of market and production signal processing lies at the heart of the quantum scientific method and every form of financial risk management will be facilitated

under a banking system of full/maximal reserves or 100%money/credit. Furthermore, the new information electronics technology can propel forward the dynamic allocating knowledge forces of the markets against the static inertia of monopoly, privilege and protection in the global economic polity. The minimal reserve fiat credit system accelerates the destructive entropic effect of the time value of money on economic production; this mono-causality is driven by systemic non-locality:

A= the monetary process is discrete (emission in quantum waves) and dual (saving/payment vs. investment/bookkeeping);

B= the quantitative decrease in economic productivity (real depression of growth) results from a quantitative increase in fiat credit (artificial monetary prosperity);

C= the quantity of debt increases systemic economic entropy, quantum mechanically (by every single payment via debt) and thermodynamically (by total debt expansion=inflation);

D= the quantity of inflation can mathematically never equalize the debt quanta;

E= the centralized monetary injection of inflationary quanta increases the temporal illiquidity of insolvent quanta:

F= the acceleration of the debt quanta increases the quantity of exponential debt ultimately;

G= an exponential debt chain quantum ends automatically (final temporal monetary devaluation);

H= asset devaluation (and in progressive cases, asset destruction=war/revolution/radical social conflict) and high interest (contrapuntal deflationary forces) decrease the inflationary quantum;

I= the productivity/debt quantum cannot be equalized by an infallible debtor and/or fallible creditor in a fiat credit system=minimal reserve banking, according to mathematical, physical and economic standards of logic;

J= the monetary quantum can only work in its natural/physical function as a market/productivity replicator under a full reserve banking system that separates money from credit (1:1 banking).

Conclusio: The nature of the reserve requirement is the single monetophysical mechanism of future economic productivity, determines the probabilistic time value of money and quantizes economic production via spatio-temporal entropy; today market globally, via quantum mechanical and thermodynamic monetary time value processes of human economic production.

The structural properties are:

1= debt= payment without previous productivity or voluntary saving;

2= credit= loan of monetary quanta;

3= interest= plus-payment in % on credit quanta;

4= money= econophysical measure of productivity via time value as market replicator;

5= inflation= artificial expansion of the monetary quanta via fiat credit.

The model relation is:

Productivity/debt x time/inflation= value of money

-temporality is decisive, measurement via purchasing power parity/ppp, e.g. by simple food basket and/or basic human service (who eats gold or drinks oil?)-



The serial de-finite set of monetary relations under fiat credit/minimal reserves reads:

100%debt...credit...interest...inflation...0%money

-debt as continuous temporal phenomenon for=monetary value destruction-

The monetary process under dynamic efficiency reads:

100%money...credit...interest...debt...0%inflation

-debt as discrete inter-temporal phenomenon for=economic value production-

This simple heuristic logic clarifies the serial effect of monetary 'creation'; the debt-free emission of the monetary quantum is the causal necessity for a healthy market production economy and implies negentropic temporality; however, quantitative economic history shows that there exists a kind of 'natural' fluctuation of the time value of money(1-2%). The physical reason of this economic phenomenon is still a scientific guess, but methodical intuition points to a reasonable function of economic growth via 'natural' instability or adaptive physical development of the body economic.

Conclusio: Continuous and progressive debt via minimal reserves destroys the discrete duality and accountability of the physical time value of money on economic production=productivity is shortened and finally stopped.

Future monetary evolutions will reveal, and contemporary financial evidence documents, that the minimization of the reserve requirement is the single cause for the depressive effects on economic productivity. Mathematical relationships, e.g. traditional financial statistics/stochastics, are not identical with natural laws of economic production, but cognitive and linguistic inventions of the human

mind to abstract, reduce and condense information from real world complexity, i.e. we are always in want of better methodical mathematic language to condense complex bodies of economic reality. Physical relationships of the monetary production economy are supposed to explain the empirical facts of the nature of economic behavior by methodical evidence; therefore, it is decisive to understand human economic activity and especially monetary behavior as extremely correlated atomic modes on a single holistic continuum of physical production as space-time structure. The quantum relationships between economic (esp. monetary) behavior and physical production are may be difficult to extract from complex socio-economic event chains, but can be identified by elaborated economic method (words are clouds, method is rain).The a priori emission of private commercial fiat credit (x interest) under minimized reserve banking and the a posteriori emission of public fiat money is the driving destructive force of the modern market economy; risk management and monetary reform have to concentrate on this social mechanism of modern evil that performs an ongoing quantum destruction and devaluation of the physical time value of money on economic productivity, i.e. only **a radical maximization of the reserve requirements can stabilize the space-time structure of the monetary production economy and market growth.**

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