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“Everything should be made as simple as possible, but no simpler.”
Even if Einstein didn’t actually say that, I’m sure he would have meant it.

A New Macroeconomics to Explain High Wealth Inequality

The intention here is to present a different way to approach macroeconomics. I am looking for critical discussion from readers to reveal those defects to make it more properly descriptive of economic reality.

Very brief summary

This essay takes an approach to macroeconomics different from the present version that Samuelson defined in the 1950’s. It is a monetary approach (different from Friedman and Schwartz) that shows how a fundamental monetary constraint tends to gradually lead to inequality in holding of money, which can limit the effectiveness of money to allow goods and services to be distributed in an economy. Methods are described that have evolved historically to allow governmental and financial sectors to compensate, but which often do not compensate enough to counter wealth inequality. This is different from the standard approach because this new approach employs multiple agents to clarify how inequality of income and especially inequality of wealth tend to develop among groups of people in an economy. It shows the important influence of monetary velocity, using the differences in monetary velocity among agents as a better measure for what MPC (marginal propensity to consume) is traditionally used to describe. The analysis includes the financial sector as essential for understanding the economy. It demonstrates how “secular stagnation” can develop endogenously in an economy, which is encouraged by very low interest rates and high wealth inequality.

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Stylistic note: It may be surprising for some contemporary readers, but it used to be the case (when I learned English) that the pronoun “he” referred to either a male or female person unless the referenced person was known to be female. On the other hand “she” was reserved *only* for females. Now many insist that “he” must be restricted to refer *only* to a male individual. Unfortunately that leaves no singular pronoun except possibly “it” that can refer to either male or female person. A very bad practice has been to use the third person plural “they” to refer to the singular case, which now leaves the term “they” ambiguous as to whether it refers to one or many. In this essay I have decided to use “they” only for the plural and “he/she” for the singular which takes the place of what “he” formerly meant. I use “he” to refer only to males. That is awkward for speech, but it’s the best I can think of for contemporary writing.

Ironically, it is now considered acceptable for the phrase “you guys” to refer to either males, females, or both.

Section 1.1 Introduction to money and its fundamental constraint on an economy

The purpose of this essay is to describe an approach to macroeconomics that is monetary based and which shows how wealth inequality is a likely consequence of any money system, even ones centuries ago. In this essay I find limitations of present macroeconomic theory which was originated by Paul Samuelson in the 1950’s, which attempted to give mathematical form to Keynes’ economic insight of the 1930’s. I’m not claiming his formulation is wrong, and despite much respect I have for Samuelson and Keynes for trying to understand how our economy works, I believe macroeconomic theory has been demonstrated to be inadequate because it has so often failed to provide understanding for some important recurring economic problems—notably why wealth inequality commonly seems to become uncontrollably worse, and why high debt so often becomes a problem within economies.

Section 1 describes how basic properties of money that have not been sufficiently examined have had very much to do with the collapse of the economy in the 1930’s—and also can explain aspects of the US and world economy which have puzzled economists in the US, particularly since 2010, and which were also experienced in Japan before that beginning in about 2000. Although this is a monetary approach, it is not related to that of Schwarz and Friedman whose monetary theory considerably differs from this one. The discussion here finds that in addition to monetary quantity, it is vitally important to also consider the effect on an economy of “monetary velocity.” This analysis shows how each economic individual has his/her own characteristic velocity; and it is the distribution of these differences over the population that determines overall velocity which exerts strong influence on economic performance.

Here are five economic events which have been seen in the last thirty years which this economic description better explains:

- (1) Why the world seems to require unprecedented low interest rates, and even negative rates.
- (2) Why very high wealth inequality has developed especially after 1980, which has reverted uncontrollably to levels seen only in the 1920’s after which followed the depression of the 1930’s.
- (3) Extraordinarily rapid increase in money supply since 2010—especially in 2020, being invoked in seeming panic by the Fed—with scant insight from macroeconomic theory that could explain why such high rates of increase are

suddenly needed. Yet surprisingly, inflation remains at a low level that Milton Friedman and Ben Bernanke would likely have considered unimaginable in 2000. Our economy has been described by some as being in “secular stagnation,” which is a term first used by Alvin Hansen in the 1930’s to describe the economy in that decade, and has more recently been used by Lawrence Summers to describe the post 2010 decade.

- (4) Why national debts almost always go up, and tend only very rarely to go down except when accomplished by rapid defaulting of debt. Related: why the attempt to make debts go lower in a controlled, “sensible” way, often referred to as “austerity” are almost always disastrous to an economy.
- (5) Why inflation seems to be a necessary feature of economies which are reasonably functional.

What should macroeconomics be expected to explain: One of the main motivations for the development of Samuelson’s modern interpretation of macroeconomics was to explain the 1930’s depression, and allow mathematical expression for Keynes’ proposed solution. However, Schwarz and Friedman writing in the 1960’s disagreed with Keynes, and put main blame for the 1930’s depression on the Fed for responding inappropriately to the crisis. Friedman certainly made valid criticism of the Fed for not acting appropriately, but he did not explain why the economy, operating “naturally” without external help would have needed such corrective action. Friedman later took a conservative position that almost any governmental interference with the natural workings of the economy would be harmful—which leaves a big question as to why any such Fed action in the 1930’s was necessary in the first place. In retrospect, the most effective fix for the 1930’s depression was, unfortunately, World War Two, which certainly seemed to fix the US economy by providing an immense increase in demand and consequently increased employment, which no doubt was not surprising to Keynes, but made a horrible mess for the world in other obvious respects.

Ben Bernanke in 2002 made a late apology for the Fed in which he agreed with Friedman’s criticism of the Fed’s policy in the 1930’s. This prompted a different, very strong monetary policy by Bernanke in response to the 2008 financial breakdown, based on the Fed’s perceived historical mistakes in the 1930’s. This included what was called “QE” (quantitative easing) in which trillions of dollars were used to purchase bonds, both Treasury and other more questionable bonds. I believe it is fair to say that effort as a cure for the economy proved less responsive than expected.

The fundamental monetary constraint—a difficult history: the explanation to be presented here may find difficult acceptance among those who have been educated in the traditional macroeconomics in the post 1950 time period. This difficulty could arise because of the seeming simplicity of this monetary analysis, which may seem too simple to provide a firm basis upon which to explain recent aspects of our economy. But this simple explanation can supply useful answers that conventional macroeconomics can’t easily explain.

One fundamental reason for inadequacy of present macroeconomics is that it does not recognize the *fundamental monetary constraint* which the use of money imposes on an economy when the total quantity of money is fixed. I will make clear how an economy based on money *inherently* tends to produce an unstable economy, with gradually

increasing wealth inequality and as a consequence of that reduced efficiency for money exchange of goods and services in an economy. This relies on properties of money that have existed for thousands of years. Consequently the same problem must have existed for as long as money has been used as a means of exchanging goods and services. After discussing this I'll specify a number of actions that have been historically taken to compensate, to make an economy work better despite the constraint, such as adding a financial sector which allowed borrowing and loaning of money.

I'm not the first one! I cannot claim complete credit for the explanation I will outline—which is not original with me, nor the first time similar proposals have been made. Keynes has cited many examples of past historical explanations similar to this one in Chapter 23 in his “General Theory” book. These explanations have often placed responsibility for the frequent breakdown of economies on “over saving” or “underconsumption.” These explanations have been quite unreasonably rejected by most mainstream economists. Keynes described several previous ideas expressing the depressive effect of not consuming enough, arguments historically advanced by Mandevill, Malthus and John Hobson which have been almost universally rejected by mainstream economists—with exception of at least Keynes and Heilbroner who were at least sympathetic enough to explain these views. Mainstream economists frequently rejected such ideas, with protests not to their lack of logic, but rather their lack of proper ascetic morality. Here is a paragraph from Keynes' book (p 362) where he refers ironically to “wicked sentiments” expressed by those who thought that more consumption was needed to help cure an ailing economy:

No wonder that such wicked sentiments called down the opprobrium of two centuries of moralists and economists who felt much more virtuous in possession of their austere doctrine than no sound remedy was discoverable except in the utmost of thrift and economy both by the individual and by the state. Petty's “entertainments, magnificent shews, [sic] triumphal arches, etc.” gave place to the penny-wisdom of Gladstonian finance and to a state system which “could not afford” hospitals, open spaces, noble buildings, even the preservation of its ancient monuments, far less the splendours of music and the drama, all of which were consigned to the private charity or magnanimity of improvident individuals.”

Those described as “underconsumptionists” argued that more consumption, often specifically more consumption by those who were wealthy, was needed to keep money in an economy flowing. The purpose here is to demonstrate how there is a *strong inherent tendency* towards inequality of wealth driven by elementary properties of money which can justify that view. I do believe that the extreme wealth inequality presently in the US economy is an economic defect that *ought* to somehow be corrected—but my main focus here is to show *how* it so easily happens. *How* it happens must be first understood if we believe we should attempt to remove the causes of extreme wealth inequality. This analysis shows how extreme wealth inequality also *simultaneously* reduces productivity in the economy. I will first cite precisely the assumptions on which it is based—then proceed with logic that shows how the money instability leads to inequality in holding of cash money. Then I describe a short term fix that has been historically introduced that allows holding of wealth as loanable funds or stocks. But this only delays the problem that later produces a much larger wealth inequality problem.

Section 1.2 Describing the fundamental economic constraint

Beginning from the beginning: What is an “economic system”?

Human civilizations are groups of people who work cooperatively to share workday tasks, which is more efficient than everyone working independently. Some people will become more proficient and efficient at some tasks than others. It is beneficial for everyone if different tasks are divided among the members so that instead of each person doing all tasks they need by themselves, they divide the tasks so that they can be performed by different people according to their skill, preference and efficiency. An “economic system” is the set of rules and customs that tries to make this allocation of work efficiently with some perception of fairness.

But how can people divide tasks to distribute the effort in a manner that seems equitable? If it is not perceived as fair, resentment and dissension is likely to reduce the effectiveness of an organization of people working to share necessary tasks. The most basic form for some kind of “economic system” is a set of rules by which people agree to share tasks that a society needs to accomplish.

In this essay, “people” can refer to businesses too: In this essay I usually refer to economic participants as “individuals” or “people.” But this could also refer to a group of people, known as a “business” or “corporation” or a “bank” which is essentially treating a body of people into a “body like” person. Businesses and corporations are under the control, and owned by “people.”

In an extremely small community in which everyone works together and all know each other it might work according to a Marxist philosophy, where each contributes according to ability and takes according to need. In that case the members of a small community such as a few families, each will be able to remember who contributes services and who takes those services, and judge how to apportion tasks with some sense of fairness. However in a larger group—especially when the number of people is so large that not everyone knows each other or how much they contribute, it is desirable that people have some other method of apportioning tasks in a manner that people find reasonable.

Elements of a money system for goods/services exchanges:

A simple money system uses an agreed upon *fixed total* of tokens (such as dollars) for the economy. I’ll next describe the *fundamental monetary constraint* which is imposed because total money in an economy is fixed. To begin with, for purpose of analysis I will start with the **assumption that no financial system such as banks are available** that enables people to borrow or save money between different persons. In other words people have to make transactions of goods and services with only the exchange of money that they have in their possession. I’ll explain why the fundamental monetary constraint within an economy puts a strong limit upon the maximum amount of money that any individual can save without ruining the ability of money to perform its important other money function: that of exchanging goods/services. Later (section 5) I’ll show why a financial system of banks that allows borrowing and lending of money has necessarily developed so people can save high amounts of money without crushing the ability of money to exchange goods/services.

As the foundation for this essay it is necessary to understand why a simple money system with *fixed total value* creates a monetary constraint that requires each individual to contribute over time *about the same value* as that same individual consumes. Things go wrong when some individuals produce *much more* than they consume. In a fixed money economy, when some produce more than they need, that excludes others from performing

this work and getting paid the money they would otherwise gain to allow purchase of those extra goods. This view has been historically observed and often expressed, however it has been almost always rejected by mainline economists. People who made such arguments were derisively labeled as “underconsumptionists.” Therefore I will need to supply a very careful step by step analysis to show why this view is correct, on page 6. I will also explain that modifications requiring a loanable funds market or government taxation are necessary to allow our economy to function properly when for some individuals the value contributed is not equal to the value consumed.

How money acquires value: Over time and experience in conducting exchanges of goods and services there will be a perceived “value” in terms of effort or skill for particular tasks that will be associated with the payment of a specific amount of money—for which a lesser or greater number of tokens will be exchanged from the recipient to supplier of such tasks. Different price options offered by sellers compete with each other for buyers which tends to keep money at some approximately uniform perceived value. With a “fiat” money system as we use in the US today, it is “competition in the marketplace” that tends to enforce fair values among different products and services. To keep prices fair and reasonable this requires that there be no barriers that restrict such competition—such that if some believe that others are pricing their products or service unfairly high, those individuals must have the option to intervene in the market to offer the same service at the same or lesser price. We will assume this, even though modern economies can often be criticized for tolerating monopolies which prevent such competition.

What gives “fiat” money value? With a “fiat” money system, it is often said that such money is not backed by anything, except for perhaps “faith.” However it’s not the case that such money is backed by “nothing.” It must be “backed” by the existence of a healthy market of goods/services which provide real value in exchange for money. Without that, money would be worthless, and truly backed by nothing. Even bitcoin has a perceived value in dollars which holders of bitcoin will now, or in the future be expected to claim. If those dollars had no purchasing power in actual goods/services, the bitcoin would also be worthless, and backed by “nothing of value.”

Gold backed money: With the older “gold backed” system, the intention was to make gold a “standard” or “reference commodity” whose value would be compared with any good or service being traded—however even then the “competition” factor must have also been an important factor that defined a purchasing value for money. In addition, when gold was money it likely caused gold to reflexively have more value than it otherwise would have as just being a shiny rare metal, owing to its ability to claim a variety of market goods and services which might be valued even more than the metal.

List of four important assumptions that impose fundamental monetary restraint for a simple economy. These assumptions will be relaxed later with further analysis:

Assumption 1: The total *quantity of money* in an economy does not change—or at least changes very slowly. That total amount of money in the economy is allocated in different proportions to all persons participating in the economy who wish to trade with others. In the US the total quantity of money is not perfectly fixed, since it can be increased or decreased by the U. S. Federal Reserve as will be described later to increase or decrease business activity, but they are not usually rapid changes. Over years the Fed gradually has increased the amount of money

when the economy is being expanded with more goods/services being offered, in order to keep prices from dropping (deflation) to accommodate the increase of economic activity. However in the short term money quantity is usually reasonably constant.

Assumption 2: The total *real* value of goods *and* services for sale in an economy averaged over a particular length of time, from year to year, is not fixed—but is determined by the choices and activities and talents of the individual participants that supply goods/service or their labor. So this total value in an entire economy is “crowd sourced” by all participants, and will be increased or decreased by decisions of many individual participants who decide what and how much to produce.

Assumption 3: When a good or service is transferred from a producer to a consumer, an amount of money is transferred in the opposite direction from the consumer to the producer according to its price, which is the perceived value of the good or service. Thus, the amount of money an individual holds is an indicator of how much net value that person has contributed to the economy. This is the way individual holdings of money change in value.

Assumption 4: No financial sector of banks is yet present. Transfer of money, not checks or borrowed money, is the only method of exchanging goods. Later I’ll explain why such banks, or option to buy bonds are necessary in our economy.

These assumptions contain the conditions for “fundamental monetary constraint” which already can provide a basis that predicts the qualities of a recessions or depressions that have been historically observed, which are instabilities which are not obviously predicted by present macroeconomic analysis—because contemporary macroeconomics does not account for this constraint. Conventional macroeconomics usually predicts economies that always operate in a corrective equilibrium suggestive of a benevolent “invisible hand.” Breakdowns such as occurred in 1929 and 2008 are rarely predicted—and even just before 2008 some assumed that such economic disturbances could in the future easily be avoided by proper Federal Reserve policy. This is certainly not the first time economists have been surprised by a sudden economic breakdown. They are usually blamed on “exogenous” shocks of some kind—however as I will show, this is a problem that is inherent to an economy because of basic properties in the structure of money, and so is predicted to occur by this version of macroeconomics.

