

# FRACTIONAL RESERVE BANKING AS ECONOMIC PARASITISM

## A SCIENTIFIC, MATHEMATICAL, & HISTORICAL EXPOSÉ, CRITIQUE, AND MANIFESTO

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### Abstract

This paper looks at the history of money and its modern form from a scientific and mathematical point of view. The approach here is to emphasize simplicity. A straightforward model and algebraic formula for a large economy analogous to the ideal gas law of thermodynamics is proposed. It may be something like a new  $F = ma$  rule of the emerging econophysics field. Some implications of the equation are outlined, derived, and proved. The phenomena of counterfeiting, inflation and deflation are analyzed for interrelations. Analogies of the economy to an ecosystem or energy system are advanced. The fundamental legitimacy of “expansion of the money supply” in particular is re-examined and challenged. From the hypotheses a major (admittedly radical) conclusion is that the modern international “fractional reserve banking system” is actually equivalent to *legalized economic parasitism by private bankers*. This is the case because, contrary to conventional wisdom, the proceeds of inflation are not actually spendable by the state. Also possible are forms of “economic warfare” based on the principles. Alternative systems are proposed to remediate this catastrophic flaw.

### 1 introduction

“An invasion of armies can be resisted, but not an idea whose time has come.”

—Victor Hugo

The dynamics of money is an extremely complicated subject. It’s a foremost preoccupation of humans,

as in the way money system mechanics is intricately woven into major plotlines of complex and influential popular fiction works such as Rand’s *Atlas Shrugged* [52] or Stephenson’s *Cryptonomicon* [61]. Extrapolated, it even becomes a “social energy system” theme in more futuristic or outlandish forms such as emerging from the popular science fiction movie *The Matrix*.

Possibly the full leverage of focused worldwide scientific inquiry and attention has yet to be applied to economics. Some evidence that the science is still in its infancy are that new fields of “economic physics” or “econophysics,” “computational finance,” also dubbed “phynance,” have been proposed only recently. [4, 19, 18] Physicists are applying statistical and computational modelling techniques to come up with creative, *ad hoc*, or highly realistic theories of money flow in *e.g.* large economies or stock markets. [20] Despite the overused cliché, objective scientific commentators sensitive to these kinds of shifts and trends could easily identify all the signs of an apparent Kuhnian “paradigm shift” [38] in progress.

So the blaring headlines read, “Physicists try to break economists’ monopoly on financial theory” [4] and “Physicists attempt to scale the ivory towers of finance.” [19]

One major factor in the shift is increased computational power due to the so-far-uninterrupted realization of Moore’s law over about four decades at the close of the 20th century, *i.e.* exponential growth (in gates per chip or many other similar measurements). This awesome and accessible power has elevated the computer to the status of a new scientific instrument, roughly analogous to the invention of the microscope

or telescope, which has rapidly transformed conventional scientific perspectives on laws of both nature and societies.

*Complexity* is the buzzword across multiple disciplines, even as previously segregated disciplines are married [12, 66] (*e.g.* in the case here, physics, finance, biology, thermodynamics, *etc.*). It is likely key insights have not yet been totally realized, remaining potential lying undeveloped. For example, virtually all economic theory of the 20th century was developed largely *without* extensive computational experiments, modelling, simulations, and empirical analysis, so central to the new style of inquiry *via* the premiere, even transcendental instrument(s) of science—the computer and the algorithm. [13, 5]

The new breed of econophysicists are very open-minded in their metaphors, borrowing seemingly almost indiscriminately (leaving them open to one of the major but predictable criticisms). A particular new meme receiving heavy attention and advancement is the metaphor of the *economy as an ecosystem*. Such a view seems obvious in retrospect of various research delineating the parallels, but it was unfamiliar, novel, and even somewhat radical when first exhaustively and definitively proposed by *e.g.* Rothschild in the seminal and foresightful book *Bionomics: Economy as Ecosystem*. [55] It was not clear initially if the idea was just another shallow fad not so much with scientific merit but to be mostly appropriated by those seeking to justify ulterior political or social agendas. [7]

However, subsequent quantitative research, now a full decade after Rothschild’s manifesto, has pushed the metaphor into reality and significantly strengthened the case for its validity and correctness. As a Wall Street Journal reviewer wrote, used as the front-cover blurb for the book, “Revolutionary... a fascinating and highly creative alternative to the way conventional economics views the world.” The early *tour de force* analysis by Farmer, “Market force, ecology, and evolution” [20] invokes and reapplies the important Lotka-Volterra differential equations originally proposed for modelling population dynamics to a stock market system (see Farmer’s work for an excellent survey of the economy-as-ecosystem meme thread in the scientific literature).

As usual with a paradigm shift, the perspective flip-flops. How can the economy possibly *not* be thought of as an ecosystem? In Farmer’s work, different traders’ strategies are fluctuating adaptations analogous to evolutionary niches occupied by various organisms. The Lotka-Volterra equations originally introduced to explain oscillations in populations with predator-prey relationships map readily into describing capital (money) gains associated with the competitive speculative strategies utilized by inter- and independent traders.

The analysis presented here will be heavily dependent in places on the economy-as-ecosystem concept and mostly take it as unequivocally justified and virtually proven, even though it is not a common perspective among mainstream economists, and the underlying research agenda is clearly only beginning. Nevertheless, building on it, an important additional theme proposed and explored here is that of *economic parasitism*.

Along these lines, another paradigm shift is going on in the field of parasitology. Researchers are only recently beginning to appreciate the full implications of parasites in and on ecosystems, *via* similarly boundary-crossing interdisciplinary scientific collaborations, all forcing a serious re-evaluation of the “big picture.” [70] In fact the study of biology is in many ways the study of parasites; by one estimate, on planet earth parasites outnumber ‘freeliving’ species *four to one!*

New realizations are manifesting around the ubiquitous and crucial role(s) that parasites play in ecosystems. In many ecosystems parasites are far from inconsequential, insignificant, or innocuous stowaways, but in actuality, despite their relative physical and scientific invisibility, *drive* entire ecosystems. Parasites have been *a* dominant force, and maybe even *the* dominant force in the evolution of life! [70] So... given their forefront role, what is the presumable link to economics?

The third major theme pursued here in natural conjunction with bionomics and parasitism is a large scale economy seen as an *energy system*. While again this concept may seem obvious, the full understanding stemming from this perspective appears not yet available. There is a strong parallel between eco-

nomics equations and *e.g.* thermodynamics or electronics formulas that does not seem to have been explored systematically by researchers so far. Moreover, if the economy is an energy system, then various laws governing it can be analyzed and regulated based on solid engineering principles, and the mystery of economic dynamics should be minimized in *e.g.* the same way engineers understand the construction of buildings based on applying Newton's law.

So far econophysicists have tended to focus on the dynamics of markets. However it is possibly inevitable that they will soon arrive at a reconsideration of the classic questions of economics, one of the chief ones being the question of the optimal policy for *expansion or contraction of the money supply*. Hopefully new scientific light can be shed on this age-old question and definitive rather than speculative answers are within reach. This paper has been written with that main goal in mind.

## 2 brief history of money

*adult:* Our government borrows money every year.

*child:* Where does the money come from?  
How can we always be in debt and not have to pay it off?

*adult:* We're in debt to ourselves.

*child:* That doesn't make any sense!

*adult:* It's based on fractional reserve banking. Banks do not have to have all the money that they lend.

*child:* I still don't understand.

*adult:* You'll understand it when you get older.

Paper money was not used by Europeans until the middle ages, partly on the discovery of its successful use in China by Marco Polo in the 13th century. The Greeks and Romans used coins. Some standard terminology is useful: (see *e.g.* [32] or [50])

**commodity money** Money that is made out of a commodity *e.g.* typically a precious metal, either gold or silver, *i.e.* coins.

**receipt money** This is also called "fully backed commodity money" in [50]. A goldsmith or banker issues paper receipts or certificates always redeemable for an exact quantity of precious metal and the receipts may be traded independently.

**fractional money** Money that is backed by a commodity only at a fraction of the face value. Also called "fractionally backed commodity money" in [50]. Also called "bank money" or "book credit" in [17]. For purposes here, the exact fraction is considered to be fixed in perpetuity.

**fiat money** Money that is declared "legal tender" by a government with no commodity backing. Or for purposes here, arbitrary manipulation rather than fixed commitment to any fraction of backing.

**paper money** For purposes here, money made out of paper. Depending on backing it could be either receipt, fractional, or fiat money. Many authors use it as a synonym for fractional or fiat money to contrast it with commodity money.

**electronic money** For purposes here, money as reduced to an abstract accounting process involving 'blips,' no longer requiring a physical medium for transfer. Also called "digital cash" or "cybercash." Depending on backing it could be either receipt, fractional, or fiat money.

As *e.g.* Griffin [32] and Rothbard [54] explain, receipt money was often turned into fractional money by bankers. They found they could temporarily loan out additional pseudo-certificates exceeding their collected inventory of gold and collect interest on these loans. Rothbard notes that this practice was ruled legal by courts in some historical cases. Griffin asserts this practice invariably leads to an inherently unstable money system and periodic runs on banks, with many historical examples to make his case. Griffin also asserts that fiat money always leads to hyperinflation and worthless currency. These views will be carefully reappraised here with slightly different conclusions.

Immediately upon any inquiry into money, the topics of *debasement* and *counterfeiting* arise. Someone can take a gold coin, clip or shave it down, and pass on that coin, or create entirely fake coins with no gold content. Complicating the picture is that the government itself may adopt debasement of the currency as an official state policy! Many authors have blurred these cases. So a strict definition of these different forms of debasement is required.

**counterfeiting** The criminal practice of debasing the currency or creating fraudulent money.

**publicly-owned money expansion** At the knowledge and consent of citizens, the government debases the currency as a matter of policy for a revenue stream other than taxation, spent on legitimate government services.

**privately-owned money expansion** The situation mentioned above where private bankers transform receipt money into fractional money, and the practice is regarded as legal by the government. Revenue is counted as ‘profit’ by private bankers.

Counterfeiting is equivalent to theft. The criminal obtains tangible *assets* as booty at the collective robbery of *all who use the currency*. However it is not an overt theft in which victim is readily aware of, as, say, when their car is stolen and missing. *Embezzlement* is more accurate, presuming it is eventually detected!

As is widely understood by economists and the general public, both counterfeiting and publicly-owned expansion lead to, or more accurately, *cause* widespread *inflation* of prices and, if uncontrolled, destabilization of the integrity of the overall money system. Often governments have had draconian laws against counterfeiting practices as equivalent to acts of sabotage, treason, or war. Sometimes wars were actually waged partly *via* the very effective technique of one country counterfeiting another’s currency and ‘buying’ (in actuality *confiscating*) resources with it. In this sense it is a *camouflaged seizure of assets*, or, *economic warfare*. Whereas pillaging is sometimes the goal of warfare, counterfeiting permits an *invisible* pillaging with no arms or army required!

The third case above, privately-owned money expansion, is not so sharply delineated in the economics literature or popular treatments and is typically mixed up with the other two cases. This is a catastrophic error as will be considered below. For reference, call this the *cui bono caveat emptor* error (Latin, “who benefits—let the buyer beware”).

The above account hides further detail and mixes terminology based on the modern perspective. From the historical standpoint, a nation can have two kinds of banking or money systems:

**centralized banking** A universal, standardized, official government currency is controlled and issued by a *central bank*.

**noncentralized banking** Different banks may issue their own receipt money as currency, also called “banknotes.” The different banknotes circulate simultaneously in the overall economy.

Most nations worldwide now have their own central banks based on complex historical economic and political events. American history involves eras of alternation between centralized and noncentralized banking systems, now currently centralized. In the U.S. the central bank is known as the Federal Reserve and was established in 1913. Note that the central bank may either publicly-owned or privately-owned. Despite its name and management protocols the U.S. Federal Reserve is *privately owned*. The assumption that a central bank is always publicly-owned is the same *cui bono caveat emptor* error.

## seigniorage

“By this means government may secretly and unobserved, confiscate the wealth of the people, and not one man in a million will detect the theft.”

—John Maynard Keynes

In economics literature, the word *seigniorage* is typ-

ically used as a synonym for money expansion.

**seigniorage:** revenue or a profit taken from the minting of coins, usually the difference between the value of the bullion used and the face value of the coin.

In a fractional money system the mechanism is different (not associated with minting coins) but with the same effect.

Here a very careful distinction must be made. The following are *separate and distinct* but are sometimes confused by neophytes or unclear in some accounts. The terminology is somewhat arbitrary (remarkably, there does not seem to be a standard terminology devised by other commentators).

**straight borrowing** A government borrows money via issuing bills or bonds at a discount on face value, promising to repay the purchaser the face value at some specified date in the future. The interest rate is the difference between the face value and the purchase price.

**expansion borrowing** The government may also ‘borrow’ *via* money expansion, *either* publicly-owned or privately-owned. Even though in this case the standard overt procedure of “selling a bond” seems identical to the prior case of government borrowing, the underlying mechanisms and effects of the transaction are *fundamentally different*.

Note that both cases involve a “shortfall of funds” but the first case does *not* constitute seigniorage, whereas the second does. If a government’s expenditures exceed revenue (government revenue is generally taxes) then it can make up some difference *via* borrowing such that additional funds become available *via* a free-market loan by bondholders. Demand of these bonds is mainly tied to the interest rate offered by the government; higher interest rates spur higher demand. However, even after the “auction of debt,” the additional available borrowed funds may still be inadequate to fully cover a budget deficit. In which case another last resort, other than raising bond interest rates, is money expansion. Hence

the latter case can be considered in a sense a “double shortfall” (a shortfall of demand or buyers agreeing to loans).

A further key distinction must be made on money expansion. A bank may lend funds either to individuals or the government. In the former case typically the “noncentral” bank lends funds deposited by other individuals. In the latter case, typically the government borrows money from the nation’s *central bank* which controls issuance of the nation’s currency, that is, when the bank buys government bonds. In either case, if the bank has assets on deposit equivalent to the borrowed funds, it’s “straight borrowing.” If only a fraction of the loan is backed by assets, it’s “expansion borrowing.” This latter case is called *fractional reserve banking* (or, lending, borrowing). The fraction of deposits-to-loans a bank is required to hold is called the *reserve requirement*.

Hence money expansion can be localized to a given bank’s own banknotes in the noncentral system, or affecting the entire nation’s currency in the case of a central bank. In the *cui bono caveat emptor* error, most economics literature does not apply or blurs the concept of the central bank owning assets to back the government loans, not using the idea of a “reserve requirement” relative to it.

The above establishes an important direct correspondence between *commodity or receipt money* to straight borrowing, and *fractional or fiat money* to expansion borrowing. Moreover the two types may be practiced by either noncentral banks or a central bank. The banks may further be either publicly-owned or privately-owned. An even more precise distinction requires more sophistication than this overview and will be pursued further below.

In economics literature and popular accounts, the following two cases are also not always carefully distinguished. Current prices in an economy may shift under two *separate and distinct* key factors:

**supply and demand** Demand for a particular good or service may fluctuate due to changing economic conditions. This is the “invisible hand” of Adam Smith’s theory. The value or demand of the underlying assets has changed.

**money manipulation** In a fractional money sys-

tem, money units can be shifted or modified based on money expansion. The value or demand of the underlying assets is not changed.

This paper will focus on the latter case and reserve the word *inflation* exclusively for it. (To add to the confusion, many authors refer to the latter case as the *supply and demand of money*.) The distinction is also roughly between *extrinsic* and *intrinsic* factors, respectively.

The economist Keynes helped analyze the process of publicly-owned money expansion and considered the ensuing inflation as a pernicious “hidden tax” on the masses. However, many monetary reformists have proposed publicly-owned money expansion as a very useful means of taxation superior to alternatives, *presuming it is limited and erected at full knowledge and political consent of citizens* (see *e.g.* [27]). *Via* such a system:

- The state can obtain spendable revenue that requires no vast, complex, and cumbersome accounting system in *e.g.* the way the income tax does.
- It also is an extremely uniform taxation system; representing a percent of every dollar in circulation, in contrast to every reported dollar, or every dollar in only particular types of transactions. Conventional taxes on the other hand have uneven effects which are notoriously difficult to anticipate by a legislature.
- Tax evasion is essentially impossible under publicly-owned money expansion!

## money policy

“All the perplexities, confusion and distress in America arise, not from defects in their Constitution or Confederation, not from want of honor or virtue, so much as from the downright ignorance of the nature of coin, credit and circulation.”

—*John Adams*

In 1849, in a racist screed championing the righteousness of slavery over free market economics, Thomas

Carlyle lambasted supply-and-demand ideology as “the dismal science” in the first reference ever. [41] In modern form the preoccupations of “the dismal science” are over money expansion and inflation but the root issues are timeless. After centuries of commentary and reaction, it seems an utterly poorly understood, mysterious, intractable, and at times incomprehensible subject. *How should money expansion be regulated?* New theories arise regularly. For example the major trend of *monetarism* advanced chiefly by Friedman came about in the second half of the 20th century in response to dissatisfaction with existing government policies regulating money expansion.

This lack of consensus seems tremendously questionable and unsettling given that the health of entire world economies is at stake. *Routine money expansion has become the modus operandi of virtually all major and minor governments worldwide.* Regarding different policies on its regulation, no school of thought seems to have tangible proof of its supremacy of interpretation and guidance. Here maybe econophysics research can eventually untangle the tangled mess of conflicting and contradictory approaches. The following is a rudimentary “first cut” in this direction representing in parts a radical departure from conventional dogma.

## 3 mathematical analysis

“Better cut my pizza into four slices, I’m not hungry enough to eat six.”

—*Yogi Berra*

What is needed to cut through the legacy of ambiguous verbiage and claims on money expansion and inflation phenomena is a correct, preferably simple *model*. Extremely complex models of money expansion effects on the economy have been proposed recently with the help of computational simulations, and researchers will presumably continue to pursue these directions to yield new insights. [6, 35] As the models reflect, the interplay between taxation, production, and expansion is surely tremendously intricate. However, while these are admirable analyses, complicated models are only necessary if simple mod-

els do not give correct or accurate results for the purposes or questions at hand.

The approach here will be to take perhaps the simplest possible model(s) imaginable, with the fewest overall “moving parts,” and derive straightforward conclusions. These models are offered as *plausible but falsifiable hypotheses* to serve as a base for further research rather than a definitive or final analysis. They’re mainly a vehicle for introducing some key metaphors and analogies to guide intuitive thinking on the subject. (Also, in the following presentation, the prose will fully explain the meaning of the mathematical equations, leaving the latter optional for nontechnical readers.)

Economics’ basic equation for “money demand” is the “equation of exchange” outlined by Irving Fisher in his 1911 treatise, *The Purchasing Power of Money*: [50, 17]

$$MV = PY \quad (1)$$

where

- $M$  is the stock of money
- $V$  is the velocity of money
- $P$  is the price level
- $Y$  is the level of real output in the economy, *e.g.* the GDP, Gross Domestic Product.

The velocity is typically assumed constant by the “standard behavioral proposition;” it may also be taken as a measurement of individuals’ preference for saving *vs.* spending.

No monetary authorities appear to have ever remarked on the striking correspondence between this formula and the ideal gas law from thermodynamics, which holds for gases at low density. The equations that follow are mainly adapted from [65]:

$$pv = nRT \quad (2)$$

where

- $p$  is pressure measured in dimensional units of force/length<sup>2</sup> (*i.e.* force/area)

- $v$  is volume measured in length<sup>3</sup>
- $T$  is temperature,
- $R$  is a conversion constant
- $n$  is the number of particles (atoms or molecules)

The product  $p \cdot v$  has units force·length, *i.e.* energy, also analogous to *heat* and *work* in thermodynamics, measured in units of *joules*.

The correspondence is established and metaphor revealed when eq. 1 is written in the form  $1/P \cdot MV = Y$ . The analogies are:

$$\begin{aligned} 1/P &\Leftrightarrow p \\ MV &\Leftrightarrow v \\ Y &\Leftrightarrow T \end{aligned}$$

The above seems to constitute something of a very important “bridge theorem” between economics and statistical physics (specifically thermodynamics). From this parallel many new insights are immediately available. The mass economy can be seen as something like a given volume of gas under pressure. For example, if the volume is increased, the pressure per area decreases, assuming constant temperature; analogously, if the money stock is increased, prices increase (being *inversely proportional to pressure*), assuming constant GDP.

In thermodynamics a process involving no heat transfer between the system and environment is termed *adiabatic*. For ideal gases, a related process occurs at constant temperature, called *isothermal*. The thermodynamic equation for the special case of constant temperature is known as Boyle’s law:

$$p_1v_1 = p_2v_2 \quad (3)$$

Quite probably, economic transactions between individuals are the parallel to atomic collisions in the ideal gas. This hypothesis and direction are very recently being pursued by pioneering econophysicist Doyne Farmer: “[our] results suggest that some basic properties of markets can be explained by a theory much like statistical mechanics, in which each

trade imparts an impact to prices, much like a molecular collision.” [21] This concept also has strong parallels to fascinating new research by econophysicists Bouchard and Mézard into economic models of Pareto’s law of wealth distribution related to temperatures in directed polymers. [11, 8]

Another link can be found in the extremely important Black-Scholes equation for derivatives (options) pricing which was actually initially adapted from a *heat transfer* formula from mechanical engineering. In it, price differentials become analogous to heat variations. An overall stock market behaves as a heat diffusion system. It seems likely that stock market results directly correlate with general economic transactions, although this link has apparently not yet been systematically explored.

On the local, microscopic level, the collisions and transactions are random and statistically distributed. On the macroscopic level, a simple global property emerges as one of the best scientific examples of the “law of averages” realized. This will surely be a very fruitful line of inquiry for future econophysics research.

Apparently then, prices are an instantaneous measurement of *money-energy* denominated in units of current pressure, which economists sometimes refer to as “underlying value” *vs.* “nominal value.” The product  $p \cdot v$ , pressure times volume, gives a quantity of money-energy. Boyle’s law states that under “constant temperature” (constant GDP), money-energy is *conserved* under changes in the money stock; this might be called the *law of conservation of money-energy*.

In thermodynamics the direct analogue was demonstrated by Joule in a classic two-chamber air transfer experiment, which shows the *internal energy* of an ideal gas is a function of temperature only (*i.e.* not pressure and volume), written

$$u = f(T)$$

Now suppose that the money stock,  $v_1$ , (denominated in *e.g.* units of *dollars*) is increased by an amount  $v_2 = v_1 + x$ . Then  $p_1 v_1 = p_2 \cdot (v_1 + x)$ , or, (assuming constant GDP)

$$p_2 = \left( \frac{v_1}{v_1 + x} \right) p_1 \quad (4)$$

The new “pressure per dollar” is a fraction of the old pressure, and a greater “volume of dollars” is required to obtain the same level of money-energy. This is the simplest scientific and mathematical explanation of the *fundamental phenomenon of inflation*.

## intuitive analogies

This new framework and vocabulary is not merely a superficial restatement but a very important new insight into money expansion and an answer to the question, what exactly is money? A nice analogy from introductory engineering emerges here. In engineering the concepts of weight *vs.* mass, which initially seem synonymous and are sometimes casually interchanged, are carefully distinguished.