The following consequences of the above assumptions:

- 1. Money held by each person changes according to net addition or spending of money value by that person:** For anyone in the economy who over a year (or other time) produces *more* value in goods/services than they consume, the amount of money they hold will *increase* by the difference in value between what they sold subtracted by the amount they purchased over that year.
- 2. There exist three earning/spending categories:** Everyone in an economy for which total money is fixed, after one year must fall into one of three categories:
 - (1) “Savers” who produce *more* value in goods/services than they consume
 - (2) “Dissavers” who produce *less* in value of goods/services than they consume
 - (3) Those who produce the *same* value as they consume.

3. Under these assumptions, saving is a zero sum game: Those savers as a group over a period of a year will save a total amount of money \$S. Those dissavers will dissave an amount \$D. Those in category 3 will hold the same amount of cash as before. Since the total money in the economy has not changed, $\$S = \D .

Fundamental monetary constraint: There can be no net saving in an economy with a fixed total quantity of money.

If one group saves, the other group must dissave by an equal amount.

If in an economy no one saves or dissaves over a period such as a year, the money system described can be used to successfully distribute goods/services in an economy over long periods. If a “saving” group continues to save over years, this must be destabilizing. Gradually an economy will weaken because the corresponding “dissaving” group will run out of money, not allowing them to further participate. Total M1 money in the US is about \$4T. The extreme (unrealistic) case: once the total saving of money equals \$4T, the economy would be completely frozen—as all \$4T would be held non transactional which is beyond what any economy could reasonably reach. Clearly something must happen to avoid this occurrence.

A system with the fundamental monetary constraint could only possibly work well for an economy for which no one saves (therefore no one dissaves) --which over each year interval every individual produces a value of products/services equal to what that same individual consumes. Under these conditions each person will contribute an amount equal to what they take. Each person will have an average balance that will stay approximately constant equilibrium from year to year.

Note that this does *not* mean that for all individuals everyone must hold the *same* quantity of money as everyone else. Just to be clear, it also does not mean that everyone must have the same income. Different individuals can hold different average amounts for their “equilibrium” value of money. Another workable situation is that if Mr. A over a year earns and saves a net \$2000 dollars, and Ms. B over a year spends down the same net amount, as long as things then balance soon (next year) so Mr. A then spends \$2000 more than he gains next year and Ms. B increases her net cash wealth by \$2000, that would also maintain the necessary monetary equilibrium in a simple economy.

But in our present economy we know that some individuals do produce over time more than they save in our economy. The Fundamental money constraint appears to be a “paradox” since we know that in our economy people do actually do accumulate money. To explain how the present economy works we will have to modify some initial assumptions. But part of the answer in this essay is to notice that many economies in the world obviously *do* display extreme inequality of wealth.

Many in the past found this reasoning very uncomfortable—even unbelievable despite numerous examples of such historical events called “recessions” or “depressions.” This monetary constraint shows how a money economy can develop a tendency for money to be trapped and unable to serve the function of exchange of goods. If that occurs economies can get bound up with a “glut” of goods together with not sufficient money to purchase them, usually called a recession or depression.

Making a recession: How above conclusions describe common characteristics of an economy in recession/depression with a glut of goods to sell with few buyers. This is what can happen if an economic subgroup continues to save for many years.

- (1) **Money wealth inequality becomes evident** because at least some in the economy have more than adequate money they need to purchase goods/services because they are the ones who have over time produced more value in goods/services than they have consumed.
- (2) **More than adequate supply of goods are available to purchase**—created by those who have continually produced greater goods/services than they consume, providing seemingly more than adequate products/services for sale, resulting in what has historically often been described as a “glut” of goods.
- (3) **Lack of demand for goods that are available to buy**—the subgroup in the economy which has consumed more does not lack the desire, but lacks the money they need to provide economic demand for the extra products produced by the high producers. The low producers lack money to purchase, and the high producers are disappointed with poor sales.
- (4) **High unemployment**—because lack of demand for products/services reduces demand for labor to produce it. This well describes people who have been laid off from their jobs by the British description: “workers who have become redundant.”
- (5) **Under assumptions so far assumed, there are no automatic stabilizers in such an economy to reverse this situation.** In section 5 of this essay I will describe a list of tactics that have historically evolved to slow the development of this economic difficulty—one important example is the loanable funds market which allows the richer to loan to the poorer to purchase extra available goods that can “clear” the market. This can only work up to a point—the “poorer” must at least have enough monetary resources for the loaners to believe that the borrowers can afford to pay the interest, and that they will eventually be able to pay the money back to the creditor. This I believe is the most basic structure for explaining both a recession or a more serious contemporary “secular stagnating” economy observed recently.

Summary of Section 1 up to this point: The previous section has explained the cause of recessions/depressions that have been experienced for centuries, their cause not often explained: The set of four simple assumptions beginning above on page 6 are all that are needed to explain historical recessions/depressions with the classical characteristics summarized beginning on page 8.

This explanation is based on two ideas previously described that suddenly made economics much clearer for me. These have not been commonly explained by economists: (recall we are not yet assuming banks available to save

1. The “fundamental monetary restraint” occurs when money quantity is assumed to remain reasonably constant over time.
2. Some money that is being held with purpose to immediately trade for goods is “transactional” and money being saved as wealth is “non transactional.” Only transactional cash is available for exchanging goods/services in an economy.

The logic of the argument:

1. If each individual spends over time as much value as he/she consumes, all money will eventually recycle back to be transactional, ready to be spent again thus maintaining health for an economy.
2. When some people in an economy “save money” they turn “transactional” cash to “non transactional cash.
3. If they continue to do so, in the extreme all transactional money could be eventually converted to non transactional which will bring the economy to a halt with the five characteristics listed on page 8.
4. To maintain an economy that allows the possibility of saving, some additional methods of recycling “non transactional cash” back to “transactional” cash must be included within an economy. It must be a process or combination of processes that recycle money back to transactional cash at a rate sufficient to keep up with the rate that saving produces non transactional cash.

The next sections through section 5 explore such cash “recycling” methods which are required to keep an economy with savers working well. Section 8 of this essay repeats the summary similar to what has just been given, but expands that summary to include such recycling methods that are part of modern economies.

**Section 1.3: Two page review, and preview of the rest of this essay:
History has demonstrated that economists find the above conclusion difficult or impossible to believe. Here I will cover more examples in some detail and some repetition to show some consequences of the fundamental monetary constraint.**

The purpose of this essay is to resolve the contradiction above between what seems obvious that everyone *could* save, with the logical conclusion in the essay that with the assumptions of constant money supply and no financial system, that saving by everyone is impossible. The intention is to convert this “paradox” into insight. This insight eventually gives clear answers that explains some otherwise difficult to explain economic phenomena such as constantly rising public debt and inflation.

A subset of people generally succeed in saving by producing more than they consume. I explained how that will cause others to dissave, which if continued too long damages an economy by reducing GDP and increasing unemployment. Here are some attempted historical solutions:

Type 1 solution. One obvious assumption to abandon is that total money in an economy is fixed. In practice money has been gradually enlarged by the Federal reserve. The US M1 money supply from 1975 to 2020, in 45 years has been raised from \$0.3T to \$4T. (6% per year average increase.) However, to be effective to resolve the paradox this money must be supplied to those who consume less, rather than those who produce more, since money tends to flow from underproducers to overproducers, who then hold and “trap” the money from transactions..

Type 2 solution. Another method, is to transfer “saved,” non transactional cash money from over produces to under producers by loaning them money. This

method “recycles” non transactional “saved” money to those that need more transactional money to provide consumption demand. Here are several ways:

- a. Add a financial sector** that was excluded from the above analysis. Banks allow money to be saved by some who hold non transactional “saved” cash—who then loan money to those who wish to spend it—for benefit of interest paid by the borrower. This is an effective short term solution; its disadvantage is that it produces a long term problem that causes a slow flow of interest back in the wrong direction, thus in longer term increasing wealth inequality. Saved money is now not literally “saved.” Saving now has a new meaning: it is now seen as possessing an IOU (promise) from borrowers who will repay a sum of money later back to the saver.
- b. Income taxes or wealth taxes** can be imposed more heavily upon those who save non transactional cash. The government can act as a purchaser of goods and services with such taxes to provide demand, so government can represent a large part of the economic component in the economy described above that is willing to dissave to allow others in the private sector to save. Governments can tax those with “saved” cash, then Government spending can move money from “saved” to “transactional.” Another option (fiscal policy) is for government to take non transactional cash from those who hold lots of non transactional cash and issue Treasury bonds in exchange. That money is converted to transactional cash by being spent for government supplies and services. Another method is that Social Security and unemployment benefits can be provided mainly to those that dissave, while taking taxes from those that save. Wars are also highly efficient ways for governments to rapidly dissave money which can even push economies to less inequality of wealth. WW2 was highly effective in this regard, and pulled the US out of a stubborn depression in the 1930’s.
- c. Bonds or stocks (on initial stock offerings) can be purchased** by those with non transactional money from businesses who need money for investment or operations. In the US the bond market has \$40T bonds, which means that much “saved” money has, over time been transferred by bonds into (likely) transactional cash. This method also has the disadvantage of transferring interest back to the original lender—resulting in a long term trickle of interest (“trickle up”) in the wrong direction to the wealthy.
- d. Money can be given** from those with extra savings to those who spend. Non taxable charitable foundations are one example.

What this analysis will better explain than conventional macroeconomics:

- 1. The tendency for wealth inequality to grow to very high levels.** Solution 2a above buying stocks and bonds allows a subset of people to over time become highly wealthy for which there is virtually no limit unless the total interest paid gets too high of a burden for the country’s GDP to support. For our present US example: 2% of people possess over 50% of financial wealth while the bottom 50% have less than 2% of wealth.
- 2. Why debt is so high,** which is the necessary flip side of the previous item. The wealth of the saver who loans money becomes debt in equal measure to the borrower. This is another zero sum savings game, but in the loanable funds market.

3. **Why national debts always slowly rise—rarely fall:** This is the same as 2. Purchasing national *debt* enables the wealthy to gain bonds as savings wealth, while shifting their cash to government spending, which makes up for the lack of demand created by people who saved more than they spent. As savings are accumulated in the private sector, debt rises in equal measure as public debt. It is virtually impossible to reduce such debt (through “austerity”) because austerity policy tends to have the opposite effect as the original debt; it converts transactional cash back to non transactional cash, undoing the benefit for which the original loans were intended.
4. **Why interest rates have dropped to unusually low rates—**as wealth inequality becomes high the very wealthy come in possession of a high supply of loanable money. Total value of debt of borrowers must be equally high, while interest cost reduces GDP for debtors, reducing ability of the less wealthy to afford loans, so demand for loans is low. High supply of loanable money, with low demand for loans means low interest rates. This is the normal process of high supply, being sold for low demand which results in low price for borrowing, meaning interest rates are low.
5. **How the Federal Reserve recently seems to be “trapped”** into continual creation of money to purchase bonds on the market to keep bond prices from dropping. These bonds are someone’s perceived “wealth” which the Fed seems trying to preserve. They claim to believe if this wealth is lost, loanable money will be lost, thus killing the economy by shutting off loans. The real reason is more likely fear of sudden loss of wealth by the wealthy.

Section 1.3: Consequences of fundamental monetary constraint—some review of what has already been discussed:

Why do people prefer to save rather than dissave? It is not difficult to understand why there is a tendency to produce more rather than less; consider two cases. Case **one** for someone who over time produces less than he/she consumes. Case **two** for someone who over time produces more than is consumed. Both of these result in problems—but problems of a different type.

Case 1 is pretty obvious and it is easy to see why a lower limit on money is imposed. If money possessed by an individual gradually goes down because that person's consumption continuously exceeds his/her production value, eventually it will reach a bound of zero. Running out of money is not pleasant for that individual—highly motivating such person to find some productive, money producing activity. He/she simply has no other option for receiving goods from others except to try to find a job to increase possession of money. So needing some money to spend is a very unforgiving lower bound constraint to an individual.

Case 2 has a more pleasant outcome for the individual saving—but the problem caused is not as obvious. The constraint in this case is not immediately on the individual, but it reduces the ability of the entire economic system to accomplish its intended function of encouraging transfer of goods and services. The person who produces value more than he/she consumes feels no direct constraint, as in this case the individual accumulates over time gradually more money, which provides no negative motivation for him/her. Increasing a stock of money beyond the immediate need to spend can even give a sense

of security against the possibility of a future desire to make an expensive purchase, or to ensure some ability to secure goods if for some reason future income is cut off. So producing more value than needed is more likely to happen—and is usually considered much more desirable—than producing less than needed—it is a more comfortable situation for the individual. There is often a sense of virtue attached to a saver. Some have considered it to be more virtuous to be a “maker” rather than a “taker,” though that claim could well be questioned with the money system where the makers unintentionally deprive the takers of their opportunity to “make” stuff and thus gain money they need to buy other stuff.

The more comfortable preference to have more money than less is how a money system tends to encourage greater production than consumption. This is the basis for why “capitalism” has a reputation as being so good at producing stuff—this tendency is built into the very structure of money, making producing less much more painful than producing more. However this pressure with a money system also builds in a problem that needs to be solved—because as money grows in some people's accounts it then becomes less plentiful among those who are needed to consume the excessive products. That eventually hurts even the savers, as they begin to lose their customers who have insufficient money to consume the goods/services of the saver. This is just the consequence of a relatively fixed total money quantity, which has been so far assumed.

The limiting worst case: The extreme case to illustrate the logic of this argument would be if one person through the (semi) fictional “Amazoom” company that produces all products and services necessary for an entire economy, at lower price than anyone else could manage, in part due to high efficiency and capital investment. Everyone else would be redundant and gradually deplete their money to zero while Mr Amazoom (and those in his employ if adequately paid) would eventually then accumulate the entire money supply, freezing that economy. Mr. Amazoom and his employees hold money with value close to what Mr. Amazoom’s company has created, but others would not have money to buy. There could be “demand” for such products in the sense that people would like or need to have them, but with a money system as I’ve described they would only be able to sell to Mr. Amazoom and his employees. That is an unrealistic extreme example, but illustrates how a money system with fixed total amount of money could spectacularly fail. With a less extreme example, with a not numerically large, but very productive minority that saves their money could gradually begin to hold much more money that would eventually discourage the sale of that productive minority's goods and services. And at the same time there would be plenty of goods evident for sale, but seemingly not enough buyers to consume them. Another simultaneous problem would be the widespread lack of available jobs, since only some people managed to create all needed goods and services. In our present economy because of the lower online costs for Amazon we have seen the closing of very many retail stores that are no longer needed to supply most goods people need—no doubt “more efficient” but with the consequence of reducing employment for many, hence reducing economic demand as well. Does not this sound somewhat like what is happening in our “secular stagnating economy?” It shows the downside of economists’ thinking that increasing efficiency of an economy is always a virtue to be striven for.

The above discussion is very similar to what has been a parallel event with regard to individual trading nations. What's been discussed before within people using money in a single economy is essentially similar among nations trading among each other. In the previous discussion I noted that in an economy with fixed amount of money, after a period like a year every individual will fall into one of three categories: (1) Produce more than they consume. (2) Produce less than they consume (3) produce the same as they consume.

However the same is true if instead of different individuals we're talking about different nations trading among each other. The logic is the same. A much discussed concern has been with an issue called "trade balance" or "imbalance." "Trade balance" is essentially the same case when nations, rather than individuals, export over time an amount equal to what they take—which when this balance is maintained is considered to be the most workable for keeping money balances from deteriorating in world trade. Economists have taken different positions on what "should" happen for the best functioning of world economies—but most now realize that some kind of equality in importing and exporting is the best overall compromise option for all countries. The logic is exactly the same as for the individuals in an economy.

Mercantilists, who want to save more for an entire nation were historically the earliest advocates of exporting more than importing, perceiving this to be of most benefit to a nation that followed this practice, just as individuals trading among each other want to produce more than they save. To encourage this countries often placed tariffs on incoming goods, to discourage imports. Of course, as I showed in my previous analysis, this would necessarily force other nations to also import less. Frequently to balance things, the net importing nations put tariffs on products imported to them in retaliation. It eventually became obvious that this kind of battle was a zero sum game, which is the likely reason that most economists came to this conclusion recommending balance of trade among nations.

For two recent examples, economists Ben Bernanke and Joseph Stiglitz, recognizing that export surpluses for some countries force others to be in trade deficit; they described this mercantilist tendency as a "negative externality" on those in deficit because those importing more would eventually not have cash to enable them to further import—which would then be problematic not only for the importers, but the exporters who would eventually lose their markets.

For centuries this has been a frequent source of conflict among trading nations. We have recently seen such conflict occur between the US and China, as well as Mexico and Canada. When gold was the main form of money among different countries an important aspect of mercantilism was to accumulate more gold by exporting more than importing. Obviously everyone can't do that. Now that money is usually fiat, and different countries use different currencies, such differences begin to result in problematic paper money debts between countries. One way these differences can be resolved with fiat currencies that are "floating" (meaning where their relative values are not tied to a fixed ratio of value) is to adjust the exchange value of the two currencies to increase value for the country that exports more value. This option isn't available to individuals in a national economy. More commonly, because of instinctive tendency for countries to want to export more, calls are frequently made to decrease the value of a home currency to spur

exports. Countries can get into fights about who gets to devalue—frequently an important topic of “trade agreements” between nations.

A remarkable exception for nations that want to export is the US. It is by far the largest net importer of goods and services in the world, presently amounting to about \$0.5T per year. This likely makes some other countries happy, or the US wouldn't be able to do this. What could account for the US being OK with this? Going back to my original analysis, the problem of an individual who produced less is that they would eventually run out of money to buy others' goods. The US is in a unique position among the world to fix this problem for two reasons: (1) The dollar is the most important currency used in world commerce (2) The US is the only country that can (legally) print dollars. So as long as people value the dollar the US can print its way out of the problem, for almost zero cost. In practice, this means selling Treasury bonds to exporters into the US—which have essentially no initial cost—although it does obligate later payments of interest. But with interest rates at record lows, it is not a great cost, especially when considering inflation which pretty much balances out with the interest rate on Treasury bonds—making that essentially a zero cost for the US. The US will get away with this for as long as others feel good about possessing and accumulating dollars as wealth, but not spending those US paper assets known as Treasury Bonds. Another reason is that nationals of other countries can buy US property that is not exported, such as US businesses or other US real estate property. It is also possible that in the US domestic resentment could develop about US internal assets being sold to others, which became an issue with the Japanese buyers of US real estate three decades ago. It is assisted by a world that has become increasingly unequal in wealth—many who are willing to hold financial paper assets such as Treasury bonds without spending them to satisfy their desire to be perceived as more and more wealthy.

Quantity theory of money to help clarify what has been said: The next six page section uses a little *math* to hopefully help develop a greater intuitive understanding of money and also fits it into well known quantity money theory. This will make the further discussion of money more clear, and explain the concept of “monetary velocity.” This essay takes the view that monetary velocity is an important parameter that influences economies, and that its influence on economies has been unreasonably neglected by macroeconomists. Often money velocity is thought as being one number that applies mainly to an entire economy, which indicates how rapidly money is being spent, however the analysis in this essay also shows how different subgroups can also be identified as having values of velocity whose different values significantly affect GDP for an entire economy, as will be discussed.

Different people in a national economy hold different amounts of cash. Typically if people hold more cash in their pockets, or in their bank accounts they tend to spend more, increasing economic activity, or GDP. But that's not always the case, especially for those of high wealth—who may have a sizable amount of cash they don't expect to spend—they just hold cash as part of their wealth, or perhaps distant future spending. How much cash they decide to hold defines their characteristic “monetary velocity” that has to do with their *cash spending habits*, and this also has great importance on GDP. Those holding money at lower monetary velocity tend to decrease GDP in an economy. The following section shows how amount of money held, together with their monetary velocity are both important for influencing GDP in an economy.

Section 2: Quantifying “transactional” and “non transactional” cash The Quantity theory of money equation. Money velocity description.

So far I have been using the terms “transactional” or “non transactional” money as if money fits into only one of two binary categories. This section shows how the concept of “monetary velocity” is a more precise way of describing whether money is “transactional” or not. It shows how money has different *degrees* of transaction value which depend on the spending and earning habits of the possessor of the money. High velocity money means money that is highly transactional, more associated with those of low income. Non transactional money has “low velocity,” which tends to be associated with individuals of high wealth. The following equation has been traditionally used to describe the relationship between price, economic output rate, money quantity and money velocity for a monetary system such as I’ve described. Economists usually pay very little attention to velocity. An important intention of this essay is to show the importance of considering how velocity affects an economy. If many hold high amounts of money that they do not spend, meaning at low velocity, an economy will suffer reduced GDP.

$$GDP = V \times M = \sum_{k=1}^n (M_k \times V_k)$$

which is:

P x Y = M x V, = nominal value of GDP for the economy.

P=price level in an economy using the money type in question, which represents inflation if it rises, or deflation if it falls.

Y=total value (real) rate of production (per year) in the economy (real GDP/year or other unit of time). This number stays constant over time in the case where the same type and amount of goods and services are transferred, independent of the price level.

M=total quantity of money in the economy measured in terms of the total “value.”

V=velocity of money—the average number of times/year (which could also be expressed in other units of time) that each unit of value of currency is spent for final goods and services in the economy.

n = number of people in the economy. M_k and V_k represent the amount of money held, and monetary velocity of Mr. k.

For those familiar with the economic concept of MPC (marginal propensity to consume): I will eventually use the “monetary velocity” concept as a more precise term rather than MPC when discussing the different consuming habits of different groups. This will be a more accurate way to represent consumption rates of different groups.

The formula above is one way that is used to describe GDP, or total value of goods and services in an economy in a year. People usually think of this calculated over a time of one year. From this point of view it could be described as the number of total dollars in the economy **M** multiplied by monetary velocity **V**, which is the number of

times that those dollars exchange hands in one year to purchase (or sell) all goods/services in an economy.

Monetary velocity definition: Monetary velocity is an important, but often not clearly understood concept important for understanding how money works. As implied in the last paragraph, monetary velocity is a measure of how fast money is spent. It is usually expressed as the number of times per year that, on average, each dollar in the economy is spent when purchasing or selling final goods/services. The definition does not include all money exchanges: It only *counts transactions that contribute to GDP*, meaning transactions that result in exchange of *final goods and services*—so does not include money that is transferred between people for other reasons, like exchanging five \$1 bills for a \$5 bill, or receiving or paying off a previously made loan, or paying for intermediate goods to be later made into final goods, or for purchase of stocks on the stock market which usually causes only stock ownership to be transferred from one person to another. Usually when stock is purchased in a market it does not go to the company for their investment. If purchased from the stock exchange the purchase money is only exchanged with the former stock owner who doesn't deliver any actual goods/services—only an exchange of an agreement on paper.

Adam Smith as the “inventor” of GDP: Adam Smith was one of the first to propose in his famous book published in 1775 “An Inquiry into the Nature and Causes of Wealth of Nations” that the wealth of a nation should be most meaningfully measured not as a fixed “stock” of gold, but rather a potentially constantly changing “flow” of production and purchase of goods, services and investments. Before Smith many thought that the total amount of gold possessed by a country should be the measure of “wealth” of a nation. It was a radical shift in thinking at the time to think of “wealth” as a constantly moving “flow” of goods and services that people produced, rather than a (fixed) stock of gold. However (perhaps unfortunately) present day economic usage of “wealth” has reverted back to the original one before Smith. The word “wealth” now counts holding of bonds and stocks and paper money as “wealth.” It would be better to think of stocks and bonds as *potential future wealth owed to the holder, sometimes held for a very long time before paid*. Smith would certainly reject that concept of “real” wealth even more than gold—as stocks, bonds and money have no inherent wealth at all, except as paper (or computer bytes) which represent *not yet fulfilled promises* for the *real* wealth of future goods and services to be delivered in the future. Such paper possesses far less actual “wealth” even than gold—they are essentially promises—hopefully for cash money to be redeemed in the future. Although it is only a promise it is often felt to have more real value than deserved—except when a market crash, or bankruptcy happens for which “loss of confidence” can almost instantly destroy their value—which many mistakenly think is equivalent to some “real” physical loss such as can be caused by massive fire or earthquake or war which is what many imagine when financial markets undergo a huge “loss in value.” But this loss is really a sudden loss of *perception* of what they are worth in terms of a future event—that future event requiring future effort of time and material—not yet even in existence.

One purpose of this essay is to emphasize the importance realizing Smith's original insight about what should be “really” regarded as the true value of wealth for a nation or economy. An example of how well this illusion has worked to the advantage of the United States is that the US has managed for fifty years since the 1970's to continuously

import real wealth consisting of goods and services from other countries with recent value (2019) of \$50 billion/month (according to US census bureau) more than it exports to other countries—for which the sellers in other countries received only US Treasury bonds in return, which cost virtually nothing to produce. Spain managed to do something similar in the eighteenth century, but at least they had to go to the effort to first plunder gold from South America as the first step to obtain such goods. Of course the US is obligated to pay a small amount of interest in US dollars—which also is just as easily manufactured by a magic money computer in possession of the Fed. In modern times we don't even need a printing press.

Monetary policy: What in the economy determines money supply, M? The total quantity of M1 dollars in the US economy is a number that does not usually change rapidly, but can be very gradually increased or decreased by Fed monetary policy. The Fed constantly makes small changes to the quantity of M, described again later in this essay. When the Fed increases M, it is generally described in the press as the Fed is *decreasing interest rates* but it is always accomplishes this by increasing the amount of money in the economy, which the Fed usually does by buying Treasury bonds on the market for which they pay with newly created money. This causes more money to be placed into potential circulation—though recently much has gone to banks who have not loaned it out, so it has been staying unused. “Raising” interest rates is done by the Fed selling Treasury bonds to the public or banks, which causes the Fed to remove cash M from circulation, in exchange for an interest bearing bond given to the former holder of money. The Fed “buys and then subsequently destroys cash” by creating these bonds at an auction with an interest rate adjusted high enough to persuade the holders of money to give up their cash to the Fed in return for a bond—which cash the Fed then converts back into the proverbial thin air from which many claim it was originally created. Additionally, commercial banks, when they create or extinguish loans for customers also can bring money into or out of existence. Banks create money when they make loans. This will be explained more fully below in the section on “**Banks also increase the amount of effective money**” in section 5, page 34.

What controls monetary velocity V: This is rarely discussed or analyzed in a way to make this really clear to a person wanting to understand economics. For reasons I do not understand velocity has often been regarded by some economists, notably Schwarz and Friedman, as a constant that isn't of much significance. The view that will be explained in this essay is that velocity has important macroeconomic effects, for example, as is rarely noted, it was one factor strongly influencing the 1930's depression. Other reasons:

- (1) Velocity of M1 money actually has changed significantly over time, most recently between 2007 and 2017, when it decreased from 10.6 to 5.4. That means it would have had the effect of reducing GDP by 50% if during that period monetary quantity had not been increased by the Fed through what was called “quantitative easing” or QE.
- (2) Monetary velocity also has importance as a value that can be defined for each individual in an economy. These values vary *far* more among different groups or people within our economy—compared to how much it varies in time averaged over an entire economy. I do not know of any place to get actual data, but likely over a range of 0.5 to 50. As soon will be explained velocity is likely much higher for low wealth individuals, and is lower for high wealth people who spend what money they have over a longer time.

One purpose of this essay is to show how velocity significantly affects GDP of an economy.

Recent unprecedented increase of money and decrease of velocity: It should also be noted that recently the Fed has been increasing cash quantity at rates of increase historically unprecedented for the US economy. The first somewhat rapid increase increased after the financial crash in 2008 referred to as “quantitative easing” which the Fed explained as necessary to prevent an economic depression. An even far higher rate of increase was instituted in 2020. Because overall national velocity went down rapidly enough to mostly compensate, despite the rapid change, GDP and inflation in the economy did not significantly increase. The consequence of this policy has naturally caused great difference of opinion for its ultimate consequence, particularly with respect to inflation. This recent occurrence is an important reason to understand exactly what factors affect monetary velocity. I will later explain this by showing that the additional money became held almost exclusively by those of high wealth who held such money rather than spending it.

What changes monetary velocity—and what effect does this have on the economy? The first thing to note in the equation above is that the product $V \times M$ in the equation means that for a given increase in percentage of V or of M , either has the same effect on increasing nominal GDP. That is a good reason velocity should be given a proper explanation of how it is determined and how it might change, which would affect GDP in the same way as a change in M . Different individuals spend the money they hold for longer or shorter times depending on their habits, which determines their individual monetary velocity. The velocity for an entire economy is determined by the combined money habits of each member in the economy as described below. Overall velocity can *only* change if many of those individual habits change over time. It should also be noted as an example, monetary velocity in Japan, a country with economic anomalies that preceded those of other advanced economies, has monetary velocity usually much lower than the US—meaning that the Japanese apparently like to hold cash they receive for a longer time than Americans.

How the velocity of just one individual economic participant is determined: Economic participants usually have a target average amount of cash they like to hold for paying the expenses that they typically have in their everyday lives which must be paid in some form of cash. This is cash that pays little or no interest, so holding unnecessarily large amounts of cash could mean a loss of interest that could be earned if the excess were invested instead. Holding too little can foster anxiety about the ability to pay all the bills in a timely manner—so people usually choose a comfortable medium between these two extremes. Usually people think of this as the amount of money that will cover a certain *time* covering their normal expenses, which might be two weeks for those who have a low income that only barely covers expenses. At the other extreme those who have higher incomes might hold six month’s or more cash worth of expenses. Another reason one could hold that much could be someone with an unusual situation who is paid just once a year so he/she must hold a lot of extra cash to pay all expenses for an entire year. Or, another case is someone who holds cash being held with expectation to spend it on something expensive that requires saving for some considerable time.

Monetary velocity for individuals is determined for each person by two numbers (1) average amount of liquid cash the individual chooses to hold (2)the length of time it

takes for that person to spend that amount for typical expenses he/she has. That spending time is usually expressed in years—and velocity is usually expressed in units in 1/year. If the amount of money held by Mr. K for that purpose is sufficient to cover 4 months of his typical expenses, four months represents 1/3 of a year worth of expenses. The velocity is the *inverse of this time*, or for this example $V=3$, expressed in 1/year units. If $V=3$, that means each average dollar held stays around for 1/3 year, or four months after being earned until being spent. If the time to spend is shorter, then naturally the velocity (escape velocity) is higher, meaning that each dollar held doesn't stick around as long.

The “monetary velocity” of an individual can be considered a measure of the amount of cash the person wants to hold. Lower velocity indicates holding more money that would cover all expected expenses for a longer amount of time.

Monetary velocity is just a way of describing quantitatively how “transactional” or “non transactional” a particular holding of money is, which depends on the motivation of holder of the money. “High velocity” money is spent quickly. Money held as wealth, not being spent is “low velocity.”

Two more examples of velocity calculations. A person with low income will typically have high velocity. Someone living paycheck to paycheck might be paid every two weeks during which all is spent in two weeks. Assuming they steadily reduce their cash over those two weeks, that means they hold a cash amount on average that is only one half a paycheck amount. That half paycheck will cover about one week of expenses or 1/52 of a year—which is a relatively high velocity of 52. Higher velocity means that each dollar held will be more effective at producing national GDP.