*Mass* is a fundamental unit and property of matter. *Weight*, measured in units of force, is an amount of mass *relative to a given gravitation*, *i.e.* mass times gravity (acceleration), typically presumed to be Earth’s. Analogously, “underlying value” or *money-energy* is a fundamental property of economic transactions, whereas *price* is a quantity of money-energy measured relative to a given volume or pressure (pressure times volume). The same mass has different weights on different planets just as the same money-energy has different prices within different volumes or relative to different pressures. In economics and popular literature, lacking strict terminology, confusion easily arises as writers often use the single term ‘money,’ or others, to connote the two distinct meanings depending on context.

On the other hand, remarkably, much literature anticipates the thermodynamical equivalences established here without actually taking the slight extra step of articulating them directly or formally (*i.e.* mathematically). For perhaps centuries, many commentators have talked about the *volume* of money, the *pressure* of a deal, or the *heating up* of an economy.

Another analogy is extremely helpful. Imagine a company stock trading on an exchange, with some quantity of shares publicly owned. The founders



decide to issue additional stock. As is well known this “secondary offering” *dilutes the share price*. One could say that the supply and demand of the stock changed, but this is not a change in supply and demand that is related to market effects or change in underlying value of the company. It’s a simple variation on *money manipulation* as defined in the previous section.

Eq. 4 is immediately applicable and gives the new price per share after some adjustment period, assuming no other factors.  $v_1$  is the initial number of shares,  $x$  is the number of new shares,  $p_1$  is the original price per share, and  $p_2$  is the final price per share. The exact dynamics and timing of the transition would require further empirical study and is an excellent econophysics research topic. This also suggests that stock markets could be a very nice model for expansionary bank lending and government monetary adjustment (*i.e.*, a microcosm of the fractional reserve system).

*Cui bono?* The issuers of the new stock shares then own a greater share of the company even after the price depreciation of their previous shares. All other shareholders have lost real value in their holdings at the abstract redenomination. *Caveat emptor!*

Now obviously this analogy extends further. Evidently a nation’s currency actually represents shares of the economy of that country (the GDP) and money expansion is exactly analogous to issuing new shares. But how are additional shares allocated? *Cui bono?* Who owns them? *Caveat emptor!*

## counterfeiting vs. seigniorage

“The process by which banks create money is so simple that the mind is repelled.”

—John Kenneth Galbraith

These algebraic formulas often taught in high-school-level physics may seem trivial. But they are a basic, useful, rarely applied tool for analyzing some simple economic situations. For example, in the previous section it was asserted that counterfeiters embezzle at the expense of all currency holders of an economy. This seems intuitively obvious, yet what are the underlying mechanics? Exactly *what* is embezzled, and

*how much?*

Remarkably, the above straightforward formula for the simplest case, eq. 4, is again immediately applicable.  $x$  can be taken as simply the number of counterfeited dollars spent into circulation;  $v_1$  is the total number of dollars in circulation. The formula gives the final value of all dollars assuming the counterfeit dollars continue to circulate without detection, such as with debased coinage. The counterfeiter obtains *money-energy* by debasing the value of all dollars in the system.

(If all the counterfeit dollars are detected and those holding the dollars must forfeit their loss then no money expansion occurs. But typically taxpayers must make up for counterfeiting losses via a “write-off” which may be equivalent to money expansion. The formula correctly gives the *instantaneous theoretical* loss.)

However, a very complicated question also immediately arises that cuts to the heart of this model. How much *money-energy* was actually obtained by the counterfeiter? The counterfeiter spent  $x$  dollars, but was the money-energy obtained based on initial pressure  $p_i$ , or final pressure  $p_f$ ? For insight, an answer can be related to the ideal gas metaphor. Boyle’s law refers to the state of the gas at two separate times, such that it has reached an equilibrium in both states. Suppose that a significant volume change is made in a very short time. Boyle’s law may not necessarily apply to all intermediate states.

Suppose that the counterfeiter spends the fake dollars slowly. Then each subsequent dollar will have a decreasing pressure associated with it,  $p_i > p_2 > p_3 > \dots > p_f$ . Apparently in the “best case scenario” the counterfeiter obtains  $x \cdot p_i$  money-energy if the money is spent rapidly with no further transactions, and as an asymptotic worst case with slow ongoing transactions,  $x \cdot p_f$ . The actual precise quantity is also exactly the “invisible tax” levied uniformly over all currency holders. The difference between the  $p_n$  is related to how large the economy is and how quickly monetary perturbations spread throughout it (another crucial and compelling econophysics research question). For later comment, call this phenomenon the *decay rate*.

Fig. 1 shows three hypothetical scenarios for a pres-

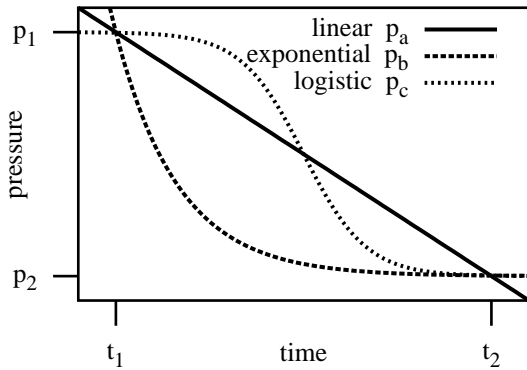


Figure 1: Three hypothetical scenarios  $p_a(t)$ ,  $p_b(t)$ ,  $p_c(t)$  for decay in pressure  $p_1 \rightarrow p_2$  from volume expansion during the time period  $t_1 \rightarrow t_2$ , *i.e.* depreciation in asset value due to inflation from money expansion *via* a gas thermodynamics model.

sure decay rate. The graph was generated for the scaled range  $[0..1]$  with  $t_1 = p_2 = 0$  and  $t_2 = p_1 = 1$  *via* the following formulas:

$$\begin{aligned} p_a(t) &= 1 - t \\ p_b(t) &= \frac{1}{e^{6t}} \\ p_c(t) &= 1 - \frac{1}{1 + \frac{1}{e^{12t-6}}} \end{aligned} \quad (5)$$

These formulas represent *path functions* for pressure change over time between the two intermediate states.  $p_c(t)$  is based on the S-shaped *logistic curve* used in many physical fields, such as for chemical mixing or measuring population dynamics in biology. Their shapes are adjustable by varying the constants and they're readily adapted to the general case using the substitution

$$p(t') = p_2 + f\left(\frac{t' - t_1}{t_2 - t_1}\right) \cdot (p_1 - p_2) \quad (6)$$

Next, what about publicly-owned money expansion? Again, remarkably, in the simple analysis, *the formulas are exactly the same*. The ratio

$$r = \frac{p_2}{p_1}, \quad r < 1 \quad (7)$$

is exactly equivalent to the *seigniorage discount* (and depending on currency issue rates).  $r$  is clearly directly analogous to a *publicly-owned central bank reserve ratio*.  $v_1$  is the reserves, the entire national economy. The 'revenue'  $x$  accruing from the money expansion can be spent on government services. Conceivably, here  $x$  could represent the entire government budget. Again, different levels of money-energy are obtainable depending on the decay rate (analyzed in more detail below).

The quantity of extracted dollars  $x$  'levied' by the state can also be expressed in terms of the seigniorage discount rate  $r$  and the original money stock  $v_1$ :

$$x = \left(\frac{1}{r} - 1\right) v_1 \quad (8)$$

This naive model has special meaning for  $x > v_1$ , or correspondingly  $r < \frac{1}{2}$ ; those ranges imply a 'levy' greater than the entire economy. The equation shows the 'tax' is minimal as  $r \rightarrow 1$  (from below), maximal as  $r \rightarrow \frac{1}{2}$  and *infinite* as  $r \rightarrow 0$  (from above).

So one is left with the perplexing question, how is publicly-owned money expansion different from counterfeiting? Obviously, with *e.g.* coin debasement the underlying mechanism is identical. The inescapable conclusion: the only difference is that in the latter case, *the funds are spendable by the state* and serve as an official pseudo-taxation system, *i.e.* as examined and partially endorsed in the prior section. The other key difference between counterfeiting and taxation comes down to *citizen knowledge and consent*.

The simple overview of this publicly-owned expansion system is that the government issues  $x$  additional shares of "stock" (dollars) of the GDP and uses the 'revenue' to buy government services, paid for by inflation.

## privately-owned money expansion

"Thus, our national circulating medium is now at the mercy of loan transactions of banks, which lend, not money, but promises to supply money they do not possess."

—Irving Fisher

Finally, consider the strange worldwide case of

*privately-owned money expansion.* Here a private bank is allowed to debase its receipt money based on fractional reserves, i.e. loan out more money than it has in reserves, either to a government or citizens. The idea of money expansion as equivalent to a fractional reserve system is not an explicit observation of modern economics, but it's transparently identical. Again, the above formula for depreciated value is *still applicable* except that the borrower must *pay back* the loan.

With straight borrowing, a lender provides immediate money-energy in return for the money-energy returned plus a fee at a future time. (That fee, “interest,” may therefore be regarded as the price or market rate of instantaneous money-energy per repayment time; the complex subject of interest is pursued below.) But by the money-energy conservation principle, *no money-energy is provided by the lender via privately-owned money expansion*—this holds *regardless* of changes in GDP. The ‘illusory’ money-energy that is spent by the borrower is accumulated *via* the depreciated value of the lender’s fractional money—inflation. *Ergo, ‘pseudo-lending.’*

In short, in this situation all money holders’ assets denominated in terms of the fractional money depreciate relative to the bank’s assets. If the bank’s fractional money is universally standardized as with a central bank, then for simplicity the groups “money holders,” “taxpayers,” and “citizens” can be taken to all overlap and be roughly interchangeable.

Mathematically, this means approximately that if a government borrows  $x$  dollars into circulation *via* privately-owned money expansion ( $x$  is the shortfall after straight borrowing), all dollars depreciate at the ratio  $v_1/(v_1 + x)$  during and after the government spending. However, in contrast to publicly-owned expansion where there are no further obligations, with privately-owned expansion the government and its taxpayers are *additionally* required to ‘repay’ the borrowed quantity of  $x$  dollars to the private pseudo-lender(s).

In one plausible scenario the government spends the money quickly and obtains money-energy at the undeflated pressure  $p_1$ , and taxpayers repay the pseudo-loan later at the deflated pressure  $p_2$  (inflated volume  $v_2$ ). Therefore total money-energy cost to

taxpayers is

$$E_1 = xp_1 + xp_2 \quad (9)$$

If the economy measured by  $v_1$  is extremely large relative to  $x$ , then  $p_1 \approx p_2$  and the bottom line is approximately  $2x$  dollars cost for  $x$  dollars worth of government services! This *bizarre and irrational* ‘system’ is known as “monetizing government debt.” Under it, where privately-owned money expansion covers government budget deficit(s), *the taxpayers effectively ‘repay’ the value of the pseudo-loan twice, first through inflation, a second time through taxation!*

The total energy extracted by the private bank can be taken as  $x \cdot p_2$ , which from eq. 8 can be expressed in terms of total money stock and the central bank reserve ratio:

$$E_2 = \left(\frac{1}{r} - 1\right) v_1 p_2 \quad (10)$$

But since  $p_2 = r \cdot p_1$ ,

$$E_2 = (1 - r)v_1 p_1 \quad (11)$$

This extraordinary equation shows that *via* the system, the pseudo-bank extracts the proportion  $1 - r$  quantity of money-energy from the original economy  $E_i = v_1 \cdot p_1$ , leaving only  $r$  remaining!

Even more shocking, in the modern privately-owned money expansion system, the lending bank is essentially allowed to count the ‘loan’ as an *asset, immediately*, not being required to wait until the end of the repayment period of the pseudo-loan to do so. In this case the pseudo-lender then essentially immediately extracts  $x \cdot p_1$  money-energy from the overall economy (*i.e. via* the device of a central banking system) at the initiation of the pseudo-loan of zero money-energy, and the taxpayers more accurately obtain  $x \cdot p_2$  worth of government services (at  $2x \cdot p_2$  energy cost). In this case the money-energy extracted by the private bank is

$$E_3 = \left(\frac{1}{r} - 1\right) v_1 p_1 \quad (12)$$

Note that if  $r < \frac{1}{2}$  then  $x > v_1$  and  $E_3$  exceeds the entire initial energy of the economy—this represents

net indebtedness by all money holders to the private bank! Evidently, economics is in fact the science of heat transfer of money-energy;  $E > 0$  represents wealth or assets,  $E < 0$  represents indebtedness.

The entire prior analysis proceeded without reference to the concept of interest. Evidently interest relative to private-based money expansion is simply *inapplicable*, because *regardless what interest fee is charged, even zero interest, the pseudo-lender has levied a real charge for a pseudo-service of no real value.*

*Usury* is defined as “the act or practice of lending money at an exorbitant or illegal rate of interest.” Similarly, practices identified as *predatory lending* have been outlawed in various jurisdictions. But this situation does not qualify as usury or predatory lending; it’s fundamentally different and far more insidious because no money-energy is actually provided. So the analysis and conclusions stand generally independent of considerations on interest—it’s irrelevant.

A slight variation is the possibility of a *hybrid* system in which the money expansion is both publicly- and privately-owned at some ratio; this appears to be the case with the U.S. Federal Reserve. However exactly the same conclusion applies, *i.e.* that any amount of privately-owned expansion is *illegitimate*.

In short, the government can finance its operations outside of taxation *via* borrowing, *or* money expansion. However privately-owned expansion reduces to an illegitimate combination (“borrowed expansion”?) with disastrous ramifications. *Cui bono caveat emptor.*

## good *vs.* bad money

In standard economics and banking  $r$  is also called the *reserve requirement*, and the inverse  $1/r$  is known as the *money multiplier*. [17, 50] In examples a typical rate is given as  $r = 0.1$ . [32] gives a banker’s rule-of-thumb ratio of 4:1 circulated (debased) receipts *vs.* deposits corresponding to  $r = 0.2$ . These are extremely low and in the previous (primitive) model fall into the range  $r < \frac{1}{2}$  that results in net indebtedness of all money holders to the bank.

However, the previous generalized formulas do not

attempt to model money that circulates outside the banking system, such as would occur with one bank issuing fractional money in much a larger economy. In this new scenario there is an amount of “nonbank” cash, say  $v_0$ , in addition to the bank reserves  $v_1$ , and  $v_0 \gg v_1$ . A ratio can be defined to give the amount of bank *vs.* nonbank cash in the economy:

$$s = \frac{v_1}{v_0 + v_1} \quad (13)$$

$s$  can also be taken as the *savings rate*. From this,

$$v_1 = \left( \frac{s}{1-s} \right) v_0 \quad (14)$$

This time the bank reserve ratio is logically defined as

$$r = \frac{v_1}{v_1 + x} \quad (15)$$

which implies

$$x = v_1 \left( \frac{1}{r} - 1 \right) \quad (16)$$

In this scenario, instead devaluation is based on this formula:

$$(v_0 + v_1)p_1 = (v_0 + v_1 + x)p_2 \quad (17)$$

Using the higher estimate for money-energy obtained by the bank,  $x \cdot p_1$ , and eq. 16,

$$E_4 = v_1 \left( \frac{1}{r} - 1 \right) p_1 \quad (18)$$

Substituting in the equation for  $v_1$ , eq. 14,

$$E_4 = \left( \frac{s}{1-s} \right) v_0 \left( \frac{1}{r} - 1 \right) p_1 \quad (19)$$

That gives the energy extracted as a fraction of the original nonbank cash economy  $v_0 \cdot p_1$ . Or equivalently

$$E_4 = s(v_0 + v_1) \left( \frac{1}{r} - 1 \right) p_1 \quad (20)$$

This equation bears a remarkable resemblance to the prior full economy money-energy transfer quantity  $E_3$  (eq. 12). It shows that for a bank holding the

fraction  $s$  of the entire economy in reserves, the energy extracted from the total initial economy, given by  $(v_0 + v_1) \cdot p_1$ , varies according to the ratio

$$r_2 = s \left( \frac{1}{r} - 1 \right) \quad (21)$$

For this equation,  $r_2 < 1$  even for small  $r$  if  $s$  is small. That is, in contrast to eq. 12, total money-energy extracted is now proportional to  $s$  or the proportion of money deposited in the bank relative to the entire economy. Still, for small  $r$  and  $s$ , the ‘leverage’ is high and  $E_4$  entails the entire economy. More exactly,  $r_2 \geq 1$  if  $s \geq r/(1 - r)$  (or  $r \geq s/(1 + s)$ ). For  $r = 0.2$  this is at  $s = 0.25$ ; for  $r = 0.1$  this is at  $s \approx 0.11$ .

This all appears to be one possible mathematical representation of *Gresham’s law*, which states “*bad money drives out the good.*” In other words, if one bank circulates debased receipts into the economy, all money depreciates based on eq. 17 and energy extracted from the overall economy is based on the savings rate and fractional reserve ratio of the individual bank. The equation appears to show that money holders may defend against mass money depreciation by minimizing their savings!

Moreover, eq. 20 seems to shed new light on Fisher’s equation of exchange, eq. 1. Recall from the earlier discussion that the thermodynamical  $v$  was chosen as analogous to the Fisherian term  $V \cdot M$  where  $V$  is velocity and  $M$  is the stock of money. It appears to be possible that velocity of money  $V$  and savings rate  $s$  are being mixed up in the classical theory, *i.e.* possibly

$$s \cdot (v_0 + v_1) \Leftrightarrow V \cdot M \quad (22)$$

From this, if savings rate decreases, money circulates more in the nonbank economy  $v_0$  than is stored in the bank reserves  $v_1$ , apparently decreasing the velocity. The classic quantity of velocity may actually be measuring nonbank money circulation relative to a fractional reserve bank. Maybe nonbank money velocity increases as the bank extracts more money-energy from higher savings.

$V$  is a somewhat mysterious quantity in classical economics, sometimes assumed constant or not, used

in multiple contexts, and its thermodynamical correspondence is not so obvious. However, some relation to savings rate does seem plausible. Thermodynamics does have equations for molecular velocities derived from statistical mechanics that it may be related to—altogether, another key item for future econophysics analysis.

A more sophisticated analysis might take into account that the bank offers some fraction of the extracted revenue as interest to depositors. In that scenario some depositors will lose or gain total money-energy based on their ratio of nonbank money to bank deposits.

### **growth, interest, temperature, *etc.***

“Anyone who believes exponential growth can go on forever in a finite world is either a madman or an economist.”

—*Kenneth Boulding, economist*

The prior model very carefully and deliberately avoided the issue of growth in the overall economy for simplified analysis. For completeness an expanding economy will now be considered. Let  $T_i = p_i v_i$  represent the perfect gas law term  $nRT$  from eq. 2 at different states. Then  $T_i$  is simply proportional to GDP, and

$$\frac{p_1 v_1}{T_1} = \frac{p_2 v_2}{T_2} \quad (23)$$

Let the economy grow by the rate  $r_T > 1$  so that  $T_2 = r_T \cdot T_1$ . Then

$$r_T p_1 v_1 = p_2 v_2 \quad (24)$$

For constant volume, *e.g.* no expansion in money stock,

$$p_2 = r_T p_1 \quad (25)$$

*i.e.* an increase in pressure  $p_2$  per dollar. But since prices are proportional to  $1/p$  this implies a *decrease* in any price in the economy, *i.e. overall price deflation*. This is a somewhat counterintuitive result by conventional wisdom: growth of the GDP results in deflation if money stock is held constant.

A major goal of modern monetary expansion policies is *price stability*, in which in theory the money stock is expanded to the degree of keeping prices ‘stable’ or constant. From eq. 24 this occurs when  $r_T v_1 / v_2 = 1$  or when a quantity  $x$  of new dollars ( $v_2 = v_1 + x$ ) are ‘created’ such that:

$$\frac{p_1}{p_2} = \frac{1}{r_T} \left( \frac{v_1 + x}{v_1} \right) = 1 \quad (26)$$

which, solving for  $x$ , occurs simply for

$$x = v_1(r_T - 1) \quad (27)$$

Spending and circulating  $x$  new dollars will stabilize prices, but the key question is, *who owns those dollars?* They may be either publicly-owned or privately-owned. *Cui bono caveat emptor.* The issue of ownership ties into the question of how the economy enlarged. Presumably it is due to the increased work, productivity, or efficiency of *all* money holders. Therefore, fairly, *all* money holders should gain.

This is one embodiment of the principle of *interest*. If an economy grows then all money holders can gain that increased energy without risk or work. It is possible to gain money in an economy without work *via* other means such as speculation, but it inherently involves a risk-reward tradeoff. By the money-energy conservation principle, the only risk-free revenue possible from an economy is *via* an increased GDP. Because of boom and bust cycles, even that is subject to fluctuation.

It is possible to have interest systems that are not directly tied to growth in the economy such as the current framework, but they are necessarily equivalent to wealth redistribution systems!

Note that arguably any rational model of the economy absolutely *must* consider the *equilibrium* state as one that does *not* involve growth. A century-and-a-half of the “dismal science” (or the history of modern civilization) may be based on an evasion or defiance of that principle. It is quite possible that economics is based on a mass collective rationalization in much the same way that U.S. citizens subscribed to the vision of the “manifest destiny” during the era of expansion to the west. Relative to serious worldwide dangers of

environmental degradation (*e.g.* global warming, pollution, deforestation, *etc.*), at the dawn of the 21st century the rationalization is increasingly taking on the signs of mass psychological delusions of grandeur.

## mattress myth & other legends

A pivotal observation is crucial here. By the money-energy conservation principle, after a temperature increase, the money-energy that accrues to money holders due to price deflation with constant money stock from eq. 25 is *exactly equivalent* to that represented by the  $x$  dollars of eq. 27! That is, *no money expansion system is inherently necessary to distribute risk-free interest gains!* It’s built into “invisible hand” supply-and-demand pressures on prices. It’s a simple consequence of the law of scarcity, or, scientifically speaking, an *emergent property* of the system.

This finding directly contradicts the supposedly enlightened modern view of “putting money into the bank where it can earn interest instead of hiding it under a mattress.” If money stock is kept constant, all money holders effectively gain interest *without* keeping their money in banks based on increased purchasing power from a global economic temperature increase. It’s also compatible with the use of commodity currency such as gold. The only-banks-can-do-it view is simply *false mythology*. The finding also conflicts with the legend of deflation as synonymous with *economic catastrophe*.

A direct corollary to the above is that if GDP is increasing and prices are stable (and any interest payments are lower than the GDP increase) then *money holders are losing money-energy*. By the earlier analogy of money as stock shares, it’s analogous to the idea of a company that has increased market value but shareholders’ stock prices remain constant. Therefore the idea of maintaining price stability *per se* may be a specious economic doctrine!

Keynesian economic theory holds that prices and wages are “sticky,” especially downward, meaning that they resist deflation. [17] This is one reason that an allocation mechanism for the additional money  $x$  may be justified. However, the problem is that such a system is more readily manipulated to channel the increased money-energy of the economy toward elitist

machinations that unfairly exclude money holders in general.

But it seems plausible that deflation in prices occurs inversely to inflation in prices. It is known that wage inflation increases slower than goods inflation so that the net effect to wage earners is diminished purchasing power. The inverse would be a decrease in wages that occurs slower than the decrease in prices, resulting in *increased* purchasing power. The final conclusion is that *the constant money stock system is theoretically superior* to the re-allocation method based on (a) guaranteed fairness and (b) lack of necessity of a central administration system.