At the other income extreme, some (well meaning) financial advisors suggest holding 6 month's of income to cover expected and some unexpected expenses. Someone holding such money in their checking amount would have a velocity of only 2, because those held dollars would be cycled only twice/year. Financial advisors that give this advice may not recognize that it would be impossible for everyone to hold this much M1 money even if they wanted to—simply because the US total amount of M1 money is not sufficient for everyone to hold this much cash. Since M1 money supply is \$3.8T, if everyone had velocity of 2, that would mean $GDP = M \times V = \$3.8T \times 2 = \$7.6T/\text{year}$! Since actual GDP is around \$20T, if everyone succeeded holding six months of cash the total GDP would be cut to less than half! If a great number of people were really determined to do this, GDP would drop to \$7.6T/year. Realistically this would not happen. Quite likely if suddenly many people decided to hold more money the Fed would see output GDP drop drastically, and decide to increase M1 money to accommodate this sudden change of cash preference. Or, also likely possible the financial advisor could be thinking some of this cash could be held not as M1 money (mainly cash and checking account money) but could be held in M2 money—which because its quantity is higher would allow everyone to hold 8 months cash. M2 money is a broader definition of “liquid cash” which includes not only M1 money, but also savings deposits and Certificates of Deposit. It isn't possible to exchange goods directly for a CD, but it considered relatively easy to convert a CD to M1 spendable cash money. M2 money supply in 2020 is about \$15T in 2019.

This previous discussion gives the hint for how a fiat money system can limit prices. As velocity slows as a result of more held cash not being spent GDP will be reduce—which

is how prices can be regulated. As a rough approximation we could think of cash as falling into one of two categories—cash which is *transactional* for immediate purchases of goods and services, and cash that is *held*—with the held type tending to reduce GDP. Monetary velocity gives a numerical value to individuals that indicates how much cash they wish to hold. If two people hold the same amount of cash, the one that has higher velocity will spend faster and produce more GDP per year for the economy.

How the total national velocity is determined once you know the monetary velocity of every individual: Once the value of every individual's money M_k and value of velocity V_k is determined, the total national velocity is equal to the sum of each person's velocity weighted by the amount of average cash they hold.

Here is how this formula is derived. As expressed in this equation, GDP of an entire economy equals the sum of each person's spending for goods and services. Each person's spending is the product of their velocity times money they hold, expressing this mathematically:

$$GDP = V \times M = \sum_{k=1}^n (M_k \times V_k)$$

GDP = M x V = Divide by M

$$V = \frac{1}{M} \sum_{k=1}^n (M_k \times V_k)$$

M_k = individual M1 cash held for expenses by person k
 V_k = individual velocity for cash held by person k
 M = total M1 money in economy
 V = monetary velocity of M1 for entire economy
 n = number of people in economy

This shows that persons who hold higher amounts of cash M_k have more weight in determining the velocity of the entire economy. It is likely also that those with higher wealth tend to hold an amount of money that covers their expenses for a longer time, implying that they have lower velocity. That gives them greater influence in reducing overall economic velocity, thus GDP, which will be covered in more detail in section 4.

With fiat money one might wonder what mechanism keeps prices P stable. The equation below shows that both quantity M and velocity V have equal effect in regulating prices. Many assume that to regulate prices, only M must be stable, but the equation shows that the overall value of V also needs to stay constant, so they both have a role to determine prices. This is shown by writing the equation above for the quantity money equation:

$$P = (M \times V)/Y.$$

One might well ask: When Y (total yearly real value of goods/services) is stable, what keeps prices P stable when fiat money M has no fixed reference to some commodity such as gold? When money is based on gold, then it would seem obvious that the price of a product or service would be compared to the value of gold, which would define the amount of money exchange based on the value of service to equivalent gold. But suppose money is not defined in terms of any commodity. How can it work to define

prices when there is no reference commodity to use for comparison?. As the above equation shows it depends on the product of M and V being stable.

We've described how money M is under some control by the Fed. We've seen that velocity could be stable over time if people did not change their habits about how much cash they wish to hold, usually for current expenses. It is likely that people get used to holding a certain comfortable amount of spending money on hand to cover their expenses for some amount of time—and decide to keep to their habitual holding time over time. Different people have different times, but so long as individuals keep their times stable, that will tend to stabilize total velocity and prices.

To make this more intuitively clear, recall that GDP is the output of goods in an economy per unit time—for example per unit second, or per unit day, or per year, being produced and sold in the economy. But if each person has a quantity of money that he/she is spending *also* at a regulated rate by slowly spending at a constant rate, then that also acts as a speed regulator for the amount of money going into the economy that can be used to pay for these goods. They can't be sold any faster than the rate at which all the customers spend their cash.

If someone decides to raise a price then that will restrict other goods from being sold, or purchased because the money coming out of the pipe is being regulated by spenders at the same former rate. So neither the buyers or sellers will transact as much as they might have preferred—making buyers reluctant to pay the additional amount for the same good or service as before, which collectively limits the prices people set.

Therefore price stability requires that monetary velocity needs to be not be too high, or too low—and remain at a stable rate. Most people know that stable prices depend on the stability of money quantity—but the additional insight here is that stability of prices depends equally on velocity being stable. There is danger for unstable prices, up or down if velocity either rises or falls too fast.

The danger of lower velocity: if people decide to hold greater cash than before it will slow down the economy, reducing GDP. This would happen if some people started to save more cash money than they needed for paying current expenses. Say, for example, they saved such cash for their distant retirement because they feared the risk in the stock market—or that bonds might default. Such held cash would be effectively reduce transaction cash, and therefore slow GDP—having the same effect as if the Fed had taken cash temporarily out of the economy.

Loanable funds market: But this problem of having savings reduce GDP can be avoided—at least in the short term—if someone who is holding more cash than needed decides to loan money instead to someone else who wants money to spend, by using the **loanable funds market**. This will be discussed below in section 5 as one method to counteract the tendency for money to get stuck as non transactional cash. This means that instead of saving money in cash, those with extra cash can loan it to others, with benefit of interest paid to them as a reward for choosing this option. That also provides money to whoever borrowed the money, that will allow those extra goods to be consumed, that were produced by those who have lent their money. However, as will be described below, if interest rates are very low, loaning non transactional money will not be as attractive, which will motivate people to hold more cash, thus reducing velocity and therefore reducing overall GDP in an economy. This is a simple way to understand how the so

called “lower interest bound” works to limit the effectiveness of the Fed who may hope to increase GDP by reducing interest rates further, when interest rates are already very low.

The opposite danger of higher velocity: people spending faster and faster because of runaway price inflation. Prices could accelerate further upward if for some reason inflation started to more noticeably increase. In other words, generally increasing prices can cause them to accelerate even more. “Noticeably” could mean that over the time period that people wish to cover their cash expenses, the rise of prices became visible in people’s radar. This could lead to faster spending if they saw their held money losing value while in their possession. Higher velocity spending would then lead to even more price rises, and possibly even faster spending. The extreme situation most people may have heard of is post WW1 Germany when people tried to spend all their income within days of receiving it, or even in the same day when inflation was at its peak. The *very act of rapidly spending* increases prices even more which is what is called “runaway inflation.” By the math above, if after one month people went from holding money for only 1 week’s expense down to three days that would more than double economic prices in only a month’s time. And even that rate was much less than it eventually became to many people’s horror in Germany in late summer of 1923 as monetary velocity ran to unprecedented rates.

Section 3

“The lower interest bound”-- Showing how very low interest rates reduce monetary velocity, and for that reason reduce GDP—the opposite of what is expected by lowering interest.

When the economy needs a boost it is usually prescribed by many economic experts that the Fed should lower interest rates. The logic is that it will make money easier to borrow because interest rates for borrowing money will be less—and more money (M) that should be available to spend which should increase GDP according to the classical quantity equation we referred to previously. Another conventional explanation is that lower interest will make it less costly to borrow to “increase investment,” which is one component of GDP. Recently, in an attempt to boost the economy the Fed has driven some interest rates to zero, and some other central banks have even pushed them to negative rates. Many have been puzzled by the lack of expected economic stimulus.

One way to describe the problem is to realize that interest rate is a price for a product—that product being to supply the opportunity to borrow someone else’s money for a period of time. But the most basic economic “reality” about price for *any* product is that if price is very low you certainly will find more interested buyers for the product—which is the logic for low interest rates. However if the price is too low there will be no sellers. Why do people who call themselves economists not understand that basic economic logic? That, in essence is the problem with low interest rates. People will not want to loan if interest rates are too low. Here we could consider “banks” as being the “people” who own and profit from them.

What has not been considered by the logic that concludes that low rates should encourage borrowing is the effect of interest on monetary velocity—a quantity which apparently has been below the awareness of economists that look at economic numbers. I have shown

from the classical quantity equation that monetary velocity V is the other number besides monetary quantity M that determines GDP. What I wish to show in the following is how very low interest rates cause monetary velocity to go down—and therefore tend to reduce GDP which is the opposite of the Fed’s usual intention for lowering rates. So Fed policy could make M go up and V down—resulting in possibly cancelling each other’s effect. This apparently is what happened a few years after 2008 in the US.

Why does monetary velocity depend on interest rates? The analysis just given in section 2 makes this easy to understand. As said, national velocity depends on the contribution of combined velocities of all economic participants. The velocity for each person depends on the amount of cash that person is willing to hold. This quantity is balanced between the desire to have enough to make it convenient to pay one’s ongoing bills—but not a lot more than that if that extra cash can be invested/loaned to earn interest. Any investment or loan has at least a small risk, so the motivation to invest/loan depends critically on interest rates being high enough to justify the risk of not holding cash. From that it is easy to see why people who have extra cash—typically wealthier people—will not be deterred from choosing to hold a lot more cash if interest rates are zero, affording no benefit to them or, incidentally, to the economy from investing that money. Holding non transactional cash in this way by a significant number of economic individuals could be described equivalently in several ways (1)Extra cash is being held that is not being spent (2)Money has fallen into a “liquidity trap.” (3)Money velocity is being reduced by low interest rates, which reduces $GDP = M \times V$.

Lower interest bound definition: This is in essence the argument for the “lower interest bound” that asserts that when interest rates are already very low the Fed will not be able to stimulate the economy by lowering the rate further.

An academic paper that shows how well velocity correlates with interest rates for ten different economies: [Money velocity and the natural rate of interest](http://www.hec.unil.ch/documents/seminars/deep/2362.pdf) Luca Benati, University of Bern. Refer to figure 2A on page 11. Interest rate is black, velocity red <http://www.hec.unil.ch/documents/seminars/deep/2362.pdf>

How high wealth inequality makes it worse: Another related factor we will discuss below is that this effect mainly applies to those who are *not* living from paycheck to paycheck, in other words *not* those who habitually spend nearly all their paychecks in between paydays. So it only applies to those who are wealthy enough to have enough leftover money that they can choose to save—or lend. This would correspond to the class of people mentioned in section 1 that earn more money than they spend. If the money held by that group is large, very low rates will reduce velocity, reducing GDP, a situation to be described in more detail later in section 4. Those who live paycheck to paycheck, by definition have no extra money to save.

This puts the Fed in a bind if the Fed finds it necessary to stimulate the economy when interest rates are already very low (by monetary policy discussed below.) It implements monetary policy by buying bonds to increase M in the economy. But very low interest rates often suggest a demand problem, as it usually means the economy already has plenty of cash—with no evident need or benefit for more from the Fed. Buying treasury bonds must be purchased from those, such as banks, who possess such bonds already—and to improve GDP the Fed needs that cash to be transactional, not held. If interest is really low the receiver of such money likely converts a non cash bond into non transactional cash which now just sits in the same place, and for the same intention for

saving as the non transactional bond did before, not accomplishing the Fed's intention. But the former bondholder can be happy because he/she no longer holds a bond at very low interest with maturity considerably far into the future with uncertain inflation potential. So the Fed by pushing M higher to force interest rates lower is simultaneously pushing V down, possibly cancelling each other out with little economic benefit to GDP. If interest rates were higher the person receiving such cash could be motivated to purchase an interest bearing corporate bond with higher interest than the original treasury bond—whose proceeds a business could thereby spend for invested capital to increase GDP. This is another way to explain the well known existence of the “lower interest bound for effective monetary policy.”

Three historical examples demonstrating that higher interest is associated with higher velocity, and lower interest with lower velocity.

US: 1960-1980 Velocity went up when interest rates went up: One example showing higher interest rates going with higher velocity was the period from 1960 through the 1980's in the US. During that period M1 monetary velocity rose pretty steadily, frequently explained (on some web sites) by saying that there was some, unspecified mysterious way that banks operated to cause this. But higher interest rate supplies a simple and compelling reason. In 1960 the 10 year Treasury interest rate was about 3.5%, and “average” time of holding cash was about 3 months. ($V=3.8$) During the period from 1960 to 1980 treasury bond interest rates rose, however with considerable choppiness—to over 10% during which M1 velocity went up to $V=7$, or to 1.7 months holding time. So people decided to shrink the amount of money they hold to gain higher interest. During this period monetary quantity also rose—so it was both M and V together that caused rising GDP. Economists often assume instead that higher interest rates would reduce GDP—but since interest rate correlates with velocity, it can be seen from the data how higher velocity also contributed to rising GDP during this period of rising interest. (sources: FRED “Velocity of M1 money stock” and “Ten year treasury constant maturity rate”)

US: 2008-2018 Velocity went down when interest rates went down: Another example in the opposite direction in the US where velocity went down together with lower interest rate: After the “Great Financial Crisis” The Fed reduced the Funds rate rapidly from 6% to 0% in 2008. M1 velocity then cruised gently down from 10 in 2008 to 5 in 2018. With that rapid drop in interest, it is likely that when bonds expired during the next ten years much redeemed cash remained in cash caused by low interest rates, possibly waiting for interest rates to rise again before investing. Interest rates were too low to attract money out of cash to bonds. That 50% velocity reduction over ten years, could have reduced GDP to half except for an aggressive Fed who had driven monetary quantity rapidly up described as “quantitative easing” or QE during 2010-2015. Because this added money was largely held non transactional rather than spent we did not have inflation over that period despite large increase of M1 injected by the Fed. (Web data source: FRED “Effective Federal Funds Rate” and “Velocity of M1 money stock”)

Japan 2000-2018 Velocity went down when interest rates were zero: The pioneer zero interest experiment to stimulate an economy with super low interest rates was Japan. In 2000 their central bank dropped interest rates lower and lower in hopes of boosting the economy. Monetary velocity started from an even much lower value than the US in 2008, indicating even much higher levels of wealth already held as zero interest cash. They

started at V at only 2.6, indicating an average cash hold time of 4-1/2 months. Lowering interest rates to zero was a brave attempt to boost their GDP by increasing M1. However their effort was relatively ineffective because velocity went down as they injected more Yen into the economy. This was cash that would have increased GDP if it had been used for more GDP transactions, but it was held instead. Here are some data points for that period obtained from FRED data:

Year	10 yr bond % nominal	M1	Velocity in 1/year	1/v –cash hold time	GDP
2000	1.8%	¥200T	2.6	.38 year	¥520T
2005	1.6%	¥450T	1.15	.75 year	¥520T
2010	1.3%	¥500T	.98	1 year	¥490T
2015	1.2%	¥600T	.89	1.1 year	¥525T
2017	0%	¥700T	.77	1.3 year	¥540T

At zero percent there was no motivation to invest in bonds. Even 1.8% for 10 year bond was apparently considered not enough motivation, especially if money holders were concerned about possible future inflation. Many were surprised that low interest rates didn't stimulate the Japanese economy, or lead to at least mild inflation as hoped. In retrospect this is no surprise. The reason, as explained above, is that the increased M1 during that time was held as wealth, not spent or invested at too low interest rate which could have increased GDP. The very low velocity numbers are apparent in the data. I used data to calculate velocity using graphs of Japan's GDP and M1 quantity data on the FRED site.

Summary: we have described two conflicting purposes for cash: transactional or as being saved An important insight of this essay is to recognize that the macroeconomy is strongly affected by the ratio of these two types which is measured by monetary velocity. Of course the money itself looks and smells the same; the difference is defined by the *purpose* for which the person has for possessing it. In the section just above that describes velocity, we saw that this tendency to hold, and not spend money can be equivalently described as an economy for which monetary velocity reduces, which also lowers GDP. Per dollar in the economy, higher velocity dollars are more productive of GDP. That is why high wealth individuals with high amounts of low velocity money tend to cause a general reduction in GDP—if over time monetary quantity M stays constant. It's important to repeat: very low interest rates cause more money to be held, causing lowered velocity and GDP.

An hypothesis important to this essay is to expect that high money holding is correlated with higher wealth—meaning that those who have more money also hold that money for a lower time rate of spending—especially when interest rates are low.

Section 4:

Geometrical graph for explaining Secular stagnation: likely cause for 1930's depression

Conditions to set up secular stagnation of an economy:

(1) Economy with a small high wealth sub group that holds a significant amount of non transactional, low velocity money as their wealth, but are responsible for only a small amount of total economic demand

(2) Very low interest rates

Here's the logic in detail: A small group with high total wealth would likely hold a significant amount of that wealth as non transactional cash money. Low interest rates would encourage holding more cash than usual, rather than the alternative of very low interest paying, more risky bonds. Looking at the whole economy it could appear that total money can seem adequate for the whole economy spending, yet much of that money could be trapped by those of high wealth, not available to lower wealth groups that constitute the source for a large percentage of demand—which therefore reduces everyone's GDP. The equivalent way to describe that is an economy with low money velocity. If wealth inequality is severe, a small percentage of high wealth holders could hold significant amount of cash out of circulation, resulting in low velocity and GDP for everyone. The economy would be affected in the same way as if the Fed had tightened credit by removing cash from the economy.

For visual example refer to the geometric plots on page 28. These are intended to show why monetary velocity is a critical factor for defining an economy. Two economic groups within a small, imaginary economy are represented by bars of two different colors: the low wealth in yellow, and the green by high wealth. The total M1 money, \$300,000, of the entire small economy of 100 people is represented by their horizontal width of the green and yellow bars. The height of the bars represents velocity for each group. The total GDP is $V \times M$, which is equal to the area of both bars. For what it's worth, the money allocation between the two groups is roughly in proportion to wealth distribution of those of the top 5% wealth compared to the bottom 95% holders in the US.

There are 5 people in the high wealth group, and 95 in the low wealth group. Each of the five holds \$40,000 cash. Each of the 95 holds average \$1059. The high wealth group has a velocity of 5—thus each spends \$40,000 for expenses in $(1/5 * 50)$ 10 weeks. The low wealth group has velocity of 20 thus they spend \$1059 in 2.5 weeks.

Since $GDP = V \times M1$, the area of each colored bar represents the (nominal) GDP for each group. The GDP of the entire economy is of course the sum of these colored areas. The total GDP is \$3,000,000 per year.

The second graph shows how a redistribution of cash in the economy could alter income for everyone's benefit.

This economy has the same total money, but for which \$100,000 has somehow been transferred from the high income group to the low income group, depicted in graph 2. Perhaps a high wealth tax on the rich transferred cash to the others—which sounds like it would be a burden on the rich, but this turns out to benefit income not only the low wealth group, but also the rich. GDP and income is now higher for both groups. The low income group was cash starved before, so it is assumed to have kept the same money velocity, but with twice the cash. Their income doubled and apparently had no trouble finding things to spend it on, providing demand in the economy that could be accommodated by business owners in the high group. The high group had only half the cash, but had increased velocity and income—possibly because the lower income people

spent twice as much—boosting their income from \$200,000 to \$300,000. GDP of the entire economy went from \$3M to \$5.5M.

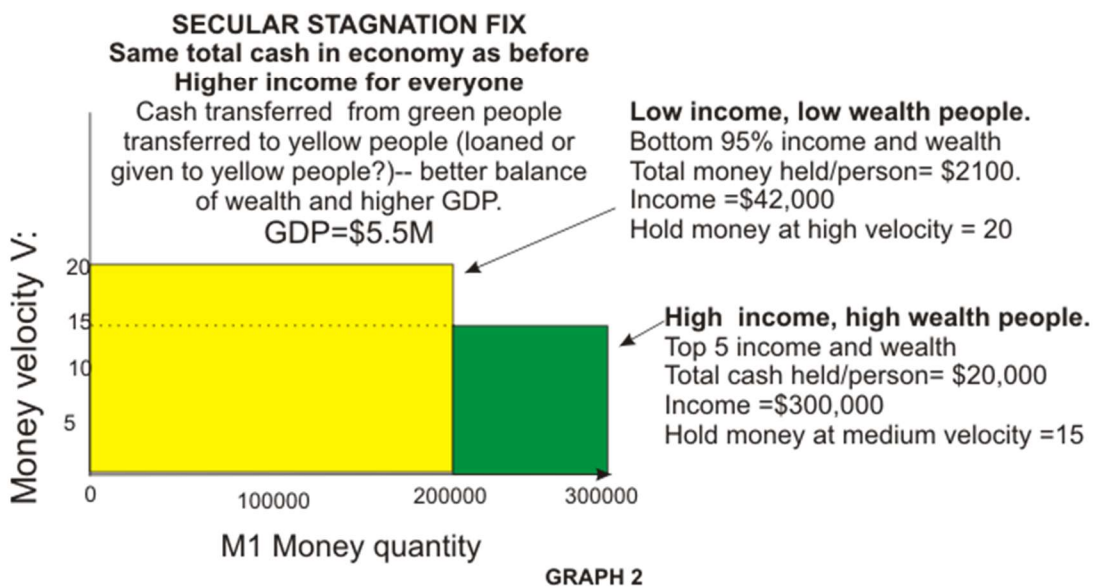
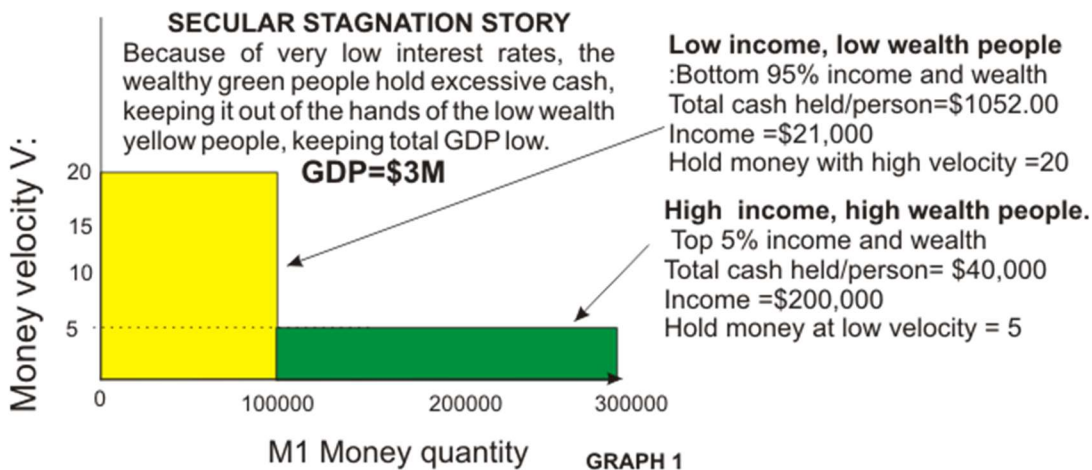
One presently possible way to accomplish this would be for the green people to loan money to the yellow people. Even if they did this at 0% interest rate, this shows how both groups could benefit. It suggests why under some circumstances, loaning money can enhance an economy. This topic will be explored in much more detail below.

This result would not be guaranteed however. It depends on whether the economy is capable of producing more when there is more money available to spend. But the point of this exercise is to show how knowledge of velocity could show the possibility for increasing GDP with the same total amount of M1 in the economy—but where money allocation has changed between two groups of the economy. GDP in the economy for the second case increased by $5.5/3 = 183\%$ -- affected by a shift of \$100,000 of cash distributed from the high wealth to the low wealth group. As illustrated this increased total GDP for both groups and decreased total income inequality. The “secular stagnation” magically disappeared.

If in the economy of the first graph many of the yellow were unemployed or underemployed, and there was more production capacity available than was actually used, then such action could cause an increase in real output, and genuine benefit to the economy, as more were employed and more was produced and purchased. This is the benefit of understanding velocity within the economy. If this economy had been studied just assuming an “average” single person (“single agent”) as is usually done for the economy, this possibility would not even have been realized.

Another scenario that could be imagined, running in reverse to the above example, beginning with economy functioning at least adequately as shown in graph 2 with interest rates being high—then from a misguided attempt to increase an economy by reducing interest rates to zero, causing more money to be held by the rich people, with velocity then decreasing, where the wealthy group would be discouraged from investing or loaning, and begin to gradually hold more cash instead which would begin to strangle the economy similar to what would happen if the Fed had taken cash out of the economy, finally leading to the top graph which could be described as an economy that had “fallen into” what could be identified as secular stagnation. This is a way of understanding how lowering rates with monetary policy can be damaging if interest rates are already very low.

This is my pitch for why it is critical to be informed about the money velocity for subgroups in an economy. In the next section I will make a similar plot that intends to depict a possible situation for the present economy in the US. Much later in this essay I’ll describe a possible similar event that was likely the cause the 1930’s depression which was another period with very high wealth inequality, and had also very low interest rates..



Secular stagnation: Visualizing how monetary velocity of different groups affects GDP in an economy of 100 people

A similar $V \times M$ plot on page 30 illustrates how variation in velocities among different wealth sectors could be affecting GDP in the present US economy: To illustrate this I have constructed a geometric plot similar to the one above, but this time trying to represent the actual present US economy. Because of lack of data the plot involves some guesswork. I divided the economy into eight groups for which the Fed has actual total cash data shown on the horizontal axis. The total money allocation values that define the width of the colored bars come from FRED Z.1 data, so the widths of the bars should be accurate. Below is more information for how this data was obtained. However the vertical velocity numbers shown are only *my guesses*, since I do not know who has data on the monetary velocity for different wealth groups. The guesses I made were intended to show the possible importance of velocities for different cash holding groups. So far as

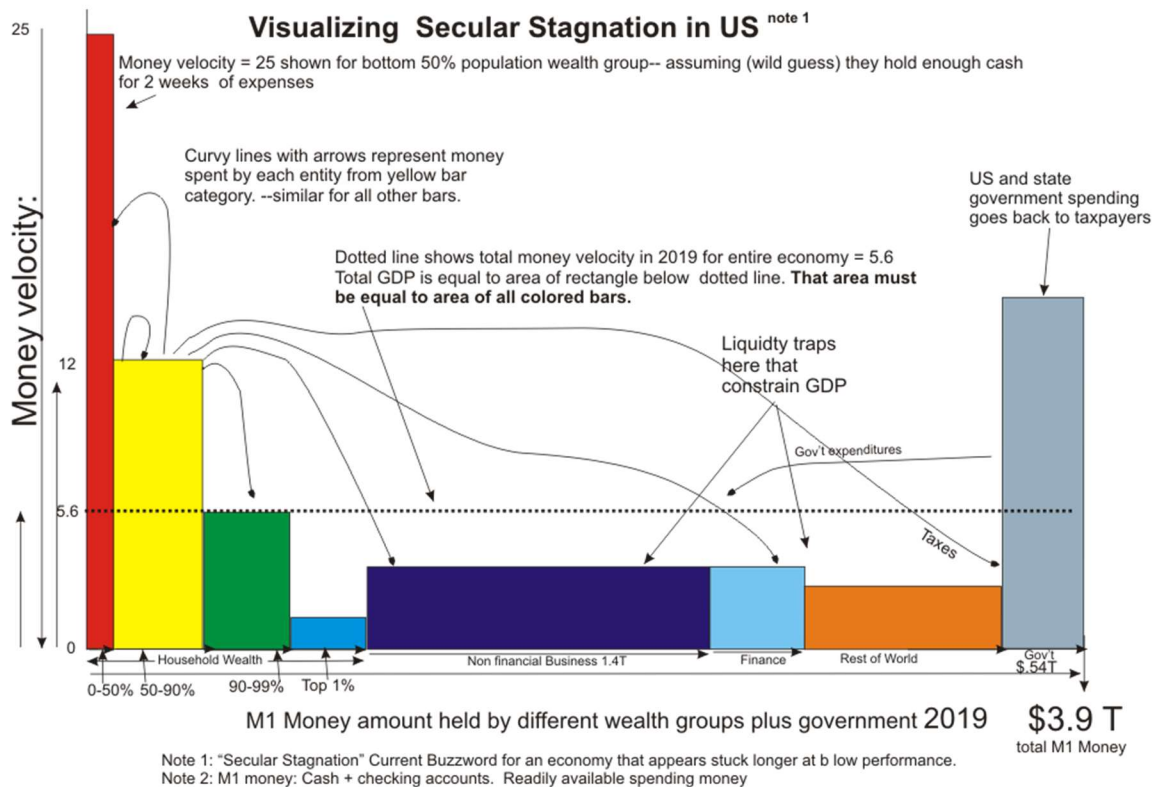
I know the Fed does not research this data. The purpose of this section 4 is to show why it would be important to know how velocity habits are affected by wealth—because differences in individual velocity could likely be affecting the GDP in the way that we do not understand, and which this plot is trying to reveal. This exercise is intended to show the value of doing the velocity analysis which is now presently lacking.

The Fed does have overall velocity data for the entire economy—which is indicated by the horizontal dotted line at $V=5.6$. Since GDP by definition is $M \times V$, that means the area under the dotted line represents a measure of the GDP of the entire economy = \$21.8T. Since the GDP must also be equal to the area of the sum of all parts, which is the total area of colored bars, in making my velocity guesses I was constrained to make the total colored bar area equal to the area under the dotted line. The one velocity value for which the Fed has data was the government sector, so I did not need to guess that one. According to the Fed, state and federal government contribution to GDP was about 1/3 of the total, so the area of the government bar must be about 1/3 the total of all the other bars.

The horizontal axis is a line whose total width represents the total quantity of M1 money in the US for 2019, which was \$3.9 trillion dollars. That cash amount is split among the 8 groups for which the Fed has data. Total M1 tends usually to be only slowly changing, so the length of this line can be considered to be stable in time, though monetary policy can slowly change it. Household income is represented by the four bars at the left—however it is likely that most of the financial and non financial business cash is also actually held by those of high household wealth.

This suggests how GDP could be increased or decreased for benefit of the entire economy by keeping the same cash (M1) in the economy, but rearranging the allocation of cash, and velocity among those eight bars. Using this picture, imagine keeping the sum total horizontal width the same, (3.9T dollars) which maintains the same total cash in the economy, but widening some bars with high velocity, and narrowing those with low velocity, while maintaining the same total width of graph. Some of the “low velocity” bars may be holding much non transactional cash. If that’s the case the total area of the bar, representing GDP, could remain the same, or even pushed higher because greater velocity by those groups who consume goods and services.

The point is to see how rearranging cash may increase velocity, and hence the area of the bars, thus increasing GDP of the entire economy benefiting everyone by reducing places where excess liquidity may be trapped. We will soon discuss the role of loanable funds to aid this process.



Source of data: Fortunately the Fed has great data to accurately plot the horizontal data, so that is not in question. This comes from two Fed sources: One is the Federal reserve Z.1 data, from the chart “Financial Accounts Matrix—

Levels for 2019 table on page 3 ”. <https://www.federalreserve.gov/releases/z1/20201210/z1.pdf> This chart documents the money held by the four groups represented by the four bars on the right: non financial business, Finance, Rest of World and Government-. Another Fed data set for the four left bars is from the Fed “<https://fred.stlouisfed.org/release?rid=453>.” Select “Levels of Wealth by Wealth Group” They show the amount of *M1 money* that is held by four separate household wealth groups: the top 1% of wealth, 90-99% wealth level, 50-89% level and 0-49% level. The data shown is for 2019. According to Fed data that constitutes all holder of M1 cash. To be clear, the width of the bars does NOT represent all financial wealth, only wealth that is held as M1 cash.

All the velocity values (vertical height of bars) were my guesses—with one exception is the velocity value for “Government” since the amount of GDP contributed by government is well known, so its area is determined. All the other heights were the result of my imagination but with the constraint mentioned before that the colored areas must be equal to the area under the dotted line. I also made a guess I thought reasonable for the leftmost, bottom 50% wealth group—by assuming that they were mainly within the low *income* group as well as low *wealth* group. Typical for the bottom 50% income group, I assumed they received pay with paychecks received every two weeks, also assuming that their paychecks were always almost completely spent during that time, with no savings.