A closely related concept to stickiness of prices is *elasticity*. [17] Prices that are inelastic have associated demand that is not affected by price changes. Elastic prices involve changes in demand at price changes. Elasticity is also a measure of “specific price sensitivity to general inflation.” Elasticity is crucial because it suggests that in general inflation, some goods, *e.g.* luxury items, inflate in price faster than others. Luxury items tend to have higher price elasticity.

The U.S. Consumer Price Index, CPI, measures the inflation of a market basket of goods purchased by a “typical household.” However, by tracking only a set of inelastic goods with prices that are not as sensitive to inflation, the CPI may consistently *underestimate* true inflation rates. Such a misleading or deficient indicator would be highly preferred by private bank owners in a privately-owned expansion system, because they would be able to extract more money-energy without detection by general money holders!

### “optimal” expansion policy

Obviously, referring to the rate of increase of the economy as “interest” is not the concept generally used in economics. The U.S. Federal Reserve determines interest rates which are returns paid on government loans or bonds (“securities”) by taxpayers. The remainder of the government deficit not covered *via* sales of the securities is that which must be financed *via* money expansion. But this direct link means the Federal Reserve has strict control over the money ex-

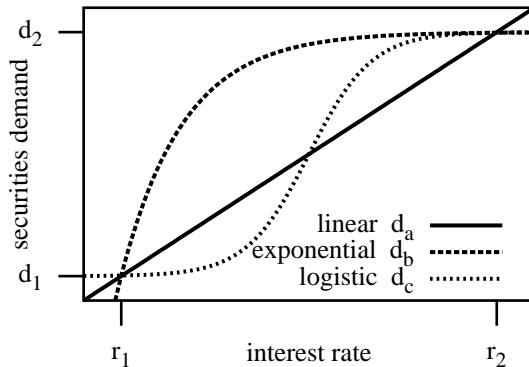


Figure 2: Three hypothetical scenarios  $d_a(r)$ ,  $d_b(r)$ ,  $d_c(r)$  for increase in government securities demand by investors  $d_1 \rightarrow d_2$  from increasing interest rates in the range  $r_1 \rightarrow r_2$ .

pansion rate based on the interest rate selected. Total demand for (and therefore sales of) government securities must vary based on interest rate according to some relationship.

Fig. 2 gives three hypothetical scenarios for the increase in government securities demand by investors over increasing interest rates. (The plot was generated simply using mirror-symmetric versions of eqs. 5.)

This mathematical relationship is the central pivot around which monetary expansion policy is balanced. When the Federal Reserve “buys” government bonds, it involves inflationary money expansion and does not conform to the supply-demand curve(s) in the figure. Government deficits could always be covered *via* higher interest rates (and no expansion) if the Federal Reserve chose that route.

The conclusion from the prior (simplistic) results is that the optimal monetary expansion policy from the point of view of money holders is always to increase interest rates up to 200% to meet budget shortfalls, *i.e.* *no privately-owned money expansion ever*, assuming the budget outlay is not adjusted. Those money holders will always end up paying *less* in total money-energy than from privately-owned expansion. The 200% figure seems ridiculous, but really it shows

the absurdity of using privately-owned money expansion for any so-called “financing” whatsoever!

A strong case can be made that if the interest rate were managed and determined in this hypothetical way (the true free market embodiment), citizens would begin to understand the true cost of publicly-owned government expansionary borrowing instead of it being invisibly disguised in inflation. The inflation rate in a publicly-owned system probably varies almost precisely according to interest rates in the hypothetical system! The inflation rate for a privately-owned system is *even worse*.

A more mathematically rigorous treatment would require taking into account the “term structure of interest rates,” *i.e.* long-term *vs.* short-term rates, and the exact speed of the inflation and government *vs.* private spending, but similar results are to be expected. Whereas publicly-owned expansion has nice properties as described, *privately-owned expansion is simply scientifically and mathematically vacuous in any variation!*

## advanced verisimilitude

The prior models are easily criticized and should not be taken too seriously, particularly the limit cases. The formulas for energy in particular are merely rough analogies. They do not have major verisimilitude but neither are they merely ‘toy’ models—primitive, but not crude. What is interesting about them is how the mathematics can reflect the various assertions (some obviously approaching hyperbole) made by various purely prose-oriented writers on the extreme implications of money expansion mechanics. There is new insight lurking in the framework; hopefully future econophysicists can use this platform to seize them rapidly.

More sophisticated models are immediately available from thermodynamical theory and are readily utilized. A brief sketch of natural refinements will be made here. In thermodynamics the general equation for work based on pressure and volume changes is

$$W_1^2 = \int_1^2 p dv \quad (28)$$

For a *polytropic* process, also *reversible*, meaning roughly that there is no frictional dissipation,  $p v^n$  is constant, *i.e.*

$$p_1 v_1^n = p_2 v_2^n \quad (29)$$

The exponent  $n$  may range anywhere from  $-\infty$  to  $\infty$ .  $n = 1$  gives Boyle’s law. For  $n \neq 1$ ,

$$W_1^2 = \frac{p_2 v_2 - p_1 v_1}{1 - n} \quad (30)$$

For  $n = 1$  (isothermal perfect gas process),

$$W_1^2 = p_1 v_1 \ln \frac{v_2}{v_1} = p_1 v_1 \ln \frac{p_1}{p_2} \quad (31)$$

The logarithmic dependency in this formula might have some relation to formulas for measuring “market impact” from buying or selling stock investigated by Farmer. [20]

If the pressure remains constant then

$$W_1^2 = p(v_2 - v_1) \quad (32)$$

A constant pressure process is called *isobaric*. The prior sections used this formula for work as a very rough approximation for calculating energy changes with  $x = \Delta v$  and rough estimates for  $p$  (using the limit cases).

The overall energy of the system remains constant with a constant GDP. However, the isothermal case  $n = 1$  applies only for perfect gases.  $n \neq 1$  can be used to model a perfect gas and nonisothermal conditions, or a general polytropic process.  $n$  is also the natural measure of the pressure decay rate mentioned earlier. The exact value of  $n$  would ideally be determined from empirical data. Maybe there is some rule such as  $n \rightarrow 1$  as the economy gets larger.

A more refined model can naturally use  $W_1^2$  as a measure of the total energy associated with a money redenomination. Note that by conservation of money-energy, no money-energy is expended by a redenomination;  $W_1^2$  represents the maximum money-energy re-allocated or seizable *via* money expansion depending on ownership. For constant temperature (no energy *via* increased temperature), a fraction of this energy is available to the government (providing public services financed by taxpayers), the remainder



is allocated to the private bank. A simple approach would be to set  $x = y + z$  where  $y$  is dollars gained by government, and  $z$  is dollars gained by private banks.  $z > 0$  would be defined as “unfair.”

The above model is somewhat awkward in that the energy calculation splits into two separate formulations depending on  $n = 1$  or  $n \neq 1$ . To escape this, one alternative is a simple variation that uses a parameter  $0 \leq m \leq 1$  to represent the continuum of pressure available at different times during the expansion process. Then

$$p_m = p_2 + m(p_1 - p_2) \quad (33)$$

So  $p_m = p_1$  for  $m = 1$  and  $p_m = p_2$  for  $m = 0$ . The money-energy associated with  $x$  dollars at different times in the pressure decay process becomes simply  $x \cdot p_m$ . Spenders obtain energy with different efficiencies  $m_1 > m_2 > m_3$  depending at what point and time in the process they spend the money.  $m$  can also be related to the earlier pressure decay curves of eqs. 5.

Another improvement in fidelity would break up existing owned assets, say  $v_1 = v_a + v_b + v_c$  where  $v_a$  is assets owned by the government,  $v_b$  by citizens and taxpayers, and  $v_c$  private banks.  $v_c$  could be further split into *domestic vs. foreign* ownership. The expansion has variable allocation to the government, money holders (interest), and private banks, *i.e.*  $x = x_a + x_b + x_c$ .

The general model would be very careful with the energy analysis. Basically, additional energy outside of overt capital flow is available from either increased temperature (GDP) or currency redenomination. The analysis determines how much of this energy goes into government services, how much goes to money holders *via* interest or money deflation, and how much goes to private banks.

All of these equations can be easily converted to differential form for extended computational simulations:

$$\begin{aligned} p_{t+1} &= f_1(p_t) \\ v_{t+1} &= f_2(v_t) \quad \text{etc.} \end{aligned}$$

## electronics analogy

“The greatest shortcoming of the human race is our inability to understand the exponential function.”

—*Albert A. Bartlett, physicist*

The science of “mechatronics” has been described as a marriage of electrical and mechanical engineering and computer science. A remarkable correspondence is noted in the field whereby mathematical analysis from one discipline can be mapped onto another. Holbert has compiled a convenient table summarizing these correspondences in [33], “Interdisciplinary electrical analogies.” Electrical, mechanical, hydraulic/acoustic, and thermal sciences all have similar laws for the basic physical entities of force, mass, energy, *etc.* This paper adds a new column for economics.

So under this correspondence, one could take a complicated dynamical system from physics requiring analysis by Newton’s law. The physical setup or apparatus translates to a system of mathematical equations. But there is a direct correspondence between *e.g.* an electrical circuit that embodies exactly the same properties and leads to an identical mathematical analysis. The established parallel is intuitive, extraordinary, and somewhat uncanny. For example, mapping mechanical to electrical:

force	⇔	current
velocity	⇔	voltage
friction	⇔	resistance
mass/inertia	⇔	capacitance

For economics, the case for the electrical analogy is made in very sophisticated detail in [2]. These correspondences permit a systems analysis and modelling of a vast economic system, reduced to theoretical equations. The electrical or circuit analogy is particularly relevant in the computer age. This all combines to serve as the strong underlying basis for the new science of “blip mechanics” as a *new engineering discipline*.

In electronics, power is given by  $P = VI$  where  $P$  is in watts,  $V$  is voltage in volts, and  $I$  is current in amperes (coulombs of charge per second). The energy

is given by the product of power and the timespan,  $VI \cdot \Delta t$ . But for the infinitesimal time period  $dt$ , this can be taken as the “instantaneous energy:”

$$E_{dt} = VI dt \quad (34)$$

Watts are joules per second, so this equation measures joules. From the earlier equations (*e.g.* perfect gas law eq. 2), voltage  $V$  is analogous to pressure  $p$  and current times timespan  $I \cdot dt$  to volume. The quantity  $I \cdot dt$  as volume implies that dollars are analogous to coulombs of charge. The system of a perfect gas in equilibrium with an internal energy is therefore analogous to a circuit in equilibrium being fed by a voltage source, *e.g.* a battery.

A brief example will be considered. In finance, the compound interest formula can be given as a recurrence relation  $A_{t+1} = f(A_t)$ ,

$$A_{t+1} = \left(1 + \frac{r}{k}\right)^k A_t = A_0 \left(1 + \frac{r}{k}\right)^{kt} \quad (35)$$

where  $A_t$  is the capital at year  $t$  (initial capital  $A_0$ ),  $r$  is the interest rate per year,  $k$  is the number of compounding periods per year. But by an application of l'Hôpital's rule (from elementary calculus) it can be shown that as  $k \rightarrow \infty$

$$\lim_{k \rightarrow \infty} A_t = A_0 e^{rt} \quad (36)$$

This is referred to as the “continuously compounded interest formula,” and the longer any compounding is in effect the closer it approaches the formula. It can also be used as an estimate of price inflation given the inflation rate. Or conversely if  $r < 0$  it can measure the depreciation in value due to inflation.

In electronics the standard RC resistor-capacitor circuit has similar exponential dynamics, analyzed in typical introductory references. [67] This is a circuit with a battery with voltage  $V$ ,  $R$ -ohm resistor, and  $C$ -farad capacitor all in simple series. The voltage over the resistor at time  $t$  is given by the formula

$$V_R = V e^{-\frac{t}{RC}} \quad (37)$$

The formula is giving the “inflation” that occurs in the circuit when  $-1/RC = r$ . The resistor can

be thought of as the load. The capacitor accumulates charge over time. The voltage available to the load declines exponentially over time as the capacitor charges. Recall that voltage is analogous to pressure, and prices are inversely proportional to pressure.

Current represents “dollar circulation.” The current and therefore instantaneous energy of the circuit falls to zero as the capacitor charges and  $t \rightarrow \infty$ . The capacitor represents the mechanism of some entity (either public or private) that removes dollars from circulation in the economy. The asymptotic limit in this model is a circulation deadlock or energy freeze.

So, this circuit gives one possible long-term dynamical solution for the earlier systems with decreasing pressures,  $p_i > p_2 > p_3 > \dots > p_f$ , approximately according to the recurrence relation (or differential equation) associated with  $k = 1$  and as  $t \rightarrow \infty$

$$p_{t+1} \cdot (1 + r) = p_t. \quad (38)$$

This example is simple yet important in how it exemplifies the depiction of inflation dynamics as a closed energy system and analysis *via* engineering principles. A key property of the science of “blip mechanics,” somewhat in conflict with the conventional wisdom of economics, is that inflation is *not* an inexplicable aspect of arbitrary mass psychology. Particularly in a large scale economy, *price inflation is a precise, mathematical measure of the macroscopic energy dynamics of a system which adheres to physical laws.*

### recursive bite 'em *ad infinitum*

So, naturalists observe, a flea  
Has smaller fleas that on him prey;  
And these have smaller still to bite 'em;  
And so proceed *ad infinitum*.

—Jonathan Swift

A remarkable paradox emerges in the careful study of the prior mathematics, very much reminiscent of Schrödinger's notorious is-it-alive-or-dead quantum mechanical cat riddle (which many are not aware was phrased mathematically in his original paper). Earlier  $x$  was defined as money loaned to the state in

excess of straight borrowing, *i.e.* the quantity of expansion borrowing.

Consider that the model can be totally reformulated in a parallel way based on the earlier idea of expansion borrowing as a “double shortfall”. Let  $x$  simply refer to the budget deficit, the difference between funds spent by the government and total taxes collected.  $x$  then represents the amount of funds obtained from straight borrowing, and all the mathematics is identical. Then the “reserve ratio”  $r = p_2/p_1$  then represents the dilution of value in government services provided to taxpayers due to the overhead cost of repaying government borrowing, or, in a sense, the degree that the future has been mortgaged to the present. There seems to be lurking here *recursive bite ’em ad infinitum*, noted by some other writers, *e.g.* [2].

In fact, to take it to even further extremes, a political libertarian in favor of a minimalist government might take  $x$  to simply refer to all taxes. Then from that perspective the ratio  $r = p_2/p_1$  represents the ‘drain’ of government on ‘productive society’! (Finally, the anarchist argues against the validity of ‘productive society’!)

Apparently what the mathematics is really addressing is the general theoretical concept of *money spent without consent of money holders via money system mechanics*.  $x$  is the embezzlement, and  $r$  is the resulting debasement. The government may not spend funds without consent of taxpayers. Borrowing requires the consent of future taxpayers. Private banks may not spend public funds. Their dilution implies the consent of the public.

But if the government does it, why not private banks? The conclusion is that at the core of the problem, banking and government contain two sides of one phenomenon. Both contain by nature *some* mechanisms, elements, and agendas capable of, and at times applying, money-energy extraction without consent of money holders *via* concealment within the money system administration (*i.e.* embezzlement). Furthermore, from kindergarten wisdom, “two wrongs do not make a right.” So... is it alive, or is it dead? How to stop it? The halting problem.

## 4 commentary: blip corruption

“One does not have to eat an entire apple to know it is rotten.”

—*literary critic*

Over centuries, many commentators and authorities have struggled to articulate these ideas using vocabulary that has been itself correspondingly debased! Many of their quotations will be re-examined in this new light over following sections. The process of money expansion is typically called ‘creating money’ and the *pseudo-money pseudo-loaned by the pseudo-bank* is typically referred to as “credit.” But also within the literature, dire confusion or obfuscation reigns on the *razor-sharp cui bono caveat emptor* distinction set out here between *publicly-owned* vs. *privately-owned expansion*. As outlined, this intellectual error has potentially catastrophic consequences. The former case can be a legitimate means for collection of government revenue. The latter stands currently as *unexposed embezzlement*. The manufacturing of abstract credit is a means for *real wealth extraction!*

Banking authorities make a distinction between deposits and loans in the same way they distinguish between “money” and “credit.” In the nonphysical fractional reserve blip-based money system, the distinction is invalid. *Creation of credit is equivalent to the creation of money*. Whoever has or is given the authority to create credit has the authority to extract wealth from the economy by that same mechanism. Moreover, there is no meaningful distinction between fractional reserve banking and money expansion.

The analogy of counterfeiting looms large as the mathematics reveals. In many ways the only difference between illegal counterfeiting and legal privately-owned money expansion is that gains by the recipient in the latter case are officially sanctioned, not indiscriminate, and limited based on the expansion rate. Therefore, paradoxically, *privately-owned money expansion is basically equivalent to ‘legalized counterfeiting,’ i.e. a surreptitious state-sanctioned plundering of money holder wealth by private bankers!* Because it is an intrinsic oxymoron, however, the counterfeiting analogy is awkward and unsatisfactory,

and some other metaphor seems necessary.

Perhaps the simplest explanation for this situation is that *new shares of the economy are issued, but they are owned by private bankers at the expense of the ownership of all other shareholders (i.e. money holders, taxpayers, citizens)*. Via mere money manipulation the private bankers own a greater real share of the entire economy (*e.g.* GDP denominated in dollars).

Hence the term “money stock” takes on new meaning! The tragic absurdity of the situation has reached epic, international, worldwide proportions. All the complex economic theory, terminology, and mathematics could simply be dropped for the following explanation:

The government has delegated its responsibility of ensuring public monetary integrity to private bankers. But the arrangement has devolved and degenerated to negligence and abdication. Those bankers have reneged on the implicit promise of providing monetary integrity. Their system correctly meticulously keeps track of ‘blip’ ownership and its transfer *except, via* the delegated ownership and administration of the blip-system, and under the guise of *specious, distorted, and flawed economic science*, the bankers can arbitrarily create and own new ‘blips’!

What has occurred is an unequivocal *corruption* in the integrity of the money. Money is a representation means for *scarcity*. Holders utilize it precisely for that property. Any entity that can allocate scarcity-units without exerting economic work by definition has debased the scarcity-units relative to all other holders—the units are not scarce for the embezzler. Somewhere along the line, the promise of integrity has been *trashed*.

The holders of the scarcity-units determine the definition of economic work. Legitimate government services are included. The government is erected partly to protect scarcity-unit ownership and regulate legal and illegal scarcity-unit transfer.

Privately-owned expansion is equivalent to siphoning or *leeching* of money-energy with dollar holders

“left out in the cold.”

## scarcity integrity

“The price of liberty is eternal vigilance.”

—Thomas Jefferson

“The buck stops here.”

—Harry S. Truman

The terminology and mathematical vocabulary of the previous sections gives a new framework for discussion of the different types of money. Evidently it’s a continuum:

**receipt money**  $r = 1$ ; the money is fully backed.

**fractional money** Fixed  $r < 1$ . The *unbacked fraction*  $1 - r$  may be either publicly-owned or privately-owned.

**fiat money** Unfixed  $r < 1$ ;  $r$  may arbitrarily fluctuate. Or  $r \rightarrow 0$ .

Paper money, in contrast to commodity money, is required and a prerequisite for a fractional money system, although a paper money system is not necessarily either receipt, fractional, or fiat. Paper money represents an abstraction away from directly trading a scarce entity such as precious metals. This divorce simplifies, but does not *imply*, debasement of its scarcity representation *via* money expansion—actual debasement is tied to administration. Electronic money simply replaces paper with even more convenient ‘blips.’

What a *fair* and *sound* money system really requires is *scarcity integrity*. All systems devised so far can be debased. However, debasement is not necessarily an intrinsic property of any of them. Clearly, a *fair* public money system must at the very minimum be either publicly-owned fractional, where there is legislative control over  $r$ , or fully-backed, in which case ownership of the unbacked fraction is irrelevant (there is no unbacked fraction). Fiat currency is unsound, but not in the sense that it will *inevitably* lead to total loss of value. Loss of value occurs at the discretion of whoever can effectively manipulate

$r$  via scarcity-unit creation and ownership unilaterally and clandestinely, concealed from other holders (*i.e.* without their consent).

As concluded, privately-owned fractional banking is not a fair system because, in short, it facilitates private confiscation of public property, represented by the public money. However, it is not necessarily *unsound* in the sense that it is unstable or will always collapse. Collapse occurs as  $r \rightarrow 0$ . With negligent, malignant, greedy *etc.* administration, money moves through the “backing continuum” from full, to fractional, to fiat. But even private expansion owners would presumably seek to avoid  $r = 0$ . Privately-owned fractional banking can be quite sound.

Apparently, the unrecognized dichotomy of fairness *vs.* soundness lies at the heart of much economic theory. One does not necessarily imply the other. It appears another variation on the *cui bono caveat emptor* error.

[32] quotes a bulletin of the Federal Reserve Bank of St. Louis:

Modern monetary systems have a fiat base—literally money by decree—with depository institutions, acting as fiduciaries, creating obligations against themselves with the fiat base acting in part as reserves. The decree appears on the currency notes: “This note is legal tender for all debts, public and private.” While no individual could refuse to accept such money for debt repayment, exchange contracts could easily be composed to thwart its use in everyday commerce. However, a forceful explanation as to why money is accepted is that the federal government requires it as payment for tax liabilities. Anticipation of the need to clear this debt creates a demand for the pure fiat dollar.

By previous interpretation, “fiat base” might as well be called a “baseless base.” What the above amounts to, paraphrased: “wealth is denominated in blips and those blips are legally, arbitrarily manipulated at citizens’, taxpayers’, and government’s expense for invisible confiscation by faceless private bankers.” An-

other booklet entitled *Modern Money Mechanics* by the Federal Reserve Bank of Chicago states:

In the U.S. neither paper currency nor deposits have value as commodities. Intrinsically, a dollar bill is just a piece of paper. Deposits are merely book entries. Coins do have some intrinsic value as metal, but generally far less than their face amount.

What, then, makes these instruments—checks, paper money, and coins—acceptable at face value in payment of all debts and for other monetary uses? Mainly, it is the confidence people have that they will be able to exchange such money for other financial assets and real goods and services whenever they choose to do so. This partly is a matter of law; currency has been designated “legal tender” by the government—that is, it must be accepted.

This reflects the perception of conventional wisdom that money is backed by ‘confidence’ or ‘faith.’ In reality the expectations over exchanging money for assets, goods and services are arguably a secondary phenomenon. The confidence refers to the general money holder’s expectation of an implicit promise that blips will not be arbitrarily allocated—which has been exposed here and elsewhere as a *monolithic fraud and sham*. [32]

## faith in blips

“One thing to realize about our fractional reserve banking system is that, like a child’s game of musical chairs, as long as the music is playing, there are no losers.”

—Andrew Gause [27]

Many understandably fail to regard “faith in blips” as something to be taken very seriously. The reduction of money to a total electronic abstraction and its consequences has been called “the death of money” by Kurtzman. [39] But merely denominating scarcity-units in terms of blips does not mean that those scarcity-units are meaningless or that they will be arbitrarily manipulated! Blips have a total reality.