I’m not claiming this chart is an exact true picture. The intention if its construction is to give an intuitive picture for how different velocity contributions in an economy *could* give important insights of an economy—and to show why it would be important to measure this data. For example, is non financial business (purple bar) holding more cash than they need for transacting business because there is no attractive investments because of presently very low interest rates? Just one business, Apple computer is holding \$220T in cash, which represents a good chunk of the \$1.4T blue section. It is not stated whether

that is M1 or M2—the chart represents M1 cash, but it is likely that the \$220T amount is in M2. Of course some of that money is necessary for normal operations—but seems likely that much is just held because investment opportunities are lacking, or none are available that pay sufficient interest for the risk. More data on velocity is needed from the masters of economic statistics at the St. Louis Fed.

What this is intended to suggest is the hypothetical possibility of shifting cash wealth from purple (non financial business) to lower wealth households, especially yellow and green could increase colored area, thus GDP for the entire economy, including non financial business. In that case the purple area would reduce in width, but grow in height, even with greater area than before, because of greater product being consumed by households. Both business and 0-90% households could increase GDP with the same amount of cash.

Better than MPC type descriptions: I believe by using velocity description rather than the usual MPC analysis, gives a clearer and more convincing way to visualize the possible benefits of wealth redistribution.

Why specifically would I like to have this data? I would like to answer the question asked by economist Larry Summers: is why the economy after 2010 deserve his description as being in “Secular stagnation.” Here’s what I believe happened that could be an important part of the story: In 2008 the Fed dropped interest rates to zero. As I suggested before, low interest is what caused the monetary velocity to drop from 10 to 5 from 2008 and 2018, for reasons I’ve already explained. The velocity decrease demonstrates that more money was being held non transactionally by some in the economy. My hypothesis is that additional cash added by the Fed’s quantitative easing during that time was held by those who had high wealth and low velocity already, which is why GDP did not increase by the added cash injected in the economy. If we had two sets of actual data above, one at 2008 and the other at 2019 we could test if that hypothesis is correct by observing where my predicted velocity changes occurred.

However I’ve discovered recent Fed data that strongly suggests this is what actually happened, from the Fed’s “distributional financial accounts” data that has information on the distribution of cash among the following four household wealth groups: 0-50%, 50-90%, 90-99%, top 1%. They have data for every quarter for two decades. Here is contrasting data for 2008 and 2019:

This data shows the relative percentage of M1 assets for these four groups for two different years. As I suspected, only the top 1% increased cash holdings by 2019 compared to other groups. They went up by 65% from 15 to 25. By 2019 all three lower groups had less total percentage than before. The extra cash in the economy landed mostly in the top 1% of households. I would also guess that this group had the lowest monetary velocity. Additional data showing income for each wealth group would be needed to show that.

Year	0-50% wealth	50-90% wealth	90-99%	Top 1%
2008	12.6% cash	40.2% cash	31.9% cash	15.3% cash
2019	8.9% cash	37% cash	28.9% cash	25.2% cash
Rough average cash/% tile, 2019	0.18%	0.9%	3.2%	25.2%

Table 1 Fed: distributional financial accounts

This does not include the other business groups that as shown on the chart hold quite a bit more cash than households, however—all of which could be very useful to judge the complete effect of Fed monetary policy. Fed data in chart can be found by searching for “Fed distributional financial accounts” on Google.

How could a change in tax policy affect GDP? Another type of useful information is provided by the graph is noting the how high the “government” bar is. This is the one for which we have a verified—and high value of velocity—so there is no speculation about what government contributes to GDP. What we can see is that it is particularly efficient at producing GDP per dollar it holds. This must be because government sales and income taxes are collected uniformly over the entire year—and also spends evenly over a year—without holding a high amount of cash at any one time compared to the rate of spending. This suggests why those who recommend austerity in government budgets to boost GDP are likely wrong—cutting government spending down and reducing taxes—especially if those tax savings are delivered to the low velocity wealthy. This would likely reduce GDP by reducing the width of the “government” bar and increasing the width of those of the top 1%, and the two business bars equal to the width removed from government. That would reduce the area of the government bar much more than the bars related to high wealth—thus reducing GDP. What this plot shows is that although some might claim government spending is “wasteful” they cannot also claim that it will reduce GDP—this chart shows that more government spending coming from those holding low velocity money will likely *raise* GDP because these dollars are spent more rapidly. Perhaps some could believe that the products or services produced by government do not represent *good value* for what is spent—so the same goods and services could be provided with greater efficiency with lower GDP if they were not done with tax revenue. Keynes once jokingly suggested that to reduce unemployment people could be hired to dig ditches, and another crew could be paid to put the same the dirt back to increase GDP, deliberately creating government waste. That even makes some sense to solve the economic difficulty I described in section 1, in an economy where because some people produced more than they consumed have left others with diminished amount of money, which as was explained could also leave some unemployed. It would be a silly but effective way to transfer cash from the overproducers to provide employment money to the (formerly) underproducers so that they would have the money to purchase the extra goods that were not being consumed because of insufficient money demand. The chart also usefully demonstrates that to have a maximally positive effect on GDP, such taxes should come from those bars that show the lowest velocity.

Holding low velocity cash reduces GDP for everyone: This chart also demonstrates how companies that hoard much cash, such as Apple computer, who holds \$220B are, thereby holding much idle cash that could reduce GDP for the economy. Another way to understand this concretely that Apple has gotten that cash pile by accumulating higher profits—literally more money than they know what to do with it. This plot shows how the economy could benefit more it were to flow rather than be held stationary. This also demonstrates the economic benefit to GDP of greater competition from companies who make similar products for less cost—for which the high cash that Apple has suggests that their cost of production is significantly lower than what Apple’s customers pay. Essentially that would give consumers extra money to spend on other parts of the economy—with other companies who may not accumulate cash as fast. It is a way to

visualize the benefit of competition that have the opportunity to reduce profits of monopolies taking advantage of high prices.

Another potential future benefit of this type of plot showing how GDP is contributed by different wealth groups is that it suggests the value of studies that provide insights about how money flows among the different holders of money shown on the graph. The diagram shows small arrows from the yellow bar that represent money flows out of that group—all of which will enter one of the other groups represented in the diagram. This is only shown for the yellow group, but obviously the same is true for all the other groups. It would be expected that for each group to maintain close equilibrium the number of dollars leaving each would be approximately equal to the number entering from other groups, meaning spending equal to producing, however as described in section 1, there is no economic force that tends to impose such equilibrium. Studying the factors that govern the rate and targets of these then affect the height and width of each bar, which could yield predictive data showing not only overall GDP variations, but also how wealth and GDP among subgroups might change for example by different tax policy choices.

The geometric plot also makes it easy to visualize how those groups in the economy who loan money to other groups produce a “trickle up” flow of interest money that gradually narrows the bars of borrowers, and widens the bars of loaners by an equal amount.

The following section shows how the tendency of the “monetary constraint” which tends to reduce monetary velocity in hands of those that produce more, has been compensated by a number of historical methods that do the opposite. It is therefore not surprising that methods shown in the following list have historically evolved to counter the tendency towards lower GDP, and higher wealth inequality, because some earn more than they spend.

Section 5: Methods that have historically evolved that attempt to counteract the “fundamental monetary constraint” that causes GDP reduction because monetary wealth gradually drains from excess consumers to excess producers.

Each one will be described below. Many will not work if interest rates are too low to impose a necessary opportunity cost for holding non transactional cash. Some of these effect a short term better balance, however have a flaw that they produce interest payments that have long term cash flow back in the wrong direction.

Category 1: Loanable funds: Loan money at interest for others to spend:

x **Solution 1: Bank loans and bank money multiplier**

x **Solution 2: Increase corporate bonds and government (treasury) bonds**

a **Solution 3: Buy initial issue of stock of companies**

Category 2: Fed policy

Solution 4: Monetary policy stimulus

Category 3: Government Action

x **Solution 5: Fiscal policy stimulus**

b **Solution 6: Encourage opportunities for competition in monopolistic business sectors**

g **Solution 8: Unemployment insurance and Social Security**

- g **Solution 9: Tax credit for low income people:**
- g **Solution 10: Progressive income tax**
- x **Solution 11: Wealth tax.**
- x **Solution 12: Inflation.**
- Solution 13: Grow the economy**
- Solution 14: Ancient practice monetary jubilee**
- Solution 15: Have a war**
- Non solution 14: Buy stock on the Stock market**

Solution 1: Bank loans shift cash money from those who have non transactional cash to those who need more money to make transactions.

This converts low velocity cash to higher velocity cash. Those who produce more than they consume use their “saved” cash to be loaned to those who will spend it. In return they are paid interest for this favor. A bank is one method for doing this. This allows cash to be recycled back to the population described in section 1 who may consume more cash than they earn, to maintain cash flow in the economy. Without some possibility as this, the above section 1 showed how an economy could come to a halt by driving cash from those who consume more to those who produce more.

Banks provide saving accounts and loans: Banks take that non transactional cash as “savings” and loan it to trustworthy others who need extra cash to purchase goods to recycle it to transactional cash. To do that the bank requires the recipient to agree to a repayment schedule along with agreeing to pay periodic interest payments to the bank. The interest payments serve two purposes: (1) Pay the person supplying the funds to convince him/her to take upon credit risk for loaning their money and to accept returned cash at a later time (2) to pay the bank for the service of insuring the money will be loaned to reliable and credit worthy persons. The reason it is sure to go to transactional cash is that the person paying interest would obtain no benefit if they just wanted to hold the money.

Recent evasion of traditional bank responsibility: An important part of a bank’s responsibility and reason for collecting some portion of interest is payment to make an accurate judgment for who is likely to be a good risk for repaying the loan. Traditionally this was done by making the bank financially responsible for the loss in case of borrower default, which provides strong motivation to only loan to reliable borrowers. This responsibility has recently been legally evaded by the practice of selling the loan to a third party. This would be especially tempting to sell such loan if risk of default were high. This was surely one of the main factors for generating the wide defaults on mortgage loans during the Great Recession in the late 2000-2010 decade..

Banks also increase the amount of effective money in an economy “money multiplier”: Banks are permitted to loan a total amount that is equal to 90% of the money that is entrusted them to loan. That means they have to keep 10% of it as a “reserve” to allow those few savers who wish to occasionally withdraw their funds. Money is no longer limited to the tokens that originally defined what “money” is. Money has an extended meaning by being numbers held in the owner’s account in the bank which is a record stored on paper or computer. Banks allow savers to write a check to a supplier of goods/services which instructs the bank to move the number in the buyer’s account to the seller’s account. This is not the original money itself—but acts exactly

like money for purposes of exchanging goods/services. By this method, if banks must hold at least 10% in “actual” cash, the total effectively multiplies the cash up to ten times as much compared to before banks existed which expands the amount of transactional cash available in an economy.

Goldsmiths as banks: This concept originated a long time ago with goldsmiths who provided a service to people to securely store their gold money. Rather than require owners of gold to carry this gold around they allowed “checks” to be written to the goldsmith directing him/her to transfer ownership of some gold from buyer to seller. These “checks” acted just like money, but didn't actually require the buyer or seller to handle, or even see the gold itself, which kept the gold safer. Since transferring these checks did not require any change in gold storage, it was possible to allow total amounts to be borrowed and loaned to be much larger than the actual total amount of gold held by all the goldsmiths in existence. Only enough gold would be required to occasionally allow someone to remove the actual gold for those few occasions when the gold itself was desired. This allowed the existing amount of gold to be used as if it were a much larger amount for a larger number of economic members. And since the gold wasn't often taken, the goldsmiths could get away with holding only as much as they needed for occasional withdrawal. This allowed the transactional power to transact with gold to be multiplied—in effect increasing the money supply. This is essentially the same way banks work today. Instead of gold, banks hold dollars that have been printed by the Fed. So one difference is that instead money having some inherent value like being a rare metal, money that can be printed by the Fed is the “gold” of modern bank. In addition, banks are limited by law to keep at least 10% of these dollars on hand—however they can legally loan out 90% of the money that has been deposited by savers. That multiplies effective money in a checking account up to nine times.

Solution 2a: Loanable funds market option: corporate bonds.

Another similar form of loaning is a bond, which can be issued by a business that needs cash for purchasing capital or for other needs. The bond may be purchased by someone with extra non transactional cash. The motivation for paying interest on a bond is to buy something else at a time earlier than would have been otherwise possible—which is why this method transforms non transactional cash to transactional cash. A bond usually has a fixed interest rate that will be paid to the purchaser, and a term which defines a date upon which the funds originally paid for the bond will be returned to the purchaser with interest. Using a bond has the similar benefit to the bond purchaser as provided by the bank transaction, except that it avoids the bank fees needed, and judgment by the bank. However a bond has the disadvantage of a fixed term, which may be farther in the future than the purchaser wants to wait to have money returned.

Bond Markets: However another service a bank may offer is to provide a “market” for bonds that will purchase bonds before they are due, and sell them to a buyer who wants a shorter term. Of course the bank will make a service charge for this. The advantage to bond purchasers is that it artificially makes bonds appear more liquid to purchasers—so long as there are plentiful buyers the original bond holder will not have to wait for the end of its term to convert it to cash.

As has been stressed already, interest rates must not be too low for them to be desired as an alternative to cash: This is required to motivate the lenders for the inconvenience

and delayed time use of their money, and also sufficient to compensate for credit risk. A bond must pay enough interest to justify the credit risk, and to compensate for the deferral of the benefit of money for a period of time, or the holder of non transactional cash will choose to hold cash rather than expose them to credit risk.

Any limit to the total value of bonds? Banks are required to retain a portion of “money” when they loan, which these days allows banks to multiply money as much as ten times.. However, bonds is can be issued in very high amounts, without the limit imposed by banks, who must hold some reserve cash. The value of M1 in the US is about \$4T, which limits banks to loan a maximum comparable to this as a maximum total. **Bank deposit loans in 2018 totaled about \$3.5T no. \$14T.** However bonds have no such maximum limit. **Presently the private and public bond market is valued at about \$40T.** An economy can impose a limit to this amount because of the interest that must affordable and be paid by the borrowers of money—which interest is a part of GDP. As this market becomes larger it imposes a larger drain of interest on borrowers, thus limiting the ability for the bond values from getting too high.

Solution 2b: Loanable funds market: Treasury bonds and municipal

bonds. This is essentially similar to solution 2a, but the bond issuers are government agencies who use the money for public purposes. The US Treasury bonds are purchased from the federal government, which then become a public liability in the form of the US public debt. Interest must be paid by the public in form of taxation. **The present value of this (which the public owns) is about \$19T.**

Public debt forms an important, mostly unrecognized, function for the economy: it is a portion of the economy as described in **section 1** that consumes more than it produces. This is valuable economic service that takes taxes primarily from those that produce more than they consume, essentially low velocity money, and transforms that money to higher velocity transactional money by paying for government services.

Having a growing public debt is part of the balancing process that the original monetary constraint imposes upon the economy, making it possible for some in the private sector to save as government spends more than it produces. Virtually every modern economy has a national debt. It is a means of keeping monetary velocity from dropping. To assist this virtually always goes up in nominal money value, but frequently accompanied by inflation which allows its value in real terms to increase more slowly, or even decrease more than it otherwise would. Inflation (solution 11) also reduces the value of the debt, which reduces the negative effect on the economy of the interest, which is the “trickle up” effect that transforms transactional money from taxpayers to interest paid on the debt, which is money that typically goes to those of higher wealth who hold treasury debt. This was also illustrated in **section 4** which showed how government acts as a high velocity user of cash to help boost GDP likely more than other economic sectors per dollar of money that it holds.

Solution 3: Buy initial issue of stock of a company. This is a slight variation on the option to buy a corporate bond. The essential difference is that instead of paying interest, a stock provides some usually undefined portion of the profit of the issuing company.

Solution 4: Monetary policy stimulus This occurs when the Fed allegedly converts thin air to money, with which they purchase treasury bonds held by the public. A treasury bond is of course in non transactional form—monetary policy converts it into money instead, adding to the amount of money in the economy. To boost the economy, this cash must be spent, or turned into transactional cash, not held as a method of holding wealth in which nothing is accomplished by converting it from a bond. Unlike fiscal policy, there is no guarantee that this money will become transactional. The hope and assumption is that the newly made cash will then become transactional cash to buy something, and that it will not remain as held cash. However if interest rates are zero, or close to zero, there is likely no motivation to turn cash into a transactional form. In fact holding cash has the advantage that it does not have a term only after which it will be turned into cash. This is another description of the “zero limit bound” for monetary stimulus—which is why this option does not work to provide transactional cash when interest is low or zero.