Blips take the physical form of the vast accounting apparatus used to record, manage, and track them. Blip value is the mathematical property of energy derivable from the science of blip mechanics and not a mere psychological phenomenon. Blips are *exactly as real as the entire economy*.

If wealth-owners wish to preserve their own assets against *blind robbery*, then they must understand the basic engineering principles of sound blip-systems and ensure their blip-system has *the absolute highest degree of integrity achievable and is free of corruption*—it is the imperative of citizens, taxpayers, and money holders to *actively create one*, and not passively accept any shoddy or boobytrapped system foisted on them (bootytrapped?). They must be hypervigilant for the slightest signs of ‘leakage.’ Bugs in blip algorithms or implementations have *the most catastrophic consequences imaginable—blip loss*.

Evidently from history this task is in many ways far more difficult than erecting a government—herculean, sisyphian, gordian, and pandoran (massive, futilely repetitive, intractable, and insidious). It seems both government and banking are defective legacy systems and their functions need to be rewritten and consolidated into a *new blip-system!*

The following statements were made during hearings of the House Committee on Banking and Currency, September 30, 1941. [32] Members of the Federal Reserve Board call themselves ‘Governors.’ Eccles was Chairman of the Federal Reserve Board at the time.

Congressman Patman: “How did you get the money to buy those two billion dollars worth of Government securities in 1933?”

Governor Eccles: “We created it.”

Patman: “Out of what?”

Eccles: “Out of the right to issue credit money.”

Patman: “And there is nothing behind it, is there, except our Government’s credit?”

Eccles: “That is what our money system is. If there were no debts in our money system, there wouldn’t be any money.”

Paraphrased, in a way that neither Eccles nor Patman would have understood at the time: after nationwide economic dislocations that eventually escalated into a national congressional inquiry, almost certainly ensuing as direct consequences of the corrupt blip-system, Patman is asking Eccles if the blip-system has integrity. Eccles replies that no, the blip-system has no integrity, but that it is running smoothly and exactly how it was designed to operate. New blips can be and were created arbitrarily and ownership assigned to the private bank, and subsequently loaned to the government. The state is required to repay those blips.

The debt is the blip-debt owed to the private Federal Reserve bank by the U.S. government, *i.e.* citizens, taxpayers, and money holders. Eccles has succinctly explained the process whereby all money is ultimately based on blip-debt—to *private bankers*. As Senator Barry Goldwater stated:

Most Americans have no real understanding of the operation of the international money lenders. The accounts of the Federal Reserve System have never been audited. It operates outside the control of Congress and manipulates the credit of the United States.

Translation: the entire U.S. economy is denominated in blips, the *debasement* of which its government has *zero control over*. By the design architecture, dictated by first-class users, the blip system is simply not accountable to second-class users. The world’s “last remaining superpower,” with the largest stockpile of nuclear weapons, and the correspondingly most gargantuan and highest security military-industrial complex of all nations worldwide, has outsourced its blip management! *The blips stop somewhere else*.

## gold & Greenspan

“In truth, the gold standard is already a barbarous relic.”

—John Maynard Keynes

Complex treatises on gold as a money standard have been written and its role in finance will only be briefly regarded here for completeness. For a representative

view on its role, an excerpt from an unreckoned article by current Federal Reserve chairman Alan Greenspan is highly useful. The article (or the following quote from it) circulates among money reformists and gold money advocates. Entitled “Gold and Economic Freedom,” it was published in 1967 in the book *Capitalism, the Unknown Ideal* edited by Ayn Rand: [30]

The abandonment of the gold standard made it possible for the welfare statist to use the banking system as a means to an unlimited expansion of credit. . . .

The law of supply and demand is not to be conned. As the supply of money (of claims) increases relative to the supply of tangible assets in the economy, prices must eventually rise. Thus the earnings saved by the productive members of society lose value in terms of goods. When the economy's books are finally balanced, one finds that this loss in value represents the goods purchased by the government for welfare or other purposes. . . .

In the absence of the gold standard, there is no way to protect savings from confiscation through inflation. There is no safe store of value. If there were, the government would have to make its holding illegal, as was done in the case of gold. . . . The financial policy of the welfare state requires that there be no way for the owners of wealth to protect themselves.

This is the shabby secret of the welfare statist's tirades against gold. Deficit spending is simply a scheme for the “hidden” confiscation of wealth. Gold stands in the way of this insidious process. It stands as a protector of property rights.

More on young Greenspan's brush with Rand's philosophy of Objectivism can be found in Bradford's article, “Alan Greenspan: Deep Cover for Capitalism?” [10] Or, the Randian libertarianism view of money finds expression in her novel *Atlas Shrugged* [52] in which a secluded utopian society is founded based on a gold coin money system.

Greenspan's article is very astute and incisive, such as in how it focuses on the issue of consent by money holders, but it contains the same classic *cui bono caveat emptor* error. Greenspan assumes the “welfare state” is the recipient of the revenue accruing from money expansion. The article also tends to mix up the fairness *vs.* soundness issue.

By the previous section, scarcity integrity is the true goal of a fair and sound monetary system. Greenspan's argument phrased in this terminology is that a gold standard implies scarcity integrity. Yet in the same article he describes privately-owned money expansion based on fractional reserves, backed by a gold standard, as an accepted, conventional, and legitimate banking practice. But in that case there is not necessarily a way for wealth-holders to protect themselves from confiscation *via* dilution either, except, traditionally, government regulation! Alas, another case of *recursive bite 'em ad infinitum*, which gold does not inevitably halt.

Greenspan does make the excellent point that in a free market of private fractional reserve banks, *r* will at least be subject to competitive pressures based on best interest rates offered. Unfortunately, there is nothing intrinsic about gold that ensures that bankers will not debase a receipt system—historically, oftentimes governments (taxpayers) have had to refund losses to depositors due to collapses from poor or greedy management. (A minor case could be made that gold coins circulating in the economy would serve as a check on private expansion.)

Gold money advocates, oftentimes a motley crew, have recently gained some traction by starting new currency systems administered over the internet, as profiled recently in an entertaining account by Dibbell in *Wired* magazine entitled “In gold we trust: from gun-wielding libertarians to radical Muslims, an unlikely global cabal is plotting financial revolution.” [16] But they seem to not directly confront the real key issue of how money holders ensure or are guaranteed it is fully backed and not fractional.

Within money reform circles there is much lack of careful distinction over the difference between the medium itself and the administration system, *i.e.* what mechanisms ensure scarcity integrity. Maybe they adhere to the unconscious equation that “the

purity of the gold is equal to the purity of the bank.” But the former is physical and the latter is more abstract, and scarcity integrity is exactly the chasm separating the two.

Gold or other precious metals certainly seem an excellent base for a fully-backed currency with scarcity integrity. What might ensure scarcity integrity is not so much gold backing but regular, independent audits that certify full backing. A later section, “21st century blip-system,” will make proposals on alternative systems based on these observations.

Gold advocates may disagree with the conclusion already reached above that ‘blips’ alone are a possible and viable basis for a sound and fair monetary system with scarcity integrity. The case will be made that a blip-system may actually maximize scarcity integrity in crucial ways that a physically-backed system cannot, by simplifying the process of auditing.

## 5 blips vs. nations

“Let me issue and control a nation’s money and I care not who makes its laws.”

—*Mayer Amschel Rothschild*

“A private central bank issuing the public currency is a greater menace to the liberties of the people than a standing army.”

—*Thomas Jefferson*

The striking dichotomies and convoluted gyrations that arise between political and economic power were in full force at the founding of the U.S. and have persisted strongly throughout its history. Griffin [32] documents very thoroughly the numerous upheavals and crises that centered around the banking system. The entire U.S. government revolution, with the motto “no taxation without representation!” was based on defiance of the existing dual *economic and political* order. The modern equivalent might as well be framed as, “no allocation without representation!” (*Re, recursive bite 'em ad infinitum!*) The debate is very much reflected or even epitomized in the archetypical schism between Hamilton and Jefferson and excellently analyzed in Gordon’s work. [28]

In the year before the Constitutional convention, egalitarian populist Thomas Paine wrote that he was strongly opposed to fiat money, which he called *counterfeiting by the state*. He specifically abhorred legal tender laws which force people to accept it, saying “the punishment of a member [of the convention] who should move for such a law ought to be *death*.”

The provision allowing “emitting bills of credit” contained in the prior articles of the confederacy (used as a draft for the new constitution), proven historically disastrous, was struck down by an overwhelming margin. Voicing the sentiment of the majority of delegates, Hamilton said, “To emit an unfunded paper as the sign of value ought not to continue a formal part of the Constitution, *nor ever hereafter to be employed*; being, in its nature, repugnant with abuses and liable to be made the engine of imposition and fraud.” But his views were complex; he had also stated:

A national debt, if it is not excessive, will be to us a national blessing. It will be a powerful cement to our nation. It will also create a necessity for keeping up taxation to a degree which, without being oppressive, will be a spur to industry.

During the many political trials-by-fire of the fledgling nation, Jefferson shrilly sounded the alarm bell many times:

If the American people ever allow private banks to control the issue of their currency, first by inflation and then by deflation, the banks and the corporations that will grow up around them will deprive the people of all property until their children wake up homeless on the continent their Fathers conquered.

In 1814 Jefferson retired to Monticello and bitterly resigned himself to defeat on the issue of the nation’s currency. In a letter to John Adams he wrote:

I have ever been the enemy of banks; not of those discounting for cash, but of those foisting their own paper into circulation,



and thus banishing our cash. My zeal against those institutions was so warm and open at the establishment of the bank of the U.S. that I was derided as a Maniac by the tribe of bank-mongers, who were seeking to filch from the public their swindling and barren gains. . . . Shall we build an altar to the old paper money of the revolution, which ruined individuals but saved the republic, and burn on that all the bank charters present and future, and their notes with them? For these are to ruin both republic and individuals. This cannot be done. The Mania is too strong. It has seized by its delusions and corruptions all the members of our governments, general, special, and individual.

In the phrase contrasting “discounting for cash” *vs.* “foisting paper into circulation, thus banishing cash,” Jefferson was making the distinction between a legitimate bank seigniorage fee (known to the depositor) and fractional reserve banking. The remainder captures firsthand the ‘maniacal and delusional corruption’ of ‘filching and swindling bank-mongers’ Jefferson faced, who’d witnessed the entire revolutionary war. Ironically, Jefferson died leaving his mansion estate Monticello deeply in debt!

President Andrew Jackson successfully managed to extricate the government from the clutches of a private banking system run by Biddle during his term in a vicious battle, even after a monumental confrontation with Congress and the Supreme Court, once shouting at a group of bank supporters in a fit of rage, “You are a den of vipers and thieves! I will route you out!” Jackson declared that the second bank of the U.S. was a quarter owned by foreign investors who reaped its profits *via* the era’s equivalent of privately-owned money expansion.

## blips *vs.* civilization

Josiah Stamp, a president of the Bank of England, once spoke candidly during an informal talk to about 150 history, economic, and social science professors in the late 1920’s at the University of Texas: [27]

Banking was conceived in iniquity and born in sin. The bankers own the world. Take it away from them, but leave them the power to create money and control over that money, and they will create that money right back again. Take this power away from bankers and all great fortunes will disappear, and they ought to disappear, for this then would be a happier, better world to live in. My sons should not object; they are well educated and should be willing to take their place in the business world. But if you want to continue to be slaves to the banker and pay the cost of your own enslavement, then let the bankers continue to create money and control credit. However, as long as government will legalize such things, a man is foolish not to be a banker.

This is a remarkably modern view relative to the ideas espoused in this paper. Stamp has captured the idea of worldwide enslavement *via* the money system and contrasted it with the productive activities of business.

The following quote circulates in money reform literature and is attributed to the Rothschild brothers.

The few who can understand the system [of fractional reserve banking] will be so interested in its profits, or so dependent on its favors, that there will be no opposition from that class, while on the other hand, the great body of the people mentally incapable of comprehending the tremendous advantage that capital derives from the system, will bear its burdens without complaint, and perhaps without even suspecting that the system is inimical to their interests.

Here the Rothschilds refer to the *parasitical* money-energy extracting ‘class’ on one hand and how it is woven together, and the careful balance with an uneducated public that supports the system on the other hand. All the words “tremendous advantage,” “burden,” and “inimical” are arguably understated or misleading. Also note that they suggest only that “perhaps” no suspicion will be aroused, implying the

system may still be workable if suspicion is aroused but it never comes to anything (*e.g.* the conversation quoted above between Patman and Eccles in 1941).

Robert H. Hemphill, Credit Manager of Federal Reserve Bank, Atlanta, Georgia stated: [32]

This is a staggering thought. We are completely dependent on the Commercial Banks. Someone has to borrow every dollar we have in circulation, cash or credit. If the Banks create ample synthetic money, we are prosperous; if not, we starve. We are, absolutely, without a permanent money system. When one gets a complete grasp of the picture, the tragic absurdity of our hopeless position is almost incredible, but there it is. It is the most important subject intelligent persons can investigate and reflect upon. It is so important that our present civilization may collapse, unless it becomes widely understood, and the defects remedied very soon.

*Ergo*, blips *vs.* civilization, humanity, the world, *atoms!* Hemphill is correct in the account except his insistence that the system may collapse, a claim by many other writers. Assuming the *parasite* is not suicidal, the system would be carefully maintained and kept as stable as possible—no “killing the goose that lays golden eggs.” Also, from the point of view of the parasite, the system has no defects, it is functioning as required. He also fails emphasize the mere *borrowing* of dollars is not so sinister as much as the obligatory *repayment* to the Commercial Banks.

So some basic themes emerge from all accounts. In the real world of atoms, blip mechanics involves various key dynamics:

**religion *vs.* science** The public and its elected officials may simply have blind faith in the scarcity integrity of the blip-system, both in theoretical and physical terms, or they may actually directly at least verify that it runs correctly, according to intent, and is free of corruption.

**slavery *vs.* freedom** Blips measure scarcity-units which are also equivalent to time and labor by

citizens, taxpayers, and moneyholders by their voluntary consent. “Blip-masters” (controllers of the blips) can gain indentured servants—slaves.

**parasitism *vs.* productivity** If a parasite can defeat defense mechanisms, infiltrate, and seize effective control of the blip-system, it can leech real money-energy *via* abstract blip manipulation. But it must be done while evading detection of the host, either physical or theoretical.

**warfare *vs.* prosperity** Jefferson direly warned that, in his opinion, in-the-flesh “standing armies” lined up against the country’s borders were *less* deadly than blip-system parasite infection. By earlier analogies, counterfeiting is an almost unbelievably effective tool of *invisible warfare via* seizure of assets and control (of *e.g.* slaves or especially political machinery).

## 6 the religion of capitalism

“...the free-market faith stands on the verge of becoming a national cult.”

—*T.C. Frank* [24]

“But my second response, horror, had to do with seeing, writ large as only a confab of True Believers can do, technolibertarianism.”

—*Paulina Borsook* [7]

Capitalism as a religion may seem a dubious metaphor to many, but the symptomology is present, identifiable, and unmistakable in modern culture. Critiques of capitalist ideology as verging on religion can be found in *e.g.* “The folklore of capitalism” [24] or the chapter “Bionomics in your Daily Life” in Borsook’s book, *Cyberselfish* [7]. Any critique quickly faces the “fish in the water problem.” Capitalism engulfs and encircles humanity’s modern intellectual environment in the same way water surrounds fish, presumably those of which (as the analogy goes) who’ve never experienced “fresh air” are incapable of comprehending the concept.

The same people that would scoff at the idea of capitalism as a religion might also scoff at the idea of lack of true scarcity integrity in the U.S. blip-system. Yet their confidence is a matter of *faith*. Among the public, nobody has firsthand knowledge of how the system operates or what super-secure safeguards are present to ensure lack of corruption. Re: Patman *vs.* Eccles, the internal dynamics of the Federal Reserve are shrouded in secrecy even from *Congress*—hence, books on the Federal Reserve with titles like *Secrets of the Temple* by Greider [31], *Secrets of the Federal Reserve* by Mullins [49], *The Secret World of Money* [27], *The Occult Technology of Power* [1], or *Creature from Jekyll Island* by Griffin [32].

It’s all reminiscent of the now-urban-legend of Fort Knox that supposedly once stored all the nation’s gold reserves. As stated by Barry Goldwater in the earlier quote, *the Federal Reserve has never been independently audited*. This may not seem so disturbing—after all, many companies are never audited by outside agencies either. Except, when one considers that if new blips are arbitrarily created in the electronic transaction system of the Federal Reserve (known as FedWire), *no outside detection is possible whatsoever* because there *is* no outside system that verifies (or even *can* verify) the *total quantity* of FedWire deposits!

As outlined, as is commonly mistakenly supposed, the religious aspects of capitalism are *not* related to the abstraction of blips, because a nonphysical blip-system is a totally workable foundation for a secure banking system. What involves faith is the assumption that it is administered without any kind of manipulation, or that the only kind of manipulation is that in which the government uses the extra revenue for the same purposes as taxation, *i.e.* public services.

Another related faith is that government representatives will ensure it has scarcity integrity; but as with the Patman-Eccles exchange, that accountability approaches a fantasy. The banking “priesthood” uses the catchword *credit* as a euphemism for *routine and unrestrained blip creation*—the exact *opposite* of scarcity integrity! Not coincidentally the rational justification for economic scripture is not available, nor questioning permitted, to “laymen.”

If capitalism is a religion, then any suspicion regarding the system’s integrity, particularly that focusing on the specific mechanisms of its actual physical embodiment (such as money expansion, central banks, or fractional reserve banking) may all be regarded as sacrilege, heresy, blasphemy, or a conspiracy theory. Definitely the idea of privately-owned money expansion gains veers into this territory. Similarly, by one account, ex-chief economist of the World Bank Joseph Stiglitz was “*excommunicated* [fired] purely for expressing mild dissent from globalisation World Bank-style. . . Stiglitz cannot simply be dismissed as a conspiracy nutter.” [51] Apparently Stiglitz no longer qualified as the chief proseletyzer.

Capitalism as a religion finds a major expression in the works of Ayn Rand such as *Atlas Shrugged* [52] published in 1957, one decade prior to the essay by Greenspan [30] quoted previously. Rand’s philosophy of “Objectivism” overlaps with libertarianism especially in regards to money. The idea of government bureaucrats as inherently a parasitical force on the productive members of society is an intense theme of her book. Unfortunately this falls into the *cui bono caveat emptor* trap. There is nothing inevitable about embezzlement ending with government, and the assumption possibly dangerously diverts attention. Government bureaucrats could be unwitting or witting pawns in a more “insidious process” (to borrow her early disciple Greenspan’s own phrase). As the saying goes, *follow the money*.

## church dogma

“Religion is the opiate of the masses.”  
—*Karl Marx*

“Don’t worry, be happy!”  
—*Bobby McFerrin*

If capitalism were a religion, one would expect unusual, mystical, intricate symbology, such as that which adorns a dollar bill. Or, elaborate worship ceremonies, such as a master priest routinely appearing before Congress to utter mysterious proclamations, such that a mere single phrase like “irrational exuberance” could throw worldwide markets into gyrating

repercussions. The adjustment of key economic parameters with worldwide-rippling consequences such as interest rates or money expansion would seem to have all the same scientific precision and consistency as interpretation of slaughtered animal entrails.

Martin Luther sparked the protestant reformation of the Catholic church in Europe by nailing his 95 theses to a church door in 1517. He chiefly protested the sale of “indulgences” by the church, *via* which he asserted the church authorities were misleading the public into believing they could buy forgiveness for their sins—that they were in fact worthless relative to that purpose. Historically, the indulgences were sold as a *financing mechanism* for additions and embellishments to the elaborately expensive and ornate Church cathedrals! Replace “indulgences” with “blips” and the modern worldwide religion begins to emerge. Are money holders being “sold” worthless blips by the central banking or fractional reserve banking systems? *Caveat emptor ad nauseam*.

Another phenomenon of capitalism as a religion takes place in teeming business pep rallies, of which all companies Microsoft has probably most perfected *via* Steve Ballmer’s revivalist-preacher showmanship. Tens of thousands of employees regularly file into a stadium for a show resembling a religious celebration turned “mass” hypnotism.

In a speech at Carnegie-Mellon University on April 10, 1980, candidate George Bush attacked incumbent Ronald Reagan for “a voodoo economic policy” comparable to something concocted by a “Governor Moonbeam,” a deadly-resonant epithet that ringed through public debate and launched two decades of editorial derisions about “voodoo economics” that continue to the present day.

There may be some hope that the new science of econophysics, in its bare and fragile infancy, may nevertheless be able to hold up some candlelight in the darkness of “the dismal science.” What aspects of it are really senseless superstition now masquerading as science?

In a religion, various terms have special meaning that may drift from reality *via* reiterated, increasingly disconnected dogma, such as:

**money supply** Expansion is called “increasing the

money supply” in the mainstream media. But this is specious and misleading lacking information on *to whom specifically the money is supplied*. The terminology is far more accurately called *dilution* (totally analogous to secondary stock offerings) or “debasing the currency.” It’s a secondary money stock offering backed by the entire country’s assets (underwritten and paid for by all citizens, taxpayers, and money holders).

**deflation** Deflation in the modern vocabulary is synonymous with calamity or disaster. But by the findings on temperature increase in the economy, a deflation may be a natural process whereby an increasingly efficient economy distributes the gains to all money holders—an “emergent” interest system requiring no centralized or bureaucratic administration, or possibility of ulterior manipulation. Deflation therefore can be a sign of a *healthy* economy with highly secure scarcity integrity!

**price stability** The doctrine of Keynesianism advocated that governments spend countries out of recessions *via* borrowing. It was eventually eclipsed by monetarism which proposes a fixed money supply rule where the money expansion rate should match growth in GDP. This does ensure price stability, but by the findings on temperature increase, money holders may *lose* wealth in a growing economy due to price stability.

**fighting inflation** Inflation is conceived as a mysterious, external, and only-marginally-controllable phenomenon much like the weather. But a central bank such as the Federal Reserve and its valiant but quixotic expansionary monetary policy “rain dance” are the *source* of inflation. [54, 26] If the expansionary monetary policy is flawed then the end effect may be to fight collective gains of publicly-generated wealth increases by diverting them to an elite few!

**free market** In *lassaiz-fair* capitalist proponents’ ideology the market is guided by Adam Smith’s

“invisible hand” of supply and demand forces. However the most important supply and demand mechanism, that which entails and subsumes all others, is the scarcity integrity of the overall system. All market dynamics is built on top of that structure. If the underlying “blip operating system” is flawed, nothing built on top of it is possibly legitimate—the possibility of a free market is fundamentally and intrinsically corrupted.

**growth** One of the most charged and loaded terms of all, “growth” as equivalent to salvation is a presumption not necessarily fulfilled by reality. The gains may not be equally distributed. But the “more pressing” matter is that growth in the overall economy is increasingly totally equivalent to dangerously amplified earth-wide environmental stresses verging into crises.

**market rates** The “free market” *non sequitur* is epitomized in the central banks’ control over interest rates and money expansion which would otherwise be determined by self-regulating market mechanisms such as deflation. Self-correcting mechanisms have been hijacked for bureaucratic machinations, effectively installing a built-in, invisible caste system—with an elite class euphemistically referred to by the Rothschilds as “the few who can understand the system, interested in its profits, or dependent on its favors.” In a sense, the money system itself is not free. Or, tail wagging the dog, it becomes the arbiter of all freedoms.

## 7 economic slavery

“Whoever controls the volume of money in any country is the absolute master of all industry and commerce.”

—James Garfield

“Money is a new form of slavery, and distinguishable from the old simply by the fact that it is impersonal—that there is no human relation between master and slave.”

—Leon N. Tolstoy

“None are more enslaved than those who falsely believe they are free.”

—Goethe

Slavery has persisted throughout recorded human history, possibly as long as or *longer* than money, and the modern era’s supposed obliteration of it can be regarded as something of a rare anomaly. Entire civilizations such as those of both Rome and Greece had economic systems that were unsustainable without slaves—more accurately, slavery formed the basis of their systems. But one might argue that slavery persists at the entry into the 21st century, just in a disguised form. Modern vernacular is rife with direct and indirect allusions to slavery. For example, the trap of low-paying jobs is referred to as “wage slavery.”

One origin of the modern “dismal science” of economics is sometimes dated as beginning with Thomas Carlyle’s 1849 denunciation of its views for the conflict of market dynamics with slavery. As Levy analyzes in his essay entitled “150 Years and Still Dismal!”: [41]

Carlyle makes a point of vital importance: the economics of his contemporaries in its idealization of market relationships among equals stands in opposition to his dream of slavery’s hierarchical obedience.

Too often soft-pedaled by those who admire his attack on economics, Carlyle was the premier theorist of the idealized slave society. In opposition to the economists’ supply-and-demand model of human society, he put forward the doctrine of obedience to one’s betters.

One may recoil at Carlyle’s aged sneer as a dark corner of a past era, an aberrant monstrosity of morality relative to today’s enlightened view. But eerie resemblance is not so easily dismissed if one remembers the entire modern worldwide economic system is based on *subservience to abstract ‘blips.’*

Therefore the concept of blips denominating tangible wealth or property can be deceptive. Blips have also become the standard denomination for all human

labor. The supply-and-demand model of human society has become the doctrine of obedience to blips. Or, “one’s betters” has been replaced with “blip-owners.”

The saying “time is money” is a reference to human labor—workers’ time is equivalent to money and can be bought and sold like a physical commodity. In many ways the central concept of economic *scarcity* is most appropriately applied to the finite *time* of all human lifetimes. The goal of “scarcity integrity” is therefore closely related to *life conservation*.

More uncomfortable insight is available in the study of the etymology of the word *seigniorage* which stems from *seignior*, a *feudal lord* who held dominion over his serfs. As modern economics preoccupation with “seigniorage” reveals, the supposed “march of progress” culminating in today’s wildly rampant technological age may not have abolished slavery, only *streamlined, optimized, and perfected the system for implementing and managing it*. If the blip-system is corrupted it has the potential to become a *state-of-the-art, technologically-based, 21st century slavery system*. *Re:* Goethe’s quote, it may also have the extraordinary property that it is largely *invisible*, the hidden framework not perceived by the slaves themselves!

In a stark historical irony, the word “Luddite” has come to be synonymous with an anti-technological stance: “one who opposes technical or technological change.” Luddites were hand-weavers and craftspeople who attacked the introduction of the automated loom but also by association the *squalid and inhumane* working conditions in factories in the early 1800s. (Jacquard, the inventor of the loom, was once almost killed by a rioting mob!) The automated Jacquard loom served as an inspiration for Babbage’s difference engine and is therefore accurately regarded as an early conceptual origination of the *computer*.

Hence, Luddites as merely anti-technologists is the one-dimensional view and possibly a dangerous red herring. The original Luddite movement could just as well be regarded as an opposition or rebellion to *technological slavery*. The concept of technology as somehow incompatible or inconsistent with slavery is an unconscious prejudice verging on an insidious archetype. Historically, various technological inventions (one example being improved shipbuilding or

shipnavigation techniques) have *exacerbated* slavery by making it more *viable, practical, manageable, or efficient*.

## 21st century sweatshops

“If you don’t know who the sucker is, then you’re it.”

—*gambler’s aphorism*

(reiterated by Warren Buffet)

So not uncoincidentally, realistic accounts that chronicle the high-technology “revolution” inescapably fall into documenting “sweatshop-like” conditions, *e.g.* *White Collar Sweatshop: The Deterioration of Work and Its Rewards in Corporate America* by Frasier [25], *NetSlaves: True Tales of Working the Web* by Lessard and Baldwin [40], or Coupland’s influential *Microserfs* [15] about actual working conditions inside Microsoft. As Lessard writes, “The unlucky ones—and by that I mean the four million or so workers who labor every day in the tech business—work away in high-pressure, low-security positions where a pink slip is a far likelier thing to see in their inboxes than a Vegas-style payout.”

These books sometimes can only be published in the vein of parody or satire even though they more closely approach anthropological studies, often a compromised dilution of the original intents of the authors in exposing inhumane conditions. (One chapter from *NetSlaves* is entitled, “Robber Barons: Who Needs Dynamite When We’ve Got IPO’s?”) Lessard and Baldwin’s book, initially “rejected by innumerable agents and publishers, rescued from the gutter” assert the mass media is responsible for distorting the reality of the business (Borsook calls it “business pornography” [7]):

The more I thought about the Net’s Universal Success Myth—the idea that winners predominate in this business and losers are the exception—the more it grated on my own experience and the experiences of almost everyone I know in the technology business. I’m a living testament to the fact that most Internet careers are nasty, brutish, and short, and I’m not alone.

Life as nasty, brutish, and short is an allusion to Thomas Hobbes' observation of the human condition, made during the medieval era of mass serfdom, but basically a synonymous euphemism for slavery.

The founding of the U.S. and an entire century of its government was fundamentally oriented around slavery and its official government sanctioning. Many earlier colonists of the country were penniless *indentured servants* who paid for the trip abroad *via* a kind of temporary slavery, buying their freedom at the rate of *e.g.*  $\frac{1}{7}$  per year. (The use of the many Jefferson quotes in this paper could certainly be construed as hypocritical, Jefferson being a slavemaster.)

The modern view clearly has a blind spot; apparently slavery and economic systems have *always* been inextricably intertwined. And progress in both political and economic systems have come *via* shifting perceptions and new realizations on the true nature of slavery, the exact forms of its manifestation, and its fundamental *immorality*. Arguably the key legal role of government even agreed-to by extreme libertarians, *protecting property*, is symmetrically mirrored by a twin: *preventing slavery*. The dated term "slavery" may be replaced with the equivalent present day terminology, *economic exploitation*.

If the blip-system has scarcity integrity, then its fairness implies the impossibility of its use for enslavement. In a fair system, private entities cannot create and own blips at the expense of the public. However, that is *not* the case with the fractional reserve banking system, with its intrinsic privately-owned expansion, from the mathematical results here on money-energy siphoning and even by the implicit or direct conclusions of various authorities.

Eccles' reply to Patman was that blips are routinely created outside of state authority. Since they are not owned by the state (the question which prompted their dialogue in the first place), they must be privately-owned. Therefore, fundamentally, *fractional reserve banking is equivalent to economic slavery*. It might be renamed a "fractional freedom" system. *Re* Bank of England president Stamp's quote

with relevant terms emphasized:

*...if you want to continue to be slaves to the banker and pay the cost of your own enslavement, then let the bankers continue to create money and control credit.*

## 8 economic parasitism

"History records that the money changers have used every form of abuse, intrigue, deceit, and violent means possible to maintain their control over governments by controlling money and its issuance."

—John Adams

"The money power preys on the nation in times of peace, and conspires against it in times of adversity. It is more despotic than monarchy, more insolent than autocracy, more selfish than bureaucracy. It denounces, as public enemies, all who question its methods or throw light upon its crimes."

—Abraham Lincoln

Mere belief in a religion may have a relatively innocuous effect on practitioners if it doesn't demand major "sacrifices"—except that, as history shouts, economic policy according to superstition is inescapably disastrous. Slavery, in contrast, is today regarded as a moral horror or even poison. But even these disturbing charges may pale in capturing the accurate reality of a corrupt blip-system. Smith noted an "invisible hand," Keynes noted the "invisible tax," and prior sections considered the possibility of an "invisible caste system" promoting "invisible slavery." Invisibility can be especially treacherous. A more diabolical metaphor is required.

Invisibility is a common theme in the earlier descriptions. Again, the Rothschilds noted the class of "the few who can understand the system, interested in its profits, or so dependent on its favors." Above Adams refers to the "money changers" and Lincoln refers to the "money power that conspires and preys

on the state.”

**conspire:** To plan together secretly to commit an illegal or wrongful act or accomplish a legal purpose through illegal action.

In the strongest indictment possible, Jefferson referred to “maniacal, delusional, corrupt, swindling bank-mongers.” Jefferson attempted to make a careful distinction of banks with seigniorage fees, and those practicing fractional reserve banking *via* “foisting their own paper into circulation, and thus banishing our cash.” Greenspan referred to money debasement as “an insidious process.”

What these accounts all have in common is an attempt to distinguish legitimate from illegitimate banking practices, and the contents of this paper are designed to nail down that dichotomy even further *via* mathematical precision. But they also are referring to a sort of “hidden alien force” that transcends the existing conceptual boundaries of government and banking.

They warn of it as an almost indescribably dangerous phenomenon, almost an entity. Earlier this was referred to as the “mechanisms, elements, and agendas capable of, and at times applying, money-energy extraction without consent of money holders *via* concealment within the money system administration” that may reside in either government or banking institutions. (To borrow Eisenhower’s neologism on the “military-industrial complex,” call it the “government-banking complex.”) Along these lines, privately-owned expansion was also concluded to be a *leeching*.

These accounts all converge to describing *parasitism*. Hence, insight from biology on parasites becomes relevant and applicable.

**parasite:** An organism that grows, feeds, and is sheltered on or in a different organism while contributing nothing to the survival of its host.

The idea of parasitism in economics or society is *millenias* old (an alternate meaning of “parasite” is “a professional dinner guest” that dates to the Greek era!) but was historically typically applied to people

who refused or evaded work. Zimmer [70] gives a colorful overview in his chapter “Nature’s Criminals” that weaves from ancient to modern times, with stops at Darwinism and even Nazism. The idea of wealth-owners as parasites is a more recent invention.

In yet another case of *recursive bite ’em ad infinitum*, in 1898 a pamphleteer John Brown wrote a book called *Parasitic Wealth or Money Reform: A Manifesto to the People of the U.S. and to the Workers of the World*, charging that three-quarters of the nation’s money was concentrated in the hands of three percent of the population, that the rich sucked the wealth of the nation away, and that their protected industries flourished at the people’s expense: [70]

With the refinement of innate cruelty, these parasites eat their way into the living substance of their unwilling but helpless host, avoiding all the vital parts to prolong the agony of a lingering death.

## bionomics

“I believe that I have given only the first rough outlines of a province of a great terra incognita which lies unexplored before us and the exploration of which promises a return such as we can at present scarcely appreciate.”

—*Johann Streenstrup on parasites (1845)*

Rothschild’s seminal and definitive *Bionomics* [55] (published in 1990) has a short chapter “Parasitism and Exploitation” with the following:

Discerning “right” from “wrong” in economics is a matter of distinguishing mutualistic from parasitic relationships. The history of civilization chronicles the gradual erection of a system of laws banning parasitic economic behavior. . . . Slavery, the most obscene form of economic parasitism, has been virtually eradicated.

Hosts are victims. No victim ever chooses to be robbed, enslaved, or denied basic human rights. Economic parasites use



secrecy, deception, brute force, and legal authority as their “hooks.” By latching onto their unwilling hosts, they are able to extort profits that no mutually voluntary relationship would provide.

...to the extent that parasitic behavior is curtailed, society benefits. A healthy capitalist economy is a community of interdependent mutualists.

To create an environment where cooperation flourishes, the elimination of exploitation in all its forms should be the chief objective of a society’s economic laws. But keeping antiparasite laws in step with a rapidly evolving economy isn’t simple. Identifying the economy’s true parasites and writing laws that destroy their hooks requires a bionomics perspective.

One survey of the idea of parasitism relative to economics can be found in Levy’s essay, “The secret history of the dismal science: parasite economics and market exchange.” [42] However, it advances the common idea of nonworking people (such as welfare recipients) as parasites, the typical association for the idea in this context, also a major theme of Rand’s fiction. [52] But this seems an inaccurate view, because it fails to capture the key element of *invisibility* of the parasite. In biology, parasites must *evade the defenses or detection of its host*. The analogy is that the parasite blends in to the normal surroundings, such as a faceless bureaucrat within an institution—or specious theories in standard economic dogma. A synonym for corruption then becomes *infection*.

Lincoln warned of the money power “preying on the nation,” very close to the parasitism conception. But arguably a key distinction between predator-prey relationships and parasitism is the invisibility of the parasite. The predator openly kills its prey, but the parasite covertly sucks the energy of its living host for indefinite time. The parasite must be *invisible* to the host to accomplish this. Invisibility is a prerequisite to sustaining the ongoing parasitism.

Hence, it naturally makes sense to define invisible slavery as human parasitism. Then arguably the converse case to Rothschild’s assertion above can be

made, (and like Goethe’s observation on slavery) *parasitism is the most insidious form of slavery*.

The standard form of worldwide “fractional reserve banking” is synonymous with privately-owned money expansion. It is not generally regarded as harmful; in fact it is seen as intrinsic to the institution of banking. But by the prior mathematical findings, it inequitably leeches money-energy from all citizens, taxpayers, and money holders. Therefore, fundamentally, *fractional reserve banking is equivalent to economic parasitism*.

From the prior analysis, one immediate question is, how could a privately-owned expansion system possibly have been erected? As [32, 49] and many others have accused, the Federal Reserve was erected surreptitiously, clandestinely, and possibly even *via* subterfuge(s). Griffin refers to the Federal Reserve as *The Creature from Jekyll Island*, where the scheme of its founding was hatched in collusion and strict secrecy in 1910 among the world’s most powerful bankers of the time.

*The “creature” is a parasite.* Jefferson’s “tribe of bank-mongers,” Adam’s “moneychangers,” Lincoln’s “money power,” Garfield’s “absolute master of all industry and commerce,” Rothschilds’ “class of few who can understand the system, dependent on its favors,” Greenspan’s “welfare state,” Griffin’s “creature”—they are all simply describing the parasite attaching to the host organism, the government-banking complex, while evading its normal defense mechanisms, such as open legislative hearings, public review and debate, expert scrutiny, *etc.*

For purposes here, the hypothetical entity will be called “*the money parasite*.” Jefferson warned in his time that “it has seized by its delusions and corruptions all the members of our governments, general, special, and individual.” Does it still survive?

If the parasite exists it would not be surprising from the biological perspective. As noted in the introduction, by some estimates parasites outnumber freeliving species by *four-to-one*. Biology is, therefore, largely the study of parasites. Economics at its heart is a life energy system with extremely strong parallels to biology. It is quite plausible that bionomics must also, therefore, largely be the study of parasitism. Such a view is of course completely un-

conventional and disturbing, to say the least.

## bloodstreams

“It’s a little like the Middle Ages. When the patient died they would say “well, we stopped the bloodletting too soon, he still had a little blood in him.”

—Joseph Stiglitz

World Bank ex-chief economist

The prologue to Zimmer’s outstanding and colorful recent overview of new paradigm shifts in parasitology, *Parasite Rex: Inside the Bizarre World of Nature’s Most Dangerous Creatures* [70] (published year 2000) is entitled “A vein is a river.” Virtually all biological parasites tend to live partially or wholly in the bloodstreams of their hosts. It can be used as a transportation system to other final target sites, but very commonly the blood itself is used as the parasite’s primary or sole food source. So the earlier engineering analogies of economics as an energy system map onto the biological parallel of it as a *bloodstream*.

In a bloodstream, blood platelets transport oxygen to all cells, which require and use it to burn chemical fuel and produce energy. So it can be viewed as an energy component. Similarly in an economy, dollars are the energy source for citizens—both are called *circulation systems*. The natural nexus for a government-banking complex parasite is in the money system. And the natural place to look for clues to its dynamics is among the tactics of real parasites.

Malaria, caused by the *plasmodium* parasite, is one of the most deadly human parasites, and still kills an estimated 2.7 million humans per year. Plasmodium enters the human bloodstream through a mosquito bite and lives in the red blood cells. The parasite can clamp onto and wanders blood vessel walls with *hooks* (recall Rothschild’s terminology) that act like tank treads, also used to latch onto platelets for invasion. It blasts through a platelet, fully enters, and the platelet’s resilient meshwork seals tightly shut behind it, all in *fifteen seconds*. The parasite then eats away at the hemoglobin within the cell.

*Plasmodium* raises the metabolic rate of its host blood cell *three hundred fifty times* to make new

copies and build molecular scalpels. The parasite adds sticky molecules to the surface of the platelet that cause it to cling to blood vessel walls and drop out of the body’s circulation (recall the earlier charge-storing capacitor electrical analogy). They clump up in capillaries in the brain, liver, and other organs. In this way they evade detection of the spleen which serves as a slaughterhouse for old or damaged red blood cells.

*Trypanosoma brucei* is the parasite that causes sleeping sickness, another extremely deadly human parasite that kills about 3 million per year. Trypanosomes are the drill-bit-shaped, self-contained cells of the parasite that swim alongside regular blood cells. During replication they occasionally change their coat proteins to conceal their existence from the immune system. The immune system recognizes their characteristic shape and attacks, but by then a small contingent of trypanosomes have changed into the new unrecognizable form and multiply furiously.

The human hosts’ immune system then becomes chronically overstimulated, attacking their own body until the victims die. The trypanosomes carefully go through the sequence of new coat proteins from a large reservoir in a carefully predetermined order, because using any prior ones would be immediately recognized and be thwarted based on the immune system’s memory. *Via* this mechanism, infection can be stretched out for months or even years!

*Plasmodium* has a similar approach. The hooks jutting from the surface of the blood platelets risk getting the attention of the immune system. There are over a hundred latch variations, each with a unique shape. The parasite occasionally switches latch designs randomly. The technique is actually equivalent to that used by *polymorphic computer viruses* that can alter their own code into equivalent but unrecognizable forms.

*Trypanosoma* and *plasmodium* analogies will be considered in the following sections. Meanwhile, another striking metaphor presents itself relative to “economy as a bloodstream.” The application of parasitical leeches to patients to remove “bad blood” as a medical treatment persisted throughout the middle ages, and is now regarded as a shockingly harmful or even deadly practice without any redeeming legit-

imacy whatsoever.

That is, a practice supposedly with therapeutic properties, fully endorsed by theory and authority, with precisely the *opposite* effect was promulgated for *centuries* by some of the most knowledgeable and well-intentioned people of the times whose occupation was *promoting health*—physicians.

Is fractional reserve banking economics’ modern day form of bloodletting? Does the Federal Reserve “fight inflation,” “prevent deflation,” and achieve “price stability” in the “free market” by “increasing the money supply”?

## baitswitching & frog boiling

“Through no fault of his, it all came to naught. . . . Almost as fast as it issued from the Mint, the new coinage went into the melting pots of the goldsmiths.”

—Richard Westfall

on Newton’s Royal Mint term

“Experience has prevent that the simplest method of securing a silent weapon and gaining control of the public is to keep the public undisciplined and ignorant of the basic system principles on the one hand, while keeping them confused, disorganized, and distracted with matters of no real importance on the other hand.”

—*Silent Weapons for Quiet Wars* [2]

Recall Adams’ warning that the money parasite “uses every form of abuse, intrigue, deceit, and violent means possible to maintain its control.” This is a chillingly accurate description that is precisely mirrored with biological parasites, almost to the point that Adams seems to have anticipated modern discoveries in the field of parasitology!

So the sinister basic strategies of parasites such as *plasmodium* and *trypanosoma brunei* involve certain key themes. The technique of *bait-and-switch* is predominant, also similar to the tactic of utilizing *decoys*. A parasite can be invisible if it can *distract or divert* the “attention” of the host’s immune system. Relative to the money parasite, the sociological

equivalent of an immune system are the safeguards within the government-banking complex such as laws, investigators, regulators, hearings, *etc.*

As part of the bait-and-switch strategy of parasites, the immune system can be driven into wild oscillations, *i.e.* repeated waves of attack. In fact this oscillatory behavior was one of the first clues into the underlying bait-and-switch mechanisms of *trypanosoma brucei*.

In 1909 Ronald Ross plotted trypanosome counts over the period of infection for a patient. The “remarkable graph” showed a clear rhythm: for a few days the trypanosomes would skyrocket, multiplying by as much as fifteen-fold. Then, just as suddenly, they would drop back down to barely detectable numbers. The cycle would take a week or so and coincide with the patient’s fevers. In other words, not a single assault, but sequential, periodic waves of flaring outbreaks.

The money parasite parallel is not obvious, but one remarkable possibility can be proposed. Classical economists believed in the fundamental self-regulatory nature of the economy. In modern parlance, the mass economy functions as a unified biological organism. By the earlier findings here, deflation can be a natural and beneficial redistribution of increased GDP or efficiency. Deflation doesn’t imply “price stability” but it may imply *beneficial money-energy redistribution*. Similarly, possibly price fluctuations are symptoms or consequences of parasitical influence, or possibly even mechanisms for *fighting* money parasitism!

The basic conclusion is that economic dislocations and notorious *boom bust cycles* that have occurred so frequently in history may be “money parasite and immune system related”—directly analogous to the wild oscillations in parasite populations and immune system response. This view is generally supported and confirmed by Griffin’s careful historical re-examination. [32]

Griffin summarizes the strategy of the Jekyll Island colluders who founded the Federal Reserve, the world’s richest bankers of the time: “to convince Congress and the public that the establishment of a banking cartel was, somehow, a measure to protect the public.” The plan was one of baitswitching,

distraction, diversion, even deception: [32]

1. Do not call it a cartel nor even a central bank.
2. Make it look like a government agency.
3. Establish regional branches to create the appearance of decentralization, not dominated by Wall Street banks.
4. Begin with a conservative structure including sound banking principles knowing that the provisions can be quietly altered or removed in subsequent years.
5. Use the anger caused by recent panics and bank failures to create popular demand for monetary reform.
6. Offer the Jekyll Island plan as though it were in response to that need.
7. Employ university professors to give the plan the appearance of academic approval.
8. Speak out *against* the plan to convince the public that Wall Street bankers do not want it.

What Griffin is describing is a stealth invasion by the money parasite into the government-banking complex host body, based on subtle sabotage of its social defense mechanisms, *via* diversion, distraction, and deception. The integrity of legitimate banking and government institutions is debased exactly in parallel to the money itself! The quasi-government, quasi-bank netherworld duality serves as a subterfuge to evade the established checks and balances within either system!

**red herring:** Something that draws attention away from the subject under notice or discussion. [From the use of red herring by fugitive criminals to distract hunting dogs from their scent.]

Griffin is also describing another horrific tactic that might be referred to as “frog boiling.” The story is

that a frog, when thrown in a pan of boiling water, will immediately jump out. However, if placed in a pan of cool water, the frog will tolerate a gradually increasing temperature—*even to the point that it is eventually boiled to death*. Institutional integrity of the government-banking complex can be similarly gradually corroded—like a sort of Chinese water torture that slowly drives it to insanity.

## immune system infiltration

“... were it left to me to decide whether we should have a government without newspapers, or newspapers without a government, I should not hesitate a moment to prefer the latter.”