The dance between fiscal (solution 2) and monetary (solution 3) policy: For monetary policy to work, there must be Treasury bonds for the Fed to buy. What would happen if they were all sold out? Not ever a problem, because Treasury bonds get produced whenever fiscal policy is applied. Being “sold out” would mean that the national debt would be 0—a problem for which I’ve never heard any concern. The concern is usually that the debt is too high, not too low. Treasury bonds are also increased when the US imports more than it exports, dollars get shipped to sellers in other countries for payment. Those sellers could just hold the cash—but better to send the money back and buy US Treasury bonds which pay some interest as well. This is preferable than if such money were being held at zero velocity which would reduce transactional money supply.

Solution 5: Fiscal policy stimulus: This is a second method by which non transactional money is transformed to transactional money. It is just a special case of “solution 2b.” A Treasury bond created and sold by the government to someone with extra non transactional cash, for payment of interest. The government then spends this cash obtained by the bond sale for government products and services, which transforms money from non transactional to transactional cash. After it is spent, depending on where it is next spent a fraction of the money may go for a second round, on and on—except that at each round of exchange some fraction of money may leave as non transactional cash depending on where it was spent. The amount of the Treasury bond then is added to the national debt, now up to \$16T of public debt, upon which the taxpayers must pay interest. (Another \$5.8T intergovernmental debt does not have a net interest cost to the government) So when such a bond is purchased a large slug of cash goes transactional, but later a small amount of interest will trickle back to the bondholder as interest which slowly reverses the flow from taxpayers to bond holder.

Weakness of loans When loans, or bonds are formed they do transfer a burst of cash from non transactional to transactional cash. Thus in the short run they compensate for the lack of money possessed by those who consume more than they produce. However they both have the long term negative effect that drains interest money back to those that originally had more cash than they needed to spend which in longer term tends to perpetuate the inequality that is intended to mitigate. So these solutions in the short term are beneficial, but in the long term they drain slowly further money from those who

originally need extra cash. In the case of fiscal policy this causes national debt to increase, resulting in interest flow back to money supplier, that requires be paid by taxpayers. This is how this method tends to lead over time to slow buildup of wealth inequality, since the national debt has historically almost always increased. On average, the principal is usually not paid back, but the interest payments remain forever-. This is what I refer to as a “trickle up” of cash from less wealthy to higher wealth—so excess debt becomes a drain on the economy. Such debt is a liability for future taxpayers, but often governments plan on inflation or GDP increase that reduces the interest flow to very low values with sufficient time.

Solution 6: Increase national debt Government sells bonds and uses money to pay for government expense. This is the same government selling Treasury bonds. Non transactional money becomes transactional when government spend the money. As mentioned above such debt can pile up—but in many cases its value will be reduced by inflation in an economy. This inflation over time reduces wealth for such holders.

Solution 7: Unemployment insurance and Social Security This transfers money taxed upon those who are making more than they spend and transfers it to those who are unemployed. Some of the tax money would come from non transactional. Virtually all of this money will be spent and not saved, converting it to transactional.

Solution 8: Tax credit for low income people: A tax on those who make more than they produce, at least some of which is likely non transactional, to pay those who consume more than they produce. So a tax credit which takes tax from those that do not save money will not

Solution 9: Progressive income tax . . A **progressive income tax** takes a higher percentage of income tax from those that produce more, compared with those that produce less. Assuming that high income people usually save a higher percentage of their income that is saved, their income tax goes directly and relatively quickly to being spent on government services.

Solution 10 Wealth tax. This would be a very direct way to convert non transactional money being held into transactional cash providing government services. It would ordinarily only apply to a level above some threshold on non transactional wealth. Recently taxing wealth above \$50M has been proposed. Its disadvantage is said to be the difficulty of reasonably accurately determining, and taxing wealth.

Solution 11: Inflation policy. Plan to increase inflation by having the Fed purchase bonds to increase money supply. Using expansionary monetary policy to increase prices. This is a very direct flat tax on financial wealth. Its disadvantage is that it taxes low wealth at the same rate at high wealth. Unless such inflation increases wages as well as goods/services it can be punishing on those with low incomes.

Solution 12: Grow the economy. Increase nominal GDP every year. If this increases income evenly while maintaining wealth at the same level—equivalent to inflation solution if nominal GDP goes up while real GDP stays at 0. This would likely also involve monetary policy that increases M1 money supply.

Solution 13: Ancient practice monetary jubilee. Or default on debt. Occasionally nullify all debts when a new king comes into power. That reduces interest burden allowing more to save with fresh loanable funds. Or defaults on debt which

avoids need in future to pay back debt that would otherwise eventually need to convert transactional cash to possibly non transactional.

Solution 14: Have a war. Although with unfortunate side effects, this was a way that worked quite well for the US after the 1930's at a time of high wealth inequality. It essentially highly increases taxes and employment, and therefore “crowds out” saving—thus reducing increase of wealth inequality. It increases employment opportunities, and makes it politically relatively easy to place high tax on income and wealth since in many cases wealthy people have the most to lose in a war.

Solution 15: If the others don't work, or if the bond market, or asset prices get very high, have a huge crash in these markets to reduce wealth inequality and total interest drain on the economy—or allow velocity to increase again. The possibility and benefits of these will be discussed after section 6.

Solution 16: Have a French revolution and eliminate some very rich people.

Non effective Solution 15—Invest in stock market: This is a non solution to the process of making non transactional cash to transactional. Some think that when a stock is purchased on the stock market that money goes “into” the stock market. Very little consideration will show this is not what happens. Money expended into the stock market is merely transferred from one holder of stock to another person. It usually doesn't go anywhere near transactional cash. It usually just trades hands from one non transactional location to another.

Positively bad Solution 16: Tax cut mainly for wealthy people for whom the saved money would be saved. Especially bad if *some* tax money is collected from people who would otherwise have spent the money for products/services. This would have the *opposite* effect of converting transactional money to non transactional money with zero GDP benefit. (“Trickle up” effect)

Summary of the logic structure of the essay up to this point:

A simple money economy, because of the fundamental monetary constraint where some people over time succeed in accumulating cash money, an economy will gradually weaken and fail. Because of this other methods of distribution develop to allow an economy to operate with greater degree of wealth inequality—however when wealth inequality gets much more extreme, economies can again fail. Low velocity money and high wealth clogs successful economic flow.

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A quick review of previous sections

Section 1: Fundamental money constraint The main purpose for the invention of money in an economy with a simple money system is to facilitate exchange of goods and services. The “**Fundamental constraint of money**” is that exchange of money is designed to work in an economy where each person produces over time about same value of goods and services as that *same person*. An economy using only money for all GDP exchanges breaks down when this is not true. However, this does *not* require that different people must all have the same income—income equality not required.

Because total quantity of money is essentially unchanged in the short term, any total saving gained by one group requires equal dissaving by another.

Members that do succeed in saving for extended time will eventually accumulate money that is not transactional (zero velocity) and result in a classic dilemma of a glut of unsold goods, with a subset of people with no money to pay for them. Some will have more money than they need, while others have not enough. In a pure money economy with no lending or financial system wealth inequality will be a necessary consequence. The loanable funds market was one possible way that has evolved to temporarily help to keep the economy going by transforming (recycling) non transactional money back to transactional money.

Section 1 also explained how the **money constraint** plays out on an international scale, with individual trading countries playing the same role as separate individuals in a smaller national economy.

Section 2: Monetary velocity was explained as a way to quantitatively distinguish transactional and non transactional money. Knowledge of this for different economic groups plays an important role in understanding how GDP is distributed.

Section 3: The lower interest bound. An economy gets stuck when interest rates become very low because this increases non transactional money to be held (lower velocity) which reduces GDP. Low interest rates discourage moving money to loanable funds market. Attempts to stimulate an economy with lower interest rates does not help.

Section 4: Defining secular stagnation of an economy is displayed in a geometric representation to allow a more intuitive visual view of what causes secular stagnation. Necessary conditions: High wealth inequality. Low interest rates. These result in low monetary velocity among those of high wealth, which lowers overall velocity in the economy, reducing GDP. Alternative definition: Liquidity trap. A geometric graph makes it easier to visualize both the problem and a pathway towards improvement.

Section 5: Attempts to compensate for Fundamental monetary constraint Some methods have evolved historically improve a poorly functional economy stuck as originally described in section 1 or section 4 by moving non transactional money back to transactional money (increasing monetary velocity) **Important examples:** Loanable funds market. Government taxation. Government debt. Monetary and fiscal policy. Inflation. War. Plus other possible ways.

The next section further describes these various attempts and their limitations, and how they can very likely cause an economy to eventually catastrophically fail due to excessive **debt and wealth inequality**. These methods greatly reduce the rate at which inequality increases, but does not stop an economy from potentially becoming ultimately non functioning.

Section 6: Different ways of holding wealth. To analyze how excess wealth inequality disturbs an economy it is important to first discuss the methods of gaining and holding wealth. The process of accumulating wealth is of course accumulated by saving: Conventional economics uses the word “saving” to describe four different types of saving. However different types of saving have different macroeconomic effects which are important to distinguish. Here are what I believe are the four most important categories of saving, which will be discussed next, in order, each with different macroeconomic effects:

- (1)**Holding Physical assets** having physical non monetary value in addition to value in money; Guessing at a wealth in US value of \$50T
- (2)**Holding cash money**, described in section 1. Total US M1 money value is about \$4T.
- (3)**Holding loanable funds—bonds and bank saving** described in section 5 Total wealth about \$40T.
- (4)**Holding Stock** equity assets for which in practice have value only as cash at time of sale. \$30T.

(1)Holding Physical Assets as wealth: Non monetary assets are the most fundamental type of wealth—in saying that I’m just repeating something similar to what Adam Smith emphasized in his famous book “Wealth of Nations.” He defined the most important type of “wealth of nations” to be the ability of an economy the ability to produce useful goods/services in an economy. He famously placed this above in importance compared to quantity of holdings of gold in a nation—which before had often been used to define “wealth.” Although gold has some value as a rare metal that has some limited uses, gold was valued most importantly because it could often be *exchanged* for the highest form of wealth, which Smith said were goods/services produced in an economy. Rather than being a fixed “stock” such as gold, he regarded national “wealth” as a “rate” or “flow” which we now attempt to measure as GDP. However most common usage of the word “wealth” has reverted back to something similar to what gold represented, which is now called “financial wealth” more similar to the way gold was valued before Smith, as a quantity rather than a flow of goods/services. However these are now represented as paper, or digital assets, which have even less worth than gold.

Physical assets frequently have a money value associated with them, but they also have a “use” value which is independent from money. So “assets” are the “king” of wealth—as other forms of financial wealth are all dependent on having the power to obtain products/services in a well functioning economy. Physical wealth assets are more commonly thought of as being items which have a sense of permanency and relatively high value such as houses, land, buildings, businesses, automobiles, though even an ice cream cone can be an important low cost very short term asset.

Stocks are an interesting special case of “asset”—which are holdings of paper which entitle a person to some unspecified amount of profit money flow from a corporation. But possession of stock normally does not ordinarily convey any physical holding except a paper promise of a portion of business profit. I’ll describe it below as a separate category of asset wealth.

Physical assets as collateral for loans: Since physical assets have “real” wealth associated with them they are often used as collateral for a loan in the loanable funds market. That gives the loaner greater assurance that the loan will be repaid, such as for a home mortgage, thus allowing a lower interest rate. However, if some physical asset begins to lose market value that can cause panic in loan markets for which the physical asset has been used for collateral.

(2) Holding cash money as wealth was discussed in section 1: This is the most basic form of financial wealth, as it is directly spendable to obtain assets or services in an economy. We could say it is “backed” by a productive economy. There is no credit risk with holding money. However there is an inflation risk to holding it as wealth if the price of goods/services begin to all uniformly rise. How this could happen by increasing money quantity or velocity was discussed in section 2.

Quantity and velocity as two important attributes of money: Compared to other forms of wealth, M1 money maximum total quantity in the US economy is quite limited at roughly \$4T, which represents about 4% of total wealth the US, so is small compared with other total financial wealth. Bank savings are also added to M1 money to define another form of money, M2, which can easily be converted to spendable cash. M2 total value in the US is about \$19T.

Monetary velocity as important attribute of money: This analysis places high importance on velocity compared with other descriptions of macroeconomics. I described how cash has two properties, both of which are often considered separately important, but which are in conflict: (1) It is important for conducting the easy exchange of goods/services in an economy. (2) It is used for holding wealth to allow time to elapse between earning and spending. Section 1 and 2 described how if money is “hoarded”—meaning that if money which is held as wealth it is not being spent to support GDP in an economy, and effectively reduces velocity, at least until it is finally spent. Velocity can be defined for any person who holds, and possibly spends money. We showed that money velocity value for that person can be determined by taking the value of average cash money $\$C$ that person tends to hold, and then measuring the number of months m of that person’s expenses which that amount $\$C$ will cover. The velocity for that person is $1/\$C$. We also previously showed that if interest rates are very low—below the “lower bound” interest rate for effective monetary policy, extra money not needed for spending might as well be held as cash hoarding rather than for spending, resulting in lower velocity that can impair an economy by lowering GDP for everyone.

How a financial crash can cause the real economy to also tank—1929: If there is a sudden crash in the bond market, stock market, or bank loan market, or even an asset market such as real estate, there can be an emergency rush out of such market to hold cash as substitute wealth instead. The reason is that the total value of the stock market before the crash was far higher than the total cash in the economy. As the crash was happening many tried to sell stocks to hold cash instead—who had no intention of buying more stock. Former stock holders could therefore suddenly hold a very significant amount of cash. That can result in sudden loss of transactional money in an economy, or equivalently, reduced money velocity, caused by the downward slide of a financial market. This is how a financial collapse can also cause GDP in the goods/services economy to rapidly decline. An example will be discussed later, with numerical detail

with reference to the 1929 stock market crash, showing how the real goods/services market was severely affected almost immediately after the stock market crash as a small wealthy population holding very high valued stocks attempted to grab money by selling stock and holding money as substitute wealth. Most economists are unaware of how a stock market crash could possibly affect the real economy, which is apparently why frequently economists say that the stock market cash did not “cause” the general rapid decline in GDP in 1930 by loss of consumption (“wealth effect”) because only four percent of wealthy people that owned most stocks that rapidly lost value at that time. But what could happen is that 4% could take a very significant money out of circulation by holding it instead of stocks.

(3) Holding loanable funds as wealth. Bonds and bank deposits:. I

explained previously that the “loanable funds” market—bank loans and bonds, is a desirable alternative to saving cash, for two reasons: (1) it provides benefit to the saver by providing interest payments to the saver; and (2) it also restores non transactional cash to transactional cash, which maintains velocity, and thus GDP in the economy. So it provides benefit to both saver and the economy as a whole.

Compared to money, holding wealth in this way has “credit risk,” meaning is more risky than cash because it is only a promise given by a trustworthy debtor of future cash to be returned at a later specified time. Although it is referred to as “saving,” rather than literally saving cash it is saving of a promise of interest and future cash. By convention, when loaning money to a bank, this money is conventionally referred to “savings” even though it exists only as a recorded credit to the saver in a bank. And now, such money, at least up to a limited maximum, is insured by governments who will print you new stuff if something goes wrong with the bank, so, for amounts held less than the “insured” amount it is virtually as safe as holding cash.

Savings not equal to investment: Conventional macroeconomics claims that “saving” is always a form of “investment.” But from the logic above there is no reason spending such saving need be restricted to investment in order to maintain monetary velocity; loans could just as useful for maintaining GDP in the economy whether spent for investment or consumption. Banks that loan money do not always require or guarantee it be spent for investment in capital or other forms of machinery that facilitate production of goods/services. Even funds provided by bonds issued by a businesses are not guaranteed to be spent for investment—nobody prevents such funds from being spent for current operations. Saving, according to the conventional macroeconomic view, benefits the economy only because of an investment that increases efficiency of production of products/services. This macroanalysis also has described why loaning is also vitally necessary as an option for saving of money in order to maintain the ability of money to continue to provide transactions in the economy, though some businesses who sell bonds for non investment as a zombie businesses—meaning that those businesses use the money for continuing operations rather than true investment in capital. I do not understand what makes economists who believe the money that people who “save” by buying bonds will know that such cash will go to true investment. Who checks? But even so, no matter how it gets spent it they can continue to provide some necessary demand to an economy, even if not otherwise more productive.