—Thomas Jefferson

The concept of the free press espoused by Jefferson and enshrined in the Constitution was as a supra-organizational force that could serve as a check on government and other social organizations—*i.e.* a kind of social immune system.

Instead of evasion of defenses, some of the most grisly parasites hijack or destroy the body’s own immune system. In several related species, *leishmania* can cause sores in the mild form (*leishmania major*), or in the more virulent and deadly forms, kill its human host within a year (*leishmania donovani*), or chew away the soft tissue of the head until the victim is faceless (*leishmania brasiliensis*). It infects macrophages, the immune system cells that normally destroy parasites by engulfing and slowly digesting them. As Zimmer writes: [70]

*Leishmania* doesn’t have to muscle its way into its host macrophage the way *plasmodium* pushes into red blood cells. It’s more like an enemy spy that knocks on the door of the headquarters and asks to be arrested.

The macrophage swallows up the parasite in a bubble that sinks into its interior. Normally, this would become a death chamber for a parasite. The macrophage would fuse that bubble with another one filled

with molecular scalpels, which it would use to dismantle *leishmania*. But somehow—scientists still don't know how—*leishmania* stops the bubbles from fusing. Its own bubble, now safe from attack, becomes a comfortable home where the parasite can thrive.

Another parasite, the blood fluke, can somehow cloak itself with a coat partially made out of the host's own blood cells by means that scientists are still only hypothesizing. "It may be that when the flukes pass by red blood cells or are attacked by white blood cells, they can tear out some of their host's molecules and attach them to their own surfaces. Thus, to the eyes of the immune system, the parasites are nothing but red shadows in a red river."

The tactic of evasion is replaced by infiltration. Recall Griffin's account above that the Jekyll Island plotters sought to "employ university professors to give the plan the appearance of academic approval," or to "offer the plan as though it were in response to popular demand and the need of *monetary reform*." As with bloodletting, *the parasite masquerades as the cure*.

So along these lines, a systematic study of seigniorage sponsored by the Federal Reserve such as [6] might have questionable impartiality.

Another direct possibility is skewed metrics for measuring crucial economic indicators such as inflation (CPI, Consumer Price Index) or unemployment levels. Historically there are many examples of political tinkering that have consistently *weakened* their sensitivity in detecting deteriorating economic conditions. These indicators are critical measurements for scientific study and in determining government economic policy, especially in identifying any deleterious effects!

Or, another analogy in the case of the money parasite is that social warning and defense mechanisms such as Jefferson's free press could be compromised or dismantled in a worldwide *blitzkrieg* of rampant money growth. This is exactly the assertion of John McMurtry, Professor of philosophy at the University of Guelph who has documented the case for international capitalism as entering a "cancer stage." (In medical science, cancer is not currently thought to

originate with parasites although a parasite source has been proposed and investigated in the past, see *e.g.* [43].)

The cancer metaphor is strongly in line with the earlier analogy of the economy or money system as also a life conservation system. McMurtry has honed the analogy carefully in his book, *The Cancer Stage of Capitalism and its Cure*. [46] "As on the cellular level, the cancer advances by not being recognized by surrounding life communities." McMurtry advances the metaphor of "world media as immune system" and suggests it has been hijacked and sabotaged. As he writes:

The essential problem of any life-threatening cancer is that the host body's immune system does not effectively recognise or respond to the cancer's challenge and advance. This failure of our social immune system to recognise and respond to the cancerous form of capitalism is understandable once we realise that the surveillance and communication organs of host social bodies across the world, as they now function, are incapable of recognising the nature and patterns of the disease. That is, capitalist-organised media and information systems select for dissemination only messages compatible with the capitalist organisation of social bodies.

## mind control & zombification

"They control their hosts, becoming in effect their new brain, and turning them into new creatures. It is as if the host itself is simply a puppet, and the parasite is the hand inside. "

—*Carl Zimmer* [70]

Adams warned of the money parasite's "use of every means possible to maintain its *control*" including *deception* and *violence*. Host control in parasitology has undergone a revolution in thinking. It was previously considered rare and few cases were known.

However, parasitologists are turning up new astonishing cases of the parasite controlling its host *via* altering host behavior to serve the parasite.

In many situations this control is very subtle and difficult to detect, particularly because it may be measurable only in the natural habitat of the host, not within an artificial laboratory environment. Often the precise mechanisms are unknown and in several cases actively under investigation by parasitologists. It's prime *terra incognita* territory to borrow parasitologist Streenstrup's quote.

The *sacculina* barnacle parasitizes crabs. Once infected the crab no longer moults and grows, which would funnel energy away from the parasite. The crab also loses the ability to regrow claws and mate. As Zimmer writes, "the crab begins to change into a new creature, one that exists to serve the parasite." Female crabs actually groom the parasite larvae as if they were their own eggs, launching them as heavy clouds in exactly the way their eggs are dispelled. The infected male crabs even adopt this characteristically female behavior with the same effect!

An Amazonian spore can infect ground-dwelling ants which normally never climb plants. It alters their behavior such that they become "insane" and begin to climb plants. The ant dies at the top of the plant where the spore can grow and break outside the ant carcass and launch itself airborne, falling to the ground to infect other ants.

A fly fungus accomplishes a similar feat, except that it causes flies to clamp down on high objects with precise timing. The infected fly maneuvers into a spore launching pad position only at sunset, when the air is cool and dewy enough for the spores to quickly develop on another fly, and only when other flies are moving down toward the ground as infection targets.

*Dicrocoelium dendriticum*, the lancet fluke, infests cows and other grazers as an adult, which spread the eggs in their manure. There snails swallow the eggs, which hatch in the intestines. The flukes reproduce in the snail, which are expelled by the snail in balls of slime. Ants eat the slime balls which may also contain hundreds of flukes. The flukes moves through the ant and eventually split up and move to the ant's mandible nerves, the abdomen, and the brain.

As Zimmer explains, "there they do some parasitic voodoo on their hosts." At night, the ant climbs and clamps down to the top of grass blades, unmoving, where it is devoured by a cow or another grazer eating the grass. That completes the cycle. Yet the fluke lets the ant loosen its grip on the grass at dawn if the ant hasn't been eaten, because both the ant and fluke would die from baking in the heat of direct sunlight! So instead "the ant scurries back down to the ground and spends the day acting like a regular insect again"—but repeats the "eat me" ritual the next night.

*Plasmodium*, the malaria parasite, alters the behavior of mosquitos to go from nonhungry to hungry depending on its vulnerability and readiness. A sick mosquito is twice more likely to drink the blood of two people in a single night. Carrying more blood to more hosts, it becomes a far more effective vector for spreading malaria.

Several parasites manipulate host behavior so that the host becomes more likely to be eaten by the next host in the chain. The extraordinary *Toxoplasma gondii* parasite infects *billions* of humans but is thought to be benign in the human host, although there is new evidence linking it with schizophrenia.

Part of *t. gondii's* lifecycle is lived in rats. It alters rat behavior *via* mechanisms that are not yet mapped. Rats normally exhibit fear of new environments, "neophobia," and avoid areas with cat smells. The infected rats are not neophobic and do not avoid cat smells, and may possibly even seek them out (but are generally otherwise indistinguishable). In effect they become "rodent kamakazes," more likely to be eaten by cats. The cat is *t. gondii's* next host in its own "food chain." These subtle behavioral modifications were only discovered as recently as the late 1990s.

*T. gondii* has also been shown within the mid-1990s to *alter human behavior*. Men become less willing to submit to the moral standards of a community, less worried about being punished for breaking society's rules, and more distrustful of other people. These changes presumably occur when *t. gondii* enters and manipulates their neurons. Researchers have so far casually or laughingly dismissed the idea that these behavioral changes have any significance in the

human host, but so far neither is there any evidence to the contrary—it’s a gaping open question.

What analogies can be drawn to the money parasite? The newer model of parasite evolution articulated by Zimmer is that they can be exquisitely sophisticated and evolutionarily adapted, from millennia of intimate co-evolution with their hosts, with the surgically-precise behavioral modifications as excellent, possibly foremost examples. If the money parasite persists, it is reasonable to suspect that it has similar sophistication. The idea of “parasite psychology” seems bizarre but it’s an inescapable and now-firmly-established direction of the research: some parasites alter host behavior by altering their brains. Zimmer accurately refers to altered hosts as “zombies.”

There are some immediate parallels, others presumably waiting to be mapped out in any new science of economic parasitology. Jefferson seemed to talk about a similar “zombification” associated with the “strong Mania of the tribe of bank-mongers, seized by its delusions and corruptions.” In a sense, “kamakaze bankers.”

However, the more relevant analogy seems to be to economic theory, which serves as the “brain” behind money expansion principles. The possibility must be faced that existing economic doctrine has been influenced, distorted, or even corrupted by the money parasite—conceivably at least as insidious as all the prior examples! There is some circumstantial evidence. It could be dismissed for its sketchiness, but on the other hand, increasingly parasitology inevitably must work from shadowy clues gleaned from fieldwork. Not all answers are matters of looking up reference books.

## smoke & mirrors, sleight of hand

“...you can see the computer age everywhere these days except in the productivity statistics.”

—Robert Solow [60]

“The productivity paradox is an artifact of superficial thinking.”

—Michael Rothschild [56]

The Patman-Eccles exchange takes on the surreal quality of a snake-charmer hypnotism session. The smoke-and-mirrors, sleight-of-hand magic act is “hard to swallow.” Or, alternately, the audience has been swallowed psychologically into the maw of the parasite. As magicians say, “now you see it, now you don’t!” Or, “A magician never reveals his secrets.” The dialogue accurately reduces the U.S. government’s financing mechanism and its accountability to a *disgraceful parlor trick*.

Joseph Stiglitz is the ex-chief economist for the World Bank and International Monetary Fund (IMF) and shared the Nobel Prize for Economics in 2001. After disillusionment over the effects of its policies, in 2001 he went public with scathing criticisms that reverberated through the world media. He described a four-step process by which a developing country is ravaged by the influx of capital aided and abetted by the IMF. He described the process as “squeezing the last drop of blood out of them.” Stiglitz resigned over his ideological differences. [62]

This case depicts an epic break in the *status quo* of economists. The IMF and World Bank can be compared to an international financial rescue agency—much like an economic “doctor.” Stiglitz is asserting its prescription is always for bloodletting *via* leeches. In a word, parasitism.

Moreover, he rejected the ideological underpinnings of the policies as corrupt. In other words, there was no legitimate economic science behind the practices, or whatever existing economic justification used was a sham. As reporter and interviewer Palast writes in [51]:

Stiglitz has two concerns about the IMF/World Bank plans. First, he says, because the plans are devised in secrecy and driven by an absolutist ideology, never open for discourse or dissent, they “undermine democracy.” Secondly, they don’t work.

Ultimately, what drove him to put his job on the line was the failure of the banks

and the U.S. Treasury to change course when confronted with the crises, failures, and suffering perpetrated by their four-step monetarist mambo.

Stiglitz does not seem to realize the deadly accuracy of his own metaphor. A parasite is not so interested in the health of its host. “Crises, failure, and suffering perpetrated” are the *modus operandi* of any parasite and a money parasite would presumably be no different. As considered earlier, secrecy is the mechanism promoting invisibility of the parasite.

“Absolutist ideology never open for discourse or dissent” certainly seems incompatible with the concept of a legitimate economic science, familiarity with which presumably was Stiglitz’ original qualification for the job. Arguably, it does not even qualify as religion. Overall, it appears that Stiglitz no longer served as a suitable victim for parasitic mind control and was discarded.

Stiglitz notes the same phenomenon of twisted economic language. He likens “free trade” by the rules of the World Trade Organization and the World Bank to the Opium Wars—“That too was about ‘opening markets.’”

Other examples of “dissension within the ranks” of economists are easily spotted. Friedman is one of the most vocal and influential economists who has focused on and been critical of monetary expansion policies. [26] He’s also attempted to convey to the public the intrinsic relationship between monetary expansion and inflation. His approach can be seen as a strong rejection of Keynesianism that dominated monetary policy in the first half the the 20th century. Strangely, bulletproof principles for governing mass world economies *via* an “economic science” still seem open to constant debate, revision, and reversal.

The parasitism hypothesis could explain other troubling anomalies noted by economists, foremost among them Nobelist Robert Solow’s “productivity paradox.” [60] How is it that the entire information revolution of the late 20th century cannot yet be quantified in economic statistics? Apparently economics has its own form of “dark matter.” Productivity is generally defined as goods produced per hour of work by laborers. It’s conceivable that, basically

*by definition*, a money parasite could *siphon off productivity gains and make any improved advantages invisible to economists—and the public at large!*

## Keynes: “economics’ Einstein”

“In the long run, we are all dead.”

—John Maynard Keynes

Keynes has been called the “Einstein of economics” but some physicists might consider it a slur. Sciences with lack of rigor and the strict, uncompromising “reality check” of experimental testing have been said to have “physics envy,” and the “dismal science” may qualify among all with flying colors.

Economics as epitomized in Keynesianism appears to fail spectacularly the Popperian criteria of scientific falsifiability—which some economists almost seem to take pride in. Even supporters of Keynes acknowledge his contradictory and inconsistent pronouncements. Economist and disciple Paul Samuelson wrote the following *non sequitur* of Keynes’ masterpiece, *The General Theory of Employment, Interest, and Money*, published in 1936:

It is a badly written book, poorly organized...it is arrogant, bad tempered, polemical...it abounds in mare’s nests and confusions: involuntary unemployment, wage units, the equality of savings and investments, the timing of the multiplier, interactions of marginal efficiency upon the rate of interest and many others...flashes of insight and intuition intersperse tedious algebra. An awkward definition suddenly gives way to unforgettable cadenza. When it is finally mastered, we find its analysis to be obvious and at the same time new. In short, it is a work of genius.

Keynesianism at its core is a rejection of the classical economic doctrine of *lassaiz-fair* and a self-regulating economy. It makes a distinction between the “real GDP” and the “natural level” of the GDP, proposing a divergence that may occur *via e.g.* savings levels, unemployment, “price stickiness,” *etc.* The general slippery idea is that government and



citizens may be required to increase consumption (spending) to fully deploy the economy, even to the extent of deficit borrowing (*i.e.* money expansion).

This ideology could be seen as a psychological rationale for a parasitical economy. Why is it precisely focused on the implicit concept of an “unnatural” and subpar (below-optimal) GDP that requires unilateral intervention? Possibly because savings represent energy storage by the “cells” of the host organism(s). The urging is to release that energy, to minimize the storage of it, presumably so that it is more readily available for money parasitism.

Perhaps most revealingly, Keynes opposed a strict gold standard, calling it a “barbarous relic.” He was instrumental in negotiating the worldwide Bretton-Woods agreement that abandoned it and erected the International Monetary Fund and World Bank in 1944. The gold standard was also the strongest historical impediment to money expansion. As Greenspan wrote, “In the absence of the gold standard, there is no way to protect savings from confiscation through inflation. There is no safe store of value.”

A money-parasitic doctrine would be preoccupied to the point of obsession with the idea that GDP or *host energy* is below an optimal level and must be increased—*via* artificial stimulation. Recall the *plasmodium* parasite that increases the metabolism of its host cell three hundred fifty times, hijacking it for its own malevolent “agenda” or “ends.” In other words, *growth at all costs*—exactly the same *modus operandi* as McMurtry’s “cancerous capitalism.”

*Keynesianism may be the corrupted ideology of veiled monetary parasitism in theory or practice.* Maybe a future “Einstein of econophysics” will be more interested in economics as a rigorous and humane science and engineering discipline rather than as a political buzz-saw power-tool.

## growth & red-queen dilemmas

Recall the key money parameter of *velocity*. Parasitologists have in many cases isolated “red-queen dilemmas” in biology. Named after a passage from Lewis Carroll’s *Alice in Wonderland*, the parasite and its host are locked in a tight evolutionary embrace

that increases the stress, activity, and pace of the host. The Red Queen runs faster and faster to stay in the same place. A hyperkinetic culture as now universally perceived by all (noted early on by *e.g.* Toffler’s *Future Shock*, 1970, or recently in Gleick’s *Faster: The Acceleration of Just About Everything*, 1999) is therefore a conceivable symptom of a money parasite!

A red-queen dilemma in an economy could have “sweatshop” conditions (noted earlier) as one symptom. The red-queen acceleration also relates to the “frog boiling” phenomenon. If workers from an earlier culture were transplanted into the present culture, it might be psychologically intolerable *ala* Toffler’s “future shock.” Again, recall the mass economic energy is measured in *temperature*. If the “temperature” is slowly increased (as an effect of the money parasite), the “water” is slowly brought to a “boil” without notice. The increased life-threatening scarcity resulting from gradual money expansion is a close analogue.

A tightly-coupled red-queen feedback loop seriously complicates the problem of considering or understanding a parasite-free system, especially relative to *growth*. For example, it may not be clear if an organism is growing at a “normal” rate or grows faster in response to the parasite. Or, the parasite may be growing but the host does not.

Some species grow faster as a defense mechanism to the parasite infection, in other situations the rampant growth is provoked by the parasite to increase its energy reserve, so *abnormal growth* is sometimes a symptom. Generally growth is often in some way abnormal under infection, either stunted or accelerated. If there’s a money parasite present, what’s “normal” economic growth?

This is the same dilemma encountered earlier in the streamlining of technology that can be more conducive to slavery systems. *Growth may disguise the presence of a parasite.* The vast and awesome technological achievements of the 20th century take on an entirely new light if one considers they can be mechanisms for optimizing parasitism efficiency!

Another remarkable possibility relative to growth can be considered, as hinted in the electronics capacitor analogy. The capacitor simply keeps stor-

ing energy as the instantaneous energy of the circuit “grinds to a halt.” A parasite can conceivably extract more energy from the system than is even required for its own survival. Or, it may jeopardize its own survival by “accidentally” or “mistakenly” extracting more than the host organism can bear without dying!

The dynamic and rapid adjustment of interest rates by the Federal Reserve as frequently as several times a year might therefore have parasitic implications. It could be a mechanism for maximizing energy extraction while adjusting to uneven growth spurts in the host. It could be seen as a way to carefully finetune the level of energy extraction from the host organism while avoiding too-dangerous lethality!

The bogus terminology of economics has already been noted, in phrases and words such as “money supply,” “deflation,” “price stability,” “fighting inflation,” “free market,” “growth,” and “market rates.” What is particularly striking is how all these terms have been skewed in exactly the false directions that would serve a philosophy of parasitic money expansion. With the precision of Orwellian doublespeak, the meanings twist harm into benefit like physicians’ leeches!

## cancer stage of capitalism

“The current financial stripping of economies and environments across the world exhibits, in fact, all the hallmark characteristics of a carcinogenic invasion.”

—*Joseph McMurtry* [46]

“The cancer stage of capitalism is not a metaphor. It is a rigorous description of where we are.”

—*Susan George*

McMurtry [46] does not outline all the mechanisms for the capitalist cancer, partly implying that they are yet all to be recognized, but he refers specifically to the “increasing volume and velocity of money that does not sustain life-hosts:”

The comparison with a carcinogen is starkly evident. A cancer pattern of disease and

metastasis is confirmed when money capital lacks any commitment to any life-organisation on the planet, but is free to move with increasing volume and velocity in and out of—but not to sustain—social and environmental life-hosts. On the contrary, ever more social resources and protection are being diverted to assist the capitalist cancer to multiply.

As outlined, fractional reserve banking and money expansion are the two key banking mechanisms for regulating—or manipulating—volume and velocity of money. McMurtry’s immune system analogy also applies paramountly to economic science, which absolutely must be able to discriminate flawed, destructive, or parasitical economic principles from healthy ones (both theoretical and applied) if a cancerous invasion is to be repelled. *That framework arguably does not currently exist.* Economists must act as “white blood cells” as much as investigators, regulators, reporters, *etc.* perhaps even more crucially so!

McMurty regards public institutions as societies’ vital organs. The “metastasizing” process is identical to mass multiplication by a parasite violently rampaging through its host or destroying defense systems:

Globally, protective systems are now being dismantled at every level. The pattern is now so universal and aggressive that even the language of its agents no longer disguises its destructive intent—“drastic cut-backs,” “axing social programs,” “slashing public services,” and so on. And society’s protective systems are openly being “cut,” “slashed,” and “axed” to “reassure lenders and investors”—that circuit of money investment and profit that is no longer linked to the production or circulation of useful goods and services.

The “circuit of money investment and profit no longer linked to production or circulation of useful goods or services” may again be compared with the electrical capacitor analogy and closely parallels the

dictionary definition of parasitism. McMurtry conveniently nails down the precise analogy to the following points:

Long-term, systematic and irreversible destruction of global life-organisation emerged for the first time during the current advanced stage of capitalism. If we consider the defining principles of cancer and the eventual destruction of a life-host, it is difficult to avoid seeing that a cancer pattern is increasingly invading and spreading across the planet. In other words, there is:

- an uncontrolled and unregulated reproduction and multiplication of an agent in the host body that;
- is not committed to any function of the host body; increasingly appropriates nutriment from the host body in its growth and reproduction;
- is not effectively recognised by the immune system;
- possesses the ability to transfer or metastasise its assaultive growth to sites across the host body;
- progressively infiltrates and invades the host body until it obstructs, damages, or destroys successive organs of its life-system; and
- eventually destroys the life-host in the absence of an effective immune-system recognition and response.

## virulence

“There is more than one way to look back at the dawn of humanity. You can go to Ethiopia and sift the dust for stone tools and scoured bones, but you can also go to the National Parasite Collection, find the right jar, and stare at a fellow traveller.”

—*Carl Zimmer* [70]

“If you’ve lost a parasite, you have lost something in the fabric of the ecosystem.”

—*Daniel Brooks*

The interpretation of the morality of a parasite is a fundamentally subjective distinction. Are parasites evil? Given that parasites are so prevalent, or conversely and more accurately, that freeliving organisms are in the minority, it could be argued that parasitism is in fact the ‘natural’ order in biology, and correspondingly in bionomics. This argument may have some validity, with various significant qualifications.

The *virulence* of a parasite is the measure of how deadly it is to its host. Some parasites are relatively harmless while others are heinously lethal. As Zimmer states,

A parasite lives in a delicate competition with its host for the host’s own flesh and blood. Any energy that the host uses itself could go instead to the growing parasite. Yet, a parasite would be foolish to cut off the energy to a vital organ like the brain, since the host would no longer be able to find any food at all. So the parasite cuts off the less essential things.

The harshness with which a parasite treats its host—what biologists call virulence—contains a trade-off. On one hand, the parasite wants to make use of as much of its host as possible, but on the other hand, it wants its host to stay alive. The balancing point between these conflicts is the optimal virulence for a parasite. And quite often, that optimal virulence is quite vicious.

This is the “killing the goose that lays golden eggs” constraint. In short, is the parasite suicidal? If a money parasite exists, there is evidence it is quite virulent. Adams insisted it was quite capable of violence. McMurtry makes the plausible case that it is at least as virulent as cancer. Mass global environmental destruction as attributed to the money parasite, as McMurtry does, is a case for very deadly virulence. Stiglitz came to a similar conclusion.

However, virulence may lie in the eye of the beholder, and may be too much a one-dimensional concept. In this area there is a very new and tentative hypothesis in parasitology advanced by Daniel Brooks and others. The idea is that parasites may be crucial links in promoting evolution or that their presence may dampen wild population oscillations of other species, serving as a balancing mechanism. For example, suppose sheep overgraze on land and begin to multiply. The parasite has more targets and might spread faster, culling the herd and preventing overgrazing, consequently having major ecological implications such as preventing grassland turning into desert.

Or, by preying only on weaker animals, the parasites preserve the health of overall species by preventing them from breeding. There is also evidence that carnivores and parasites sometimes work in tandem. Wolves that chase and eat sick, weak, and wheezing mooses are actually the next host-link in the chain for the parasite infecting the moose. A parasite may also cut down on the competitive edge of a species so it can't drive out a competitor, making it possible for the two species to live side by side.

As very recently discovered, birds in California salt marshes are *thirty times* more likely to eat infected killifish than uninfected ones, because of a parasite's behavior modification to the fish that makes them easier to spot and catch. This reveals the parasite exerts a very significant, previously unrealized effect on its ecology. Any judgement of those parasites as useless or harmful might be disputed by the birds. Entire ecosystems have invisible dynamics due to parasites that are only beginning to be uncovered.

Under the fairness of full disclosure, it must be admitted that the money parasite could conceivably promote stability among highly unstable alternatives. One immediate conjecture is that the government-banking complex is naturally likely to overinflate the currency if it has no limits, possibly to the point of total collapse. This occurred in post-WWI German hyperinflation, leading to national ruin. A money parasite could actually serve the role of extracting money-energy, but only within limits, and thus preventing the tendency toward total wanton collapse.

Another possibility is that individuals may really

attempt to save "too much" relative to circulating money in some situations, or routinely succumb to various extreme irrationalities. The parasitical siphoning could be unfair, but a possible "last resort" to a frozen or stalemated economy. This was one of the cornerstones of Keynes' original theory (born in situations of crisis unemployment) codified in the parameter of "marginal propensity to consume."

An even more outlandish possibility is suggested by some perspectives such as [2]. The idea is that human populations inherently become unstable and reach crisis proportions in density, such that a parasitism mechanism actually prevents dangerous instability and wars. But that twisted line of thinking on the other hand seems to embody a "self-fulfilling prophecy." *Wars are arguably likely a symptom or consequence of money parasitism.* The link between money manipulation and wars is very deep and complex, and supported by Griffin's account [32] and many others.

Generally, any ideas about a parasite adding stability to the overall system should be regarded very warily. They may be just new masked versions of the same parasitic philosophy, new "wolves in sheep's clothing."

At the close of his book, Zimmer makes the case that *all humans* are a parasitical species on the earth organism. The earth has a sort of "metabolism" that shuttles carbon, oxygen, nitrogen, *etc.* around the world. The rain cycle moving through streams and rivers can be regarded as a giant circulatory system. The earth is a superorganism. Humans exploit it exactly the way a parasite exploits its host.

There's no shame in being a parasite. We join a venerable guild that has been on this planet since its infancy and has become the most successful form of life on the planet. But we are clumsy in the parasitic way of life. . . . If we want to succeed as parasites, we have to learn from the masters.

McMurtry comes to a similar conclusion. He proposes that a worldwide revolution is required to eradicate the capitalist cancer—*i.e.* yet another paradigm shift. "This could be a transformation of the world's

now-failing political and economic systems which nothing short of a global cancer could effectively bring about.” [46] Then Hamilton’s quote about government debt as a “powerful cement to our nation” and a “spur to industry” takes on a new meaning.

## host psychological complicity

“A great many people think they are thinking when they are merely rearranging their prejudices.”

—William James

“We have met the enemy, and he is us.”

—Pogo, by Walt Kelly, *Earth Day 1970*

The Rothschilds as quoted in money reform literature can now be revisited for striking new meaning:

The few who can understand the system [of fractional reserve banking] will be so interested in its profits, or so dependent on its favors, that there will be no opposition from that class, while on the other hand, the great body of the people mentally incapable of comprehending the tremendous advantage that capital derives from the system, will bear its burdens without complaint, and perhaps without even suspecting that the system is inimical to their interests.

This quote is simply a veiled reference to the *host-parasite relationship*. The “few who can understand the system, so dependent on its favors” comprise the parasite. The “great body of the people mentally incapable of comprehending who bear its burden without complaint or suspicion” are the vast masses with a failed or compromised social immune system. The “burden” is exactly the money-energy extracted by the parasite from its host. “The great body of people” takes on new meaning—something like “succulent host.”

The quote reveals more, however. It’s suggesting that the money parasite feeds not only on the money-energy but also on the *psychological weaknesses of the populace*. This is an absolutely crucial element in the dynamic of the host-parasite coupling. It must be

approached and understood as not merely a physical phenomenon. Its existence is partly or perhaps even *solely* based on nonphysical properties relating to psychology. Its a link in the exploitation process.

McMurtry makes the case that the population as an immune system is not tuned to recognize the money parasite. That is certainly a major part of the equation. But one can ask, “why is it not tuned?” A full examination of money parasitism must fully, candidly, and realistically take into account all factors. While the parasitism itself is an unpleasant and macabre subject, *host complicity* is simply the “other side of the coin.” The word “victim” as applied to a host may be too much a one-dimensional concept.

A money parasite could be considered to simply be the outward manifestation of degenerative host conditions. Parasites typically prey on the weak and sick and are *simply fought off in healthy hosts*.

Ancient history has a simple parallel and model. The Roman Empire was built and dependent on an ancient imperialistic colonization process that imported a steady stream of slaves from newly conquered territories. This was the basis of their economy. Arguably, parasitism was the official state policy.

One of the formulas for its government that served for *centuries* was the “bread and circuses” combination. The rulers discovered the simple recipe for minimizing occurrences of the periodic riots of the disenfranchised. The masses were pacified with some free food and entertained with bloody gladiatorial events. The modern equivalent seems to have metamorphosed into something like “Twinkies and TV.”

Extended considerations of host psychological diseases conducive to the money parasite can be found in [2] or [1]. A short representative summary:

**greed vs. honesty** The tactful Rothschilds did not explicitly mention greed, but its implicit in the class “dependent on the favors.” Honest individuals would reject the so-called “bargain.” Greed is the foremost disease of money.

**profligacy vs. conservation** Or “irresponsibility vs. responsibility” relative to money spending tendencies. Government indebtedness is just the

macrocosmic mirror of individual debts on the microcosmic level.

**apathy vs. concern** If the public is apathetic toward its institutions, they will deteriorate. How much does the public care about its own government or banking system *vs.* extracting gains from either?

**ignorance vs. education** As Adams warned, the public must understand basic money and banking concepts to be able to fight off parasitical infections.

**dependency vs. autonomy** Entire nations can be composed of dependents and their “enablers.”

**passivity vs. action** If the public “gives away its power,” *i.e.* delegates its authority and takes a passive role, a parasite may arise to take the active one.

**reactive vs. proactive** As Griffin [32] has documented, the public can be manipulated *via* crises and a false “problem-reaction-solution” cycle.

**delusion vs. rationality** The public must understand “there is no such thing as a free lunch” or they will become one for the parasite.

**credulity vs. oversight** As Ronald Reagan remarked on his philosophy over a nuclear arms treaty with the Soviet Union, “trust, but verify.”

**distraction vs. vigilance** “Eternal vigilance is the price of freedom.” Mass sporting events and internet pornography are probably in the first category.

**groupthink vs. leadership** Some derisively refer to the public as “the unwashed masses,” “cattle,” or “sheeple.”

**cowardice vs. courage** It is possible that some have glimpsed the parasite firsthand but lacked the nerve to confront or challenge it.

## 9 economic warfare

“I believe that banking institutions are more dangerous to our liberties than standing armies. Already they have raised up a monied aristocracy that has set the government at defiance. The issuing power [of money] should be taken away from the banks and restored to the people to whom it properly belongs.”

—*Thomas Jefferson*

“The first casualty when war comes is truth.”

—*Hiram Johnson*

“Give me a place to stand, and I will move the world.”

—*Archimedes, on the nature of leverage*

To the modern ear Jefferson’s shrill warnings on banks sound like exaggerated hyperbole, especially the idea they are “more dangerous to our liberties than standing armies.” Hence the term “economic warfare” may seem unfamiliar to the point of sounding like an oxymoron. It’s a foreign or even alien idea (much like money parasitism) but its reality is supported by some of the most rare and circumstantial evidence. Under a different light, the Jeffersonian quotations are as uncannily perceptive and future-anticipating as Adams’.

Earlier it was observed that governments have historically regarded counterfeiting as a treasonous crime. Counterfeiting has the ability to destroy the economic integrity and vitality of an entire nation. It can be used as a mechanism of state sabotage, and it is even regarded as an act of war if advanced by one country on another. Widespread counterfeiting, lawlessness, and anarchy are sometimes the historical progression of collapsing empires.

As M.A. Rothschild asserted, “Let me issue and control a nation’s money and I care not who makes its laws.” By all the previous verbiage, the difference between counterfeiting and money issuance can be a very subtle matter—“razor-sharp.” For purposes here, loosely define “economic warfare” as “state-

sponsored counterfeiting used as a means of seizure of assets and establishing control over another country.”

The metaphor of “invisible slavery” was applied earlier to economic parasitism. Economic warfare likewise can have the very treacherous property of invisibility. If a nation’s currency is being counterfeited without detection, *or assets seized and control lost via an equivalent process*, it seems equivalent to a means of waging invisible warfare.

The theoretical possibility of economic warfare is hinted in the earlier mathematics. Gresham’s law, “bad money chases out the good,” fundamentally is about the *economic leverage* that can be applied *via* reserves of capital. Just as in physics when huge masses can be moved *via* carefully constructed pulley systems that increase “mechanical advantage,” it seems totally analogous that mass economic dislocations can be effected by the transfer of capital. By the formulas, a bank that issues debased currency *via* fractional reserves that circulates into the larger economy is exerting leverage against that economy by extracting energy from it.

Now, suppose that two private banks A and B are competing to extract money-energy from a given economy. Suppose that the owners of bank A manage to clandestinely incite a run on the reserves of bank B by its depositors, such as by spreading rumors of collapse. Bank B fails, and its assets then may come under control of bank A. If undetected, bank A appears to have successfully waged “economic warfare” against bank B. It successfully attacked and seized “economic territory.”

The attack is not necessarily limited to collapses. Bank B may not totally fail due to the run, but be significantly weakened from decline in its reserves from withdrawals. The economic leverage of bank A is still commensurately increased. In a sense, bank B’s money has been undermined from an economic oscillation.

Substitute “nation A,B” for “bank A,B,” “national currencies” for “bank deposits,” and this gives the theoretical background of a worldwide economic warfare technique. Moreover, if the losses are made up by taxpayers, it becomes essentially *state-financed!* Bailouts may fail dangerously to address the core disease and maybe even unintentionally *mask or pro-*

*mote it.*

The analogy applies on international levels. Different nations have currencies that are backed by their reserves. Nations become analogous to individual banks in a larger world economy. Currency exchange rates are a measure of the *leverage* of one currency against another. If a nation expands the circulation of its own fractionally-backed money outside its borders, it’s totally analogous to banks that increase circulation of their debased money, and *one nation can seize assets of another based on money manipulation.*

Now, note the basic parallel between a collapse of a bank due to a run, and mass failure or default of loans made by the bank. Suppose corrupt private bank C lends mass funds to an accomplice D. D defaults, but with kickbacks to C. Government bails out the “failed” loans of bank C.

These are extremely crucial, initially counterintuitive situations to observe. *Bank failures, bailouts, loans, or aid can be disguised weaponry for waging economic warfare* against the governments of either foreign or domestic countries. Moreover, *government-funded bank bailouts may have the unintended effect of feeding the money parasite!* These are the money system analogues of *infiltration of the government-banking complex’s immune system.*

Hence large-scale currency machinations especially during “crisis situations,” such as “currency swaps” tied with foreign money devaluations by the Federal Reserve, can be seen as weapons for waging mass worldwide economic warfare—invisible annexation of foreign assets.

Similarly, in 1970 the IMF created a new monetary unit called the SDR, or “Special Drawing Right.” As Griffin quotes Dennis Turner: [32]

SDRs are turned into loans to Third-World nations by the creation of checking accounts in the commercial or central banks of the member nations in the name of the debtor governments. These bank accounts are created out of thin air. The IMF creates dollars, francs, pounds, or other hard currency and gives them to a Third-World dictator, with inflation resulting in the country where

the currency originated. ... Inflation is caused in the industrialized nations while wealth is transferred from the general public to the debtor country. And the debtor doesn't repay.

Turner is simply describing the process of fractional reserve banking as a tool for money parasitism not on an intra-national but on the *international* scale by the IMF. By definition, inter-national money parasitism wages economic warfare.

Economics makes the distinction of GDP, Gross Domestic Product, *vs.* GNP, or Gross National Product. [17] GDP can be defined alternatively, roughly, as the percent of GNP that is owned by the nation's own citizens. That is, in a sense, the ratio  $r = \text{GDP}/\text{GNP}$  represents a fractional reserve system of the entire country, with the fraction  $1 - r$  representing *foreign ownership* of the country's assets. If a money parasite is "foreign" to the country, then the part  $1 - r$  represents degree of parasitic control of the host country. *A debtor nation status can be a sign of nationwide infection and subjugation by a foreign money parasite.*

But equivalently, such a situation can be regarded as a *domestic invasion and subjugation by an invisible foreign army*—the virtual definition of attack by a parasite from the host's perspective.

### “four steps to damnation”

“In essence, these countries end up buying back their own money, but at incredibly high rates. And this is just the beginning of the IMF's involvement.”

—Gregory Palast [51]

“Is globalization about the eradication of world poverty, or is it a mutant variety of colonialism, remote controlled and digitally operated?”

—Arundhati Roy

Possibly the most extraordinary single *damning* item of circumstantial evidence for the existence of an organized economic warfare program is the document called *Silent Weapons for Quiet Wars*. [2] This very

narrowly-known document purports to be a training manual for the science of “quiet wars” waged against the populace. It includes amazing scientific and mathematical descriptions very similar to the prior sections. It has much material relating to “debilitated host psychology,” using the depiction adopted here.

The document has never been published anywhere except in very obscure locations and on the internet. The scientific community seems to be unaware of it or ignoring it. It's circulated in small circles for at least a decade; the author is unknown. Any serious researcher looking into economic slavery, parasitism, or warfare must absolutely be familiar with the manual. But since its legitimacy and authenticity are so easily questioned by the literal-minded, it cannot serve as any form of definite evidence. Other avenues must be pursued to make the case for economic warfare.

One excellent recent item along these lines is the incendiary article, “IMF's four steps to damnation” by reporter Gregory Palast. [51] During an IMF conference in Washington in 2001 he interviewed ex-chief World Bank economist Joseph Stiglitz who was fired over his ideological differences. Stiglitz openly charges the lending program is really one accomplishing economic subjugation not unlike colonialism, only that it is implemented economically rather than militarily. Stiglitz reduced the IMF *modus operandi* relative to developing nations, described by more religious capitalist doublespeak:

**privatization** State industries are sold off after the countries shave billions off of the prices of electricity and water companies with “commissions” (kickbacks) going to the country's politicians.

**market liberalization** Stiglitz refers to this as the “hot money” cycle. Cash comes in for real estate and currency speculation and then “flees at the first whiff of trouble.” The nation's reserves that back the currency are drained sometimes in days. The IMF demands the nations raise interest rates to the astronomical ranges 30-80%.

**market-based pricing** The nation is required by IMF to raise prices on the staples of food, water,



and cooking gas. This has a disproportionately heavy cost on the poor.

**social unrest** Also called “the IMF riot.” Step “three and a half” occurs at this point as the IMF “squeezes the last drop of blood out of them, turning up the heat until the whole cauldron blows up” when food and fuel subsidies for the poor are eliminated (Indonesian riots, 1998; Bolivia, 2000; Ecuador, 2001). Secret IMF plans coldly anticipate the likely “social unrest.”

**free trade** Free trade by the rules of the World Trade Organization and the World Bank, analogous to the Opium Wars. Trade barriers are knocked down in foreign countries but with financial blockades in return.

The consistently re-occurring riot stage noted by Stiglitz is evidence of the link between *money parasitism, violence, and destruction*. In overt wars, armies engage in bloody confrontations on a battlefield. In covert economic warfare, a riot may be seen as a *symptom of or reaction to the invisible invasion*. It’s also arguably analogous to a futile mobilization of the immune system.

Much of the science of warfare centers around maximizing the element of surprise. It is to be assumed that if some renegade groups have discovered effective means of waging economic warfare that they would take extreme measures to attain the strictest secrecy. When asked by reporter Sandeep Kashik, “You claim to know the dirty inner secrets of the IMF. How is that possible?” Palast replied:

I’ve had large numbers of secret hidden documents slipped to me. The IMF really is its own secret world government; all of these reports are stamped “for official use only” and “restricted distribution.” They know if the details of what they’re doing gets out, there’d be people in the streets.

Palast writes, “A pattern emerges. There are lots of losers but the clear winners seem to be the western banks and U.S. Treasury.” Stiglitz nor Palast do not appear to realize the significance or magnitude

of the game. The steps he describes seem probably a glimpse at the *mechanisms by which the money parasite can infect entire national economies*.

A pattern indeed emerges. The above clearly describes the overt thrashing ensuing from a covert process whereby *banking and governmental systems are systematically leveraged against each other to debase the integrity of each*. This would be the core strategy *exactly expected* of a money parasite attacking the government-banking complex! Extensive delineations of this “leverage polarity” in which “both sides are played against the middle,” can be found in *Silent Weapons for Quiet Wars* [2] and *The Occult Technology of Power* [1].

More analysis of the IMF and World Bank can be found in Michael Rowbotham’s book, *The Grip of Death: a Study of Modern Money, Debt Slavery, and Destructive Economics*. [57] Another angle can be found in ex-CitiBank CEO Walter Wriston’s 1992 work, *The Twilight of Sovereignty: How the Information Revolution Is Transforming Our World*. [69]

**sovereignty** 1. Supremacy of authority or rule: *sovereignty over a territory*. 2. Royal rank, authority, or power. 3. Complete independence and self-government. 4. A territory existing as an independent state.

## high crimes & treason

If a covert plan of economic warfare has been waged, it may have international rather than mere national implications as various commentators have charged. Counterfeiting on a national level is a treasonous crime against that nation. However, it seems reasonable to classify international scale economic warfare as a “crime against humanity.” Accusations on this level have been made by U.S. Senators on several occasions.

Senator James Traficant entered a vocal (not legal) indictment against international agencies and the Federal Reserve in the Congressional record in 1993 referring to *undeclared economic war and economic slavery*: [64]

Federal Reserve Notes (FRNs) are unsigned checks written on a closed account.

FRNs are an inflatable paper system designed to create debt through inflation (devaluation of currency). When ever there is an increase of the supply of a money substitute in the economy without a corresponding increase in the gold and silver backing, inflation occurs. . . . The Federal Reserve Bank who controls the supply and movement of FRNs has everybody fooled. They have access to an unlimited supply of FRNs, paying only for the printing costs of what they need.

The receivers of the United States Bankruptcy are the International Bankers, via the United Nations, the World Bank and the International Monetary Fund. . . . This is an undeclared economic war, bankruptcy, and economic slavery of the most corrupt order!

An extremely extensive accusation of about thirteen thousand words was entered into Congressional record by Representative Louis T. McFadden in 1934: [45]

Mr. Chairman, we have in this Country one of the most corrupt institutions the world has ever known. I refer to the Federal Reserve Board and the Federal Reserve Banks, hereinafter called the Fed. The Fed has cheated the Government of these United States and the people of the United States out of enough money to pay the Nation's debt. The depredations and iniquities of the Fed has cost enough money to pay the National debt several times over.

This evil institution has impoverished and ruined the people of these United States, has bankrupted itself, and has practically bankrupted our Government. It has done this through the defects of the law under which it operates, through the maladministration of that law by the Fed and through the corrupt practices of the moneyed vultures who control it.

Speaking at the height of the U.S. Great Depres-

sion, McFadden gave ample historical information that mirrors Griffin's account [32]. McFadden asserted the foreign bankers used the system to finance and foment entire wars. He insinuates a covert agenda to create "a superstate controlled by international bankers, and international industrialists acting together to enslave the world for their own pleasure." "I do not like to see vivisections performed on human beings."

McFadden has a thorough listing of crimes and individuals he charges. "I charge them, jointly and severally, with the crime of having treasonable conspired and acted against the peace and security of the U.S. and with having treasonable conspired to destroy constitutional Government in the U.S."

McFadden was Chairman of the House Banking and Currency Committee for a ten year period and survived two apparent assassination attempts. By some accounts, McFadden died in "suspicious circumstances" in 1936.

If "international bankers" have indeed extracted vast fortunes from the U.S. and other countries globally, one might guess they have erected vast hidden economic empires. Such financial empires certainly exist and are documented and acknowledged, but obviously not as any ongoing international parasite system. [14, 22]

Any attempt to identify and disengage any supposed existing parasite system must face and contend with the vast historical battlefield littered with prior apparently failed attempts.

## 10 21st century blip-system

"In theory, there's no difference between theory and practice, but in practice there is."

—*Anonymous*

It would be facile and absurd to propose any definitive solutions for the complex socio-econo-politico problem of money parasitism documented here, given the vacuum of systematic worldwide research. The natural immediate proposal to make would simply be that the scientific community "officially" recognize it

and come to grips with it in a way that banking and political authorities have spectacularly failed to confront. A major part of the problem, possibly the core part, is public awareness.

There is certainly intense stigma associated with this subject; in many ways human money parasitism is the ultimate taboo of society and civilization. Any undermining of belief structures on being “on top of the food chain” is unequivocally shocking. It could be an immense challenge merely to achieve the status of a legitimate scientific inquiry. A “hall of mirrors” effect seems to come into play and even the possibility of parasitism already infecting the existing *scientific* establishment is conceivable. [6, 23] Consistently, parasitism appears to transcend all boundaries.

The parasite problem is quite inherently multidisciplinary. Just as the government-banking complex seems to have been deficient in its defense mechanisms, a narrow and specialized inquiry cannot possibly hope to succeed. In many ways, cooperation is the antithesis of, and antidote to, the parasitism. Similarly, the significant new breakthroughs in biological parasitology have been hard-won from interdisciplinary collaborations and insight and might serve as a model.

One serious difficulty plaguing progress is the difficulty in drawing the lines between the “free market” and “government intervention” with many un-intuitive side-effects. Allowing banks to compete to offer different currencies and interest rates seems like a reasonable *lassaiz-fair* idea, except that if any fail due to either ineptitude or corruption the depositors demand government bailouts, possibly effectively resulting in state-sponsored pathologies. Moreover, multiple currencies are a serious impediment to fluid commerce and arguably one of the very first problems a basic money system must address.

As for fractional reserve banking, one possibility is a system that comes close to “full reserves,” already advocated by some economists. A system can be devised where people agree to penalties for early withdrawal of funds, and the bank offers a range of different timed deposit accounts. The bank can count those possible penalties and loan default rates to create a system whereby all money holders are essentially consenting to any loan arrangements. Any runs

are fully handled and covered *via* application of the agreed penalties. This replaces the system whereby depositors do not explicitly select or agree to specific withdrawal conditions.

One nice possibility for minimizing parasitism hidden in state budget systems would be the following. The entire government budget distribution system could be broadcast on web pages. Individual citizens or even automated “crawling” software could follow all budgets and sub-budgets by moving through hyperlinked web pages in a way that accounts for every single dollar spent. These pages could be updated with instantaneous information on state revenue and expenditures. Such a system for meticulous accountability will of course be opposed by the vast military-industrial complex which now has tens of billions of dollars in “black budget” items.

A simple system that might significantly decrease the possibility of economic warfare is one in which use of different currencies is closely tied to national citizenship. So for example it would not be legal for large amounts of dollars to circulate outside of the U.S. This would not necessarily decrease convertability of currencies. Such an idea is obviously highly antithetical to the existing worldwide monetary system now in place.

There is some remote possibility and flickering indication that new emerging digital currencies could scale “parasite free.” [9, 16] However it seems money parasitism could be an incredibly tenacious phenomenon that will continue to carry into “cyberspace.” The argument could even be made that the numerous attempts at digital currencies have been failing due to money-parasitical factors.

One remarkable idea for a blip-system is one with a *totally fixed* number of blips. It seems counter-intuitive, but such a system is inherently feasible and practical and possibly highly parasite-resistant. The blip-system owners, or currency authority, issues blips based on any arbitrary but agreed-on criteria to the money holders, such as work or tangible assets. This can be done all at once, or gradually.

The system ideally has some way for individual holders to check (electronically) that there are no more blips in circulation than officially allowed (*i.e.* a built-in auditing system) and might also support

anonymity. Note that an electronic system has the tremendous advantage that it might be audited electronically by all holders whereas a commodity-backed currency cannot be!

Phrased in this form, the idea becomes very similar to the problem of preventing *double spending* found in cryptographic security systems for digital currency, such as those pioneered by David Chaum. [68] It's also roughly identical to a system known as LETS (Local Exchange Transaction System) pioneered by Michael Linton. [37]

The concept may seem counterintuitive, but one can observe the close parallel of its widespread functioning in the form of hundreds of thousands of company stocks on worldwide stock markets! In fact one tantalizing possibility is an increased merger between currency systems and stock markets such that they become less distinguishable. Depending on implementation, such a system could be either highly parasitic or non-parasitic.

## toward full integrity

“Science is a long history of learning how not to fool ourselves.”

—Richard Feynman

“Never doubt that a small group of thoughtful committed citizens can change the world; indeed it's the only thing that ever has.”

—Margaret Mead

An extraordinary problem with money parasitism is that arguably, laws against “money laundering” could conceivably be construed as *parasitism enforcement mechanisms*. So increasingly draconian measures to track all privately circulating currency are installed, such as in the U.S. by the secret agency known as FinCen, as profiled in Wired magazine by Kimery in 1993, “Big brother wants to look in your bank account.” [36] Similarly, The European Parliament investigated the use of the NSA's (U.S. National Security Agency) worldwide “Echelon” electronic surveillance system against charges of *economic espionage*. [3]

Some innovators are proposing and erecting new money systems that are locally-oriented and

community-based. [29, 37] That is certainly a strong possibility, but again they may be illegal by invasive state laws that require reporting both gifts and barter transactions and subjecting both to taxation. A parasitical money system fundamentally has three major requirements that are arguably now already fully installed worldwide: (a) any money must be exclusively in the form of the state-authorized currency, (b) all economic transactions are subject to taxation, and (c) loss of government control over the central bank.

Ultimately, the issue largely comes down to whether individuals *have the right to make economic transactions between themselves free of state surveillance or interference*. U.S. and international laws and legal administration currently do not appear to support such a right. Coincidentally this is precisely the same question surrounding the legitimacy of any taxation. Again, the issue is closely related to the circumstances surrounding the founding of the U.S. and “no taxation without representation.” In the new terminology, the U.S. Declaration of Independence phrase that

Governments are instituted among Men, deriving their just powers from the consent of the governed.

comes close to a tautology:

*money holders define, determine, and regulate what constitutes parasitism in the system via its administrative mechanisms.*

In any case, a new realization of fractional reserve banking as a kind of *fractional integrity or vitality system* must enter the mass consciousness, along with the full understanding that the modern economic and political systems based on it are therefore deeply and intrinsically flawed—to borrow the informal yet highly descriptive phrase, *rotten at the core*.

All the associated doublespeak must be discredited and cleared away for any meaningful or widespread changes to occur. Humanity finds itself entering the 21st century with a medieval money system. Maybe some of its intense energy directed toward technological innovation can be channeled toward a state-of-the-art money system upgrade—maybe money *is* the ultimate technological tool of humanity!

Note that some social mechanisms that might seem to fight off parasitism could in fact be useless or even excellent decoys for the parasite. For example, if many people engage in even peaceful demonstrations at world economic summits, what is accomplished relative to captalistic or money reform? The activists may be fooling themselves into thinking they made progress by whether they “made the evening news.” They might instead more productively find myriad ways of reducing “host psychological complicity” considered above. How about organizing *conferences* instead of demonstrations? There does not seem to exist a single major conference in the world for an issue as uncontroversial as “money reform.”

*Re:* the “leverage polarity” encountered above as a fulcrum for economic warfare, it’s as if the money parasite’s food source is a form of money-energy that transcends both banking and government. It encompasses both economic and political power and crosses the boundary of each. Surely any effective counter-measures or new defense system must carefully study and fully embrace that same polarity.

Previous inoculation attempts have fallen short, such as with the founders of the U.S. and its Constitution, or say Marx’s critique of capitalism, not for lack of valor or diligence but only because of the awesome “nature of the beast.” The money parasite in its various forms has probably co-evolved with humans for millenia, arguably even since the origin of exchange.

It’s conceivable this all hints at a new, previously unrecognized form of energy—say, “*monergy*”—that might be tamed with the full force of scientific and engineering discipline applied to it. Econophysics shows some promise along these lines, but a new revolutionary realm of science and engineering might be born that merges politics and economics.

Correspondingly the government-banking complex could merge and evolve into a new institutional system that corrects the present flaws in exactly the same way (*e.g.*) the well-intentioned, creative, and visionary founders of the U.S. attempted in their time. That is, remove the identified bugs uncovered in the field from the legacy system *via* re-engineering and re-release. “Government-banking complex OS v. 2.0”  
*... beta ... virus checked*

## 11 further research

“I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me.”

—*Isaac Newton*

This section collects all the references to items for future research from the prior text and adds some additional proposals, raising and outlining the many key questions.

1. The general agenda of applying econophysics research to fully analyze money expansion in a way that classical economics has somewhat avoided is a premiere and extremely critical pursuit. Vast worldwide computational resources are now applied to *e.g.* global warming simulations and econophysics research arguably has similar crucial priority (the two problems are intrinsically intertwined). A model with high theoretical and actual verisimilitude (utilizing some of the prior mathematical ideas) seems within reach. Simulations are a very natural and promising approach.
2. Given some fit of the model, the value of  $n$  for the expansion process is unknown and could presumably be determined from careful study and datamining of economic records. How does  $n$  scale for different size economies? However, due to Federal Reserve secrecy, some key parameters may not be available, such as the precise amount the money stock has been expanded. Two key questions: over the timespan of the Federal Reserve, how much money-energy has been illegitimately extracted, and how much of that moved outside the country to foreign ‘investors’?
3. Similarly, the decay rate of pressure and demand of government bonds relative to interest rates can be studied *via* historical data. These may both follow nonlinear formulas that are only approximated by the simpler approximations. A

key question is how much complexity is required for different resolutions of insight.

4. The nature of velocity of money is murky and may be tied into thermodynamical expressions for average molecular velocities derived from statistical mechanics. Analogously, money paths may follow in some sense “brownian motion” over the graphs of holders. Also the link to savings rate is very promising. What are other mathematical estimations of Gresham’s law? What is the exact leverage possible by an individual bank in a larger economy? When do individuals lose more from inflation and taxation than they gain from interest?
5. Based on strong theoretical understanding and insight, what are new systems that have fairness and soundness (scarcity integrity) as fundamental design principles, and avoid *recursive bite ’em ad infinitum, cui bono caveat emptor, etc.*? Presumably cryptographic design principles will play a role. What is a rational and optimal system?
6. The money expansion process probably is similar to stock depreciation on the issuance of second rounds and some insight could be gained from study of these cases. However this line of inquiry quickly runs into the complication of differentiating intrinsic *vs.* extrinsic factors. A general theory relating stock market dynamics to more global money systems seems plausible.
7. More research on making more detailed and rigorous (ideally *via* mathematical modelling) all the metaphors advanced in this paper seems reasonable: economy-as-ecosystem, economic slavery, parasitism, warfare, electrical capacitance, cancerous capitalism, *etc.*
8. *Silent Weapons for Quiet Wars* [2] alone demands the attention and further investigation of the scientific community, particular relative to the question of covert worldwide warfare. The historical link between money manipulation and wars is available in many references such as [32, 14, 22] yet is still arguably underexplored by experts.
9. The establishment of small, localized, and isolated testbeds of real economic systems to study money dynamics laws empirically could be an absolutely key component in moving economic science into a philosophy of strict experimental integrity.
10. Modelling social class divisions based on wealth disparity such as through Pareto’s law is closely related to the ideas of this paper, especially the “temperature of a physical substance” analogy. [11, 8]
11. Can new econophysics principles shed light on the historical record of bank dynamics, past dislocations such as booms, busts, even wars? Griffin’s [32] is an outstanding new perspective and re-examination.
12. How secure from tampering or corruption is the administration of the Federal Reserve and its computer and communication systems, *e.g.* Fed-Wire?
13. The subject of “capitalism as a religion” is a worthy sociological or sociopolitical inquiry. Psychological aspects of money-energy parasitism are also open for investigation.
14. Is CPI calculation flawed based on the conventional system from underestimation and the elasticity problem? What are mathematical models of elasticity across diverse sets of goods?
15. To what degree is Solow’s “productivity paradox” explained by the “parasitism hypothesis”?

## 12 frequently asked questions

“Imagination is more important than knowledge.”

—Einstein

“Never attribute to malice what can adequately be described by stupidity.”

—*American proverb*

An attempt is made here to anticipate some questions that might frequently occur on the contents of this paper and provide a brief summary.

Q. Isn't fractional reserve banking the only way to do it?

A. No, there are alternatives. The idea that it is, is probably based on a centuries-old philosophy and practice of money parasitism—a kind of dark-ages “leech bloodletting” that persists into the 21st century.

Q. Isn't a full-reserve system impossible because then nobody could borrow money?

A. The concept of timed-deposit accounts where depositors agree to penalties for early withdrawal is compatible with a full-reserve system with borrowing.

Q. Doesn't the Fed “fight” inflation?

A. Inflation can never be prevented by “expanding the money supply” because that is the cause of it.

Q. Isn't deflation to be avoided?

A. The mathematical findings here contradict that. Deflation can be a means for widespread and equitable distribution of the public gains of an economy. Historically, “demonizing deflation” may have been one means of infection by parasitism.

Q. Isn't “price stability” an important goal?

A. By the same line of thinking, it can be a means of preventing equitable distribution of public gains. Also, price fluctuation can be seen as a self-regulating mechanism.

Q. Isn't it true the government must borrow money?

A. Governments can and should function without borrowing in addition to tax

revenues. Borrowing represents a departure from an equilibrium state. Money expansion is an even further removed disequilibrium. It's all just variations on the same theme of parasitism.

Q. Won't the system collapse without continued growth?

A. The question is similar to the prior one. Growth is a non-equilibrium state. A sane economics must be based on an equilibrium. Collapse as a result of continued growth is the more accurate scenario. Growth can also disguise a money parasite, or be a symptom of one.

Q. What's wrong with interest?

A. Interest, defined as “risk-free gain(s),” is only possible *via* growth (or acceleration) in the economy, which itself is subject to boom-bust cycles. An interest distribution system could also be seen as an ineffective defense mechanism against parasitism—it might even be a symptom of it.

Q. Doesn't the government just print money whenever it needs it?

A. That's the cliché. The Federal Reserve and U.S. Treasury relationship is very convoluted, but basically “printing money” can be an accurate or misleading picture depending on the context. The key question is “who gains?”

Q. Aren't business cycles related to human irrationality & fundamentally inescapable?

A. It is possible the boom-bust cycle is inescapable in any system, but it is also possible that it isn't, or at least has been historically exacerbated (amplified) by a money parasite.

Q. Isn't there not enough gold in the world for modern economies?

A. The question involves a lack of understanding of the nature of scarcity. Prices would naturally adjust to the amount

- available if it were used as a standard.
- Q. Wouldn't it be a waste to use gold as a standard when it could be going to something more productive?
- A. Again the question implies a lack of understanding about the nature of scarcity. The stored gold not going to other uses is a perfect visual depiction of the fundamental nature of money as a "store of value" and the definition of "reserve."
- Q. So there should be a gold standard?
- A. It's one but not the only possibility; unfortunately any system can be debased, as gold was routinely in the past. The focus needs to be on the administration system.
- Q. Is there really an *organized* national or international "money parasite"?
- A. The case for a nationally *unorganized* one, *i.e.* on the level of a metaphor or as an "emergent phenomenon," is certainly reasonable to conclude. As for "organized"—unknown. Proposed here as a hypothesis but left as an open question. There is ample circumstantial evidence but nothing definitive or conclusive. "Need more data."
- Q. How solid are all the mathematical formulas in this paper?
- A. Not all of it is to be taken totally seriously. It's laid down immediately asking for revision. The underlying theoretical conception of energy dynamics is likely very solid.
- Q. Doesn't this entire paper fly in the face of vast swathes of existing economic theory?
- A. Yes. In fact in places it's quite disrespectful.
- Q. Why hasn't anyone in banking or government described or confronted money parasitism before?
- A. Many have, in different forms, as documented here. But it's also a problem of each mistakenly thinking that the other "has it covered," a blind-spot exploitable by a parasite. If regulators don't know what to look for, it just results in "close calls" and "near misses."
- Q. Is the Federal Reserve a nexus for a real money parasite?
- A. Possibly. A central banking system is the natural habitat of a money parasite. A worldwide system such as the IMF or World Bank would be an especially "juicy host." If the world had a bank, the World Bank would be it.
- Q. How could it be isolated if it exists?
- A. Determined investigation, maybe a real "audit." Note that published records do not necessarily accurately depict hidden dynamics. Also, in any serious investigation, the possibility must be confronted that some participants may be "tainted."
- Q. That sounds like a witchhunt!
- A. More like a parasite hunt. Remember, the immune system itself can be compromised in a parasitic invasion, in the more insidious cases. But it could even be fun, like a game, like hunting for easter eggs.
- Q. But that still sounds like McCarthyism!
- A. Yes, or maybe McCarthyism was a parasite decoy. Public hearings are flamboyant but not necessarily a very effective strategy.
- Q. [snicker] So then what's "a very effective strategy?"
- A. Andy Grove, ex-CEO of Intel and premiere 20th century surfer of Moore's Law and the technological age, wrote a book called *Only the Paranoid Survive*. Seriously, maybe a truly effective strategy is yet to be invented. A parasite at the scale of national or international economies in the 21st century must necessarily have developed extraordinarily, verging on incomprehensi-



bly sophisticated mechanisms for ensuring its own survival. But Zimmer's work reveals, that is in fact *exactly* the level that real biological parasites have routinely attained through millenia of co-evolution with their hosts.

Q. It's still all just a conspiracy theory.

A. As Lincoln, front-line expert on slavery and liberation, warned ominously, "the money power *conspires*." History abounds with real conspiracies, and to paraphrase Santayana, those who do not learn from them are doomed to repeat them. (On the other hand, it has also been said "history is written by the assassins...") Anyway, a thorough investigation does not imply belief in a conspiracy. Money holders have the right and *imperative* to enforce the integrity of their system. *It's their money*.

Q. The overall paper flips in an almost bipolar way between money parasitism in its theoretical *vs.* real forms, abounding with multitudes of nebulous abstractions, mathematical fantasies, outlandish and disconnected references, flimsy innuendoes, foggy and tenuous inferences, *nonsequiturs*, shrill polemics, awkward mixed metaphors, unproven speculations, unwarranted and wild extrapolations, frivolous quotations, borderline purple prose, and gratuitous, thinly-veiled accusations.

Q. Yes. So?

A. ... The slurs on the public citizenry at the end are tasteless, insulting, mean-spirited, out-of-line, outrageous and intolerable.

A. ok.

Q. The text has too much italics, and exclamation points should *never* be used in a scientific paper!

A. *ok!*

Q. ... If there's a worldwide economic slav-

ery or warfare system, why can't I see it?

A. Maybe because it's invisible. And note that scientific advancement (the "paradigm shift" cliché) is fundamentally about making the invisible visible as *e.g.* in the case of Pasteur, or the past and modern parasitologists.

Q. Can econophysics really replace "the dismal science" of economics?

A. Hopefully. It's an entirely different paradigm with fundamentally different tools, outlooks, and strategies. It's all a truly vast *terra incognita* waiting for another Einstein, so to speak.

Q. How could entire banks be corrupt?

A. There are historical examples of this even on a large scale such as the BCCI collapse, Bank of Credit and Commerce International in the early 1990s; regulators reported that mass funds simply "disappeared." All scenarios must be considered for a healthy immune system.

Q. How much money has been lost to the parasitism?

A. In one sense, nothing, because it has not been detected or considered a loss. In another sense, possibly astronomical amounts over many generations, conceivably enough to enslave entire nations.

Q. Can a single paper really make any difference?

A. Maybe. If it is read, understood, and disseminated. Martin Luther's did.

Q. Who will solve these problems?

A. Concerned citizens, if they exist.

Q. But will they be solved?

A. Maybe. Probably, especially in the long-term as public consciousness is raised. There are occasional "tipping point" or "critical mass" phenomena along these lines.

## 13 comments on references

The following comments are offered in addition to prior notes to other researchers interested in navigating some of the references cited. The literature pertaining to the subject of money, economics, and fractional reserve banking is vast. The selection below represents only one possible set with its own idiosyncracies.

Easily an entire paper could be written analyzing *Silent Weapons for Quiet Wars: Operations Research Technical Manual*. [2] The scientific community apparently has been totally silent on or unaware of this document, but the contents clearly deserve serious analysis as to their possible authenticity. There are two main versions circulating, one of which has no diagrams or equations (in *e.g.* Cooper's collection), the other has many diagrams and complex formulas such as partial differential equations, electronic schematics *etc.* (in *e.g.* web site version cited) that strongly conflict with any view of it as some kind of amateur prank or parody.

In many ways it is the most important single reference among this collection apropos to this paper's own analysis. It contains a scientific sophistication arguably at least two decades or more ahead of its time at its published date (1979), but also the most sinister and diabolical undercurrent conceivable. There is a very strong case to be made it is exactly what it purports to be, *i.e. a leaked top secret manual, handbook, and manifesto for insiders documenting the history and mechanics of economic parasitism and warfare, razor-honed to a deadly science.*

At 608 pages, Griffin's *tour de force* [32] is one of the most ambitious and thorough treatises on the subject of the Federal Reserve and the history of money and fractional banking. Griffin focuses mainly on U.S. history and historical figures during and since the revolutionary war, with meticulous analysis and many historical quotations, with special attention to U.S. war engagements. It's also one of the most comprehensive bibliographies on the subject available.

Much literature on the Federal Reserve falls into the genre of "conspiracy theories." The approach taken in this paper is to include these sources simply

as additional perspectives for consideration, pieces for a sociological or anthropological study. [2] and [1] are classic pieces from this genre. Unlike mainstream accounts, these articulate and explore the covert means by which money and political power can be intertwined and leveraged against each other. In [23] the economist Flaherty has taken pains to debunk the conspiracy theories on his web page, focusing particularly on [34].

Mullins' work [49] is another classic from the conspiracy literature, has much historical detail apparently based on copious research and highly accurate, but is seriously marred by the lack of citations and a bibliography. [27] is similar, also having much historical information but weak organization and no bibliography.

Rothschild's *Bionomics* [55] is the first comprehensive treatment of the economy-as-ecosystem paradigm, a very innovative and seminal book at its introduction; the ideas have been very influential. The *Bionomics* Institute and web site has active and ongoing publications and conferences.

Borsook [7] has an irreverent and facetious chapter on bionomics as a social movement, "Bionomics in Your Daily Life," documenting the various conferences in the 1990s and personalities behind their organization. It also delineates the major political agendas behind bionomics, mainly libertarianism. Borsook focuses on a brand of libertarianism finetuned by Silicon Valley hackers, verging into a philosophy of "anarcho-capitalism." Her work serves as a fair, skeptical critique and warning on extremist views and hidden ulterior agendas on *e.g.* digital cash.

Bhattacharya's work [6] is a recent complex and admirable analysis with computational simulation of a money expansion model that includes diverse factors such as production, taxation, *etc.* by a Federal Reserve sponsored economist. It also has an extensive bibliography of conventional economists' views on money expansion, *i.e.* "conventional wisdom" largely contradicted by this paper's findings and assertions. It can be reviewed while keeping in mind the potential conflict-of-interest issues noted earlier.

The accumulated edifice of 20th century economics theory is extremely formidable, and summary and

overview references such as [17, 50, 58] are very helpful in condensing decades of diverse materials. However they should be recognized as not substituting for definitive treatises and textbooks from the field.

Doyne Farmer in many ways embodies the new breed of econophysicists and is the forerunner. [18, 19, 20] He was key in helping bring about the scientific paradigm shift in recognizing chaos, complexity, and nonlinear dynamics long before it was a fashionable point of view—in fact, the agenda was initially very unsupported, risky, criticized, and even ridiculed; see [66].

The economists that come closest to articulating the same ideas of this paper are Friedman [26] and Rothbard [53]. Both writers are internationally acclaimed. Rothbard is sponsored by the Ludwig Von Mises Institute with many similar writings and is one of the few economists in the entire world to argue directly against the central banking system in the form of the Federal Reserve. [54] This reference also contains an analysis of American history based on the machinations of private banking dynasties.

[64] and [45] are remarkable, astonishing, incendiary denunciations, indictments, and condemnations of the Federal Reserve entered into Congressional record by representatives McFadden and Traficant, totally obscure, unknown, or forgotten among the general public.

[31] is about the best documentation of the internal operation of the secretive Federal Reserve available to the public. [63] is a very accessible abbreviated summary on the function of the Federal Reserve.

[22] is a comprehensive account of history based on the interpenetration of banking and key historical events such as world wars, a crucial link not typically explored by historians. [14] is a similar retrospective.

[46] is one of the few available references that proposes a similar analogy explored in this paper, the “cancer stage of capitalism.”

[59] is a 413 page treatise on economics targeted at the layman. It’s got excellent history on the interpenetration between politics and economics, focusing on the 20th century, as well as a basic introduction to the Federal Reserve system.

[39] and [69] were published at about the same time and look at the extreme international fluidity

of electronic money at the end of the 20th century, the latter emphasizing its disruptive effects on governments. [57] takes the case further and argues the case for worldwide “debt slavery” *via* international lending institutions (IMF, World Bank).

[29] and [37] are particularly helpful in proposing alternative currency systems.

[70] is a very lucidly written yet highly scientific account of the recent revolution in biological parasitology, based on many first-hand interviews of researchers.

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