Risks for holding bond loanable funds as wealth: Holding bonds is not holding “real” wealth. To be converted to “real” wealth output from the GDP producing economy two steps must occur: (1)The bond must be converted to cash by being sold, or paid as cash at the end of its term by a credit worthy issuer (2)The money then must be exchanged for goods/services. One risk for this type of saving is unexpected defaults among creditors; another risk is that high inflation could also make bonds very undesirable if the term date is in the distant future. To make bonds attractive to savers sufficient interest must be offered to justify these risks. This shows why very low real interest rate can make bonds unattractive to purchase. Inflation is also an event which can make bonds with a distant redemption date much less desirable to hold than having cash that can be spent immediately, and thus lead to a rapid collapse of their value if inflation unexpectedly rises.

Empty of net value: The total value for the economy produced by any loan or bond when it is issued is zero. The “value” represented is a record of an amount of money plus interest which is owed by the issuer to the holder so it is a zero sum process. Therefore, very similar to the money “saving” as we already discussed in section 1 in the money economy, the positive wealth created for the lender is exactly matched by the “negative wealth” loan created for the borrower. The work and effort represented by this “value” has yet to be performed by GDP requiring labor and material which is only a promise to be supplied in the future by yet performed GDP activity in the “real economy”, for which the bond holder must have confidence will eventually be fulfilled.

The total amount of debt in the US is about \$40T—which is exactly equal to the amount of wealth held by those who have loaned such debt, so the sum of total value created for an economy by the loanable funds market is zero. Sometimes the phrase “we owe it to ourselves” is used to minimize the a sense of alarm about the size of US Public debt. Although it is true the total value is zero, this is quite misleading—as the reality is that “some who are rich” owe it to perhaps others who are in poorer in debt.

This is why large private debt in an economy is equivalent is to saying there is high wealth inequality. Debt someone owes is always equal to savings for someone else. Sometimes heard from those who are (rightly) concerned about the danger of high debt—is advice for people to have more savings, and less debt. If the savings are in form of loanable debt this is not possible for everyone. The only general advice that could make sense would be to advocate that *some* should have more savings who need money for the future such as for retirement, but then that others who can afford to pay interest, such as businesses should have *more* debt. But it should also be noted that in contrast to loanable funds savings, physical asset forms of wealth, and even stocks do not necessarily have a negative side and can produce potentially positive total financial wealth, without a negative side in an economy.

Public debt, on the other hand, may or may not imply high wealth inequality; I understand that in Japan, which has immense public debt has much of that debt owned somewhat more equally among citizens compared to the US by many in the private sector. If that is true, it could be said with some truth by those in that situation that “they owe it to themselves.” Public bonds that they hold privately and for which they collect periodic interest require governments to collect public taxes that pay interest on the same bonds. However in the US, with much greater wealth inequality, that cannot be said to be accurate. The wealthiest top 10% own 81% public debt and the bottom 50% own 0.7%.

So everyone pays taxes to pay treasury bond interest which is collected mainly by the top 10% that hold the bonds.

How to give bonds the illusion of liquidity: We already said that the ultimate value of any financial asset relies on the ability of those assets to be eventually exchanged for “real” value in the goods/services market. Financial wealth that can do this easily are said to have “liquidity.” However in order to do this with money saved as bonds or a savings account they must go through a two step process, which makes it a little more uncertain than cash: first be converted to money, then converted to goods/services.

Bond markets provide illusion of liquidity: Banks usually allow this to happen with savings account or CD’s perhaps with a short delay. To give bonds a similar sense of liquidity, bond markets have been created that allow bonds to be exchanged from a seller to a willing buyer which works satisfactorily under “normal” times when there are plentiful bond buyers. However this illusion can suddenly break down if buyers become scarce because of a run on bonds. Markets are then said to “freeze,” which means is that buyers have become unconfident about whether a bond promises generally will be kept. As we described before in the “cash” section, this can potentially cause a rapid increase in demand for cash if the value of bond market is much larger than total amount of cash. Presently the value of the bond market in the US (\$40T) is ten times the total value of M1 cash in existence (\$4T)—so if everyone rushes to the bond exit door at once, only few may be able to escape with cash. For example a time of sudden fear of inflation, or if interest rates go very low, that could make bond sellers very numerous and buyers scarce, causing the bond market to freeze because of insufficient buyers. That can put strong demand for holding cash which can reduce monetary velocity, which can put downward pressure on prices in the goods/services market which is could be deflationary. So this can cause the real economy to collapse. I already referred to this as a likely cause of lowered velocity, and thus the rapid deflation after the 1929 stock market crash.

The maximum potential amount of total loanable funds saving in an economy is much higher than by saving cash: The amount of cash is limited by the total in circulation. However since it’s always possible to loan cash that one has, there is no definite limit to the total amount that can be loaned in an economy. The same cash can be recycled, and loaned again a second time. However when the total amount gets very high, interest rate payments could begin to burden the economy and reduce GDP by diverting money to bond holders rather than otherwise paid for goods/services. In the US, the total saved by savers in the form of loanable funds is approxametly \$50T, which is an order of magnitude more than is possible with maximum cash saving of \$5T as described above. \$50T is about half of the total wealth presently held in the US economy. If such bonds were paying 5% interest, that would be a \$2.5T per year diversion away from GDP, reducing GDP and economic activity by over 10% per year. As interest cost in an economy rises, that can make the cost less affordable, which can force interest rates lower—which has been the effect in 2020 and provide a more rapid transformation of transactional money from borrowers to likely less transactional cash held by lenders. I refer this as a “trickle up” of money that increases from less wealthy to more wealthy as debt in an economy grows higher, which reduces GDP, and worsens wealth inequaltiy.

As cash saving is periodically emptied of non transactional cash by generation of new lonable funds, loanable funds gradually accumulate over time. Although this keeps

monetary velocity from dropping, and thus maintains GDP, it also increases the wealth split between debtors and creditors—which is to say wealth inequality grows as well.

Loanable funds: short term benefit, longer term curse: As loanable funds gradually increase this provides short term economic benefit by helping to convert a chunks of non transactional cash to transactional cash to borrowers which maintains GDP. But it can become a longer term curse as it also constantly increases debt which requires an interest payment flow back to the borrowers—which starts to defeat the original economic benefit. Interest paid does not contribute to goods flow—interest paid means money that subtracts from what could be purchased in the goods/services market which starts to decrease GDP. In addition, savings grow in equal measure, making more money available for lending, but more debt burdens others demand for borrowing cash decreases. This process can reduce interest rates. which reduces the attractiveness for those who hold extra cash to participate by loaning.

(4)Holding Stocks as Wealth: Buying stocks is like buying a bond—except that instead paying a promised rate of interest, it may or may not pay periodic dividends, which is something like interest, but there is no advance promise about how much—although it is theoretically supposed to be a portion of the corporation’s profit. However that is highly subject to how the accountants want to account for profit. Also, unlike bonds the issuer of the stock has no commitment to redeem it.

It could seem like not having a definite amount that the holder of stock can be guaranteed would be a bug—but actually it is often a feature—because the holder of a stock can let their imagination go wild about how much in the future it might pay—which often gives a stock the potential to be sold to others for values promised limited only by their imagination—which can be a high amount.

Frequently when optimism is high stocks go up in value. The higher they go to more they are desired. Frequently there is little attention to the dividends—and much more awareness of the price, and which direction it is going.

As mentioned above, when stocks or bonds or bank accounts or for that matter assets where the price is of more concern than the inherent value of asset suddenly lose favor, and whose values crash rapidly—that can suddenly increase demand for cash as a safe substitute. When that occurs cash can suffer decrease in velocity which slows GDP. A famous example in the 1929 stock market crash. The market value at peak was about \$89B. M1 in 1929 was \$26B. GDP was \$110B. Lost 24% in one week in October, which would be about \$22B, or 85% of M1. Of course that doesn’t mean that when the market lost \$22B that that value was saved as cash. \$22B of value was “lost” but obviously when the stock was sold many sales were for less than the value of the stock. If everyone managed to get 25% of its value, that might suggest that people’s cash went up by \$6B, which would have been sucked out of wherever such cash resided before.

Section 7: How extreme Wealth Inequality eventually damages an economy

(income inequality not the main problem)

What's the problem with wealth inequality? Some criticize extreme income or wealth inequality on moral, on fairness grounds; that it unfairly distributes goods and services to some small number of participants in the economy in a manner that does not accurately or reasonably represent the amount of work, talent and effort those participants have contributed. This assumes that money *should* attempt to allocate equal work “fairly.” according to what is taken. This is essentially a “moral” argument because it is trying to define for an economy what is fair, and what is not fair. Many other traditional economists have argued that the economies as they are best as they “naturally” are, or perhaps only qualified by a different adjective such as “capitalistic” or “socialistic” depending on the economist’s view. But such a point of view depends on what they believe they “deserve”, not a matter of obvious fact. Although I do think such a moral concern is quite validly be part of any critique of an economy—I want to emphasize this is **not** the type of logic that I’m employing in this essay.

This essay describes how the *existence* of wealth inequality *as it now is* reduces gross domestic product, which is often considered to be the most important traditional measure of success of an economy. The problem is not income inequality directly, for example if everyone, with high or low income, each spend the exact amount of each of their incomes, in other words, not saving, then the problem caused by the “fundamental monetary constraint” does not arise. If income is saved then some money is for a time taken out of circulation. However it is true that those of high income are more *likely* to save a higher amount, which over time causes wealth inequality to build. I’m not claiming that GDP is the very best measure for an economy, and in my opinion I do not believe it is most optimal measure, but I am using this because it has traditionally considered to be the most important one, and it does at least have some justification for being such a measure. The analysis to be given below in eight steps explains how the *mechanism* of money because of the attempt of agents to save with the fundamental monetary constraint discussed in section 1 leads to wealth inequality in an economy, and how that inherently tends to cause GDP to be reduced when wealth inequality becomes extreme.

I do believe that there are other somewhat better ways to judge an economy than the present use of one average GDP to be the measure for an entire economy. So this paragraph, unlike my main argument, is expressing a judgmental view about what is desirable, not a factual—it is my opinion. One possibility I suggested in section 4 would be to divide an economy into different groups—for example measuring how GDP is apportioned to each of ten different deciles of income or wealth, which would evaluate a broader section of the economy based on a set of ten numbers that would show how favorably the many different groups each experience an economy. It is a value judgment of mine that the GDP geometric graphs as I showed in section 4 there, based on four *wealth* groups, gives a “better” snapshot of an economy’s value than just one average GDP number. That is one reason why I believe the “geometric” GDP plot in section 4 is a better useful measure than just an average GDP number because it does demonstrate a measure of economic benefit over a much broader part of the population ; however the main intention of that plot in section 4 was to show how wealth inequality *causes* lower GDP.

The logic in nine steps below shows how, as savers save, in the long run an economy can become damaged when very high wealth accumulates by relatively few, while many more others find their wealth decreases and unemployment to rise. It becomes trapped in a difficult place from which to recover. Here is a summary of steps that describes how that happens to an economy.

The most fundamental cause is that there is a somewhat *irreconcilable conflict* between two desirable properties of money that can inflict economic damage. The end point can be a sluggish economy with high wealth inequality in severe recession or depression.

Those two properties in conflict are:

- (1)**Medium of exchange:** Money is intended to facilitate easy exchange of goods/services that an economy is producing at somewhat uniform rate in time.
- (2)**Store of value:** Money can be held unused for long periods between earning and a delayed purchase.

(1)First step is saving cash, with problem of monetary constraint: In section 1 we proposed and discussed a simple system with no financial assets except money available as methods of saving, showing how the process of saving creates non transactional cash. Now we will consider additional possibilities as described in section 5 when some other options listed there are available that can transform non transactional cash back to transactional. The first step to saving is for the individual to save cash in the “real” economy, which requires producing goods/services, or selling financial assets which exceed by some value $\$C$ compared to what that person spends on goods/services purchased. Now assuming an economy with financial options, another way of obtaining cash is by selling previously saved loanable funds, or stock in a financial market or real assets. Through that process an individual increases his/her cash holding by $\$C$ more than what he/she possessed before intended to be saved. In the short term, since total money stock in the economy is unchanged as described in section 1, this necessarily causes “dissaving” by exactly equal amount by others in the same economy—which is the genesis of wealth inequality. In section 1 we described how holding this cash unused leads to a reduction of economic performance for everyone because some cash has been newly held as non transactional, and therefore no longer is available to contribute to GDP. In section 2 this was also described as reducing monetary velocity, and thus reducing GDP.

Under some economic circumstances for a subset of population the process of saving can be more rapid. This necessarily leads to others who will be forced to simultaneously more rapidly dissave. If the methods described in section 5 do not quickly enough convert such cash back to transactional cash, monetary velocity will decrease, and so will GDP. This can make it more challenging to succeed in counteracting this tendency to keep money sufficiently transactional to maintain its important purpose of exchanging goods/services. On the other hand if for some reason people decide to hold less cash over time, this will necessarily mean that nominal GDP must increase. This can either increase

inflation, or represent a real increase in value of products/services, or some combination of both.

Here are three examples of what can lead to more rapid acquisition of cash savings, hence more rapid production of non transactional cash, and potentially more rapid decline of GDP if not compensated by the items listed in section 5.

- 1. Fewer people produce greater value per unit time: productivity increases:** Some individuals with higher wealth or talent, who have access to more capital or technology can find ways of producing manufactured type products valued at rates much higher than they can spend. Automobile manufacture, and electronics manufacturing processes have been greatly improved to require far fewer workers to produce value than was true fifty years ago. That improves the ability of fewer people to produce much more value \$C than they purchase, and exaggerated further if workers are paid less because lack of unions or from reduced demand in the labor market. That increases the rate at which is needed to convert cash back transactional, and in this manner can increase the rate at which the wealthy become even more wealthy. It also reduces the number of people required to supply all services/products needed in an economy. Those extra which are not required (“redundant”) are then crowded out from employment, as in the example of the recession as described on page 8 in Section 1. Higher productivity is usually hailed by economists as desirable, however this is a possible unfortunate side effect of productivity if the pay of workers is not rewarded proportionally to productivity increase to provide the money to purchase the more efficiently produced goods.
- 2. Financial market crashes:** A sudden crash in the value of stocks, bonds or other assets can provide a sudden rush for holders of those assets to sell them for safer cash instead. Typically of course, the total cash obtained in this case will be less than the total amount of value which the market actually lost, but it still could result in a relatively large sudden increase in desire to hold safer non transactional cash instead of the former asset. Most economists believe the 1929 crash was not the cause of the subsequent economic decline. However the 1929 stock market crash is an example which quite likely was the initial cause of the 1930’s depression with lowered GDP and high unemployment, which will be discussed later in more quantitative detail. Another example is the sudden drop in mortgage backed securities and also stocks in 2008. These events can cause a sudden demand for holding safer cash at zero velocity, which can cause a portion of transactional cash to be pulled out to become non transactional resulting in a sudden decline in GDP and higher unemployment.
- 3. Gradual increase in wealth inequality in an economy, especially when interest rates are low which could cause reduction in economic monetary velocity.** This is explained in section 4 above, illustrated in graphs 1 and 2 on page 28. Wealthy people usually hold higher amounts of lower velocity cash than others—meaning the spending for each dollar they hold is less than those with higher velocity cash. That makes their dollars less potent for generating GDP per unit time. Others, who hold less cash, because they now hold less transactional cash, who although they spend with higher velocity, will likely spend at lower GDP because they have now diminished money quantity compared to the wealthy. This effect will be strongest when fewer achieve very high wealth, and more others have low wealth and high debt. This reduces interest rates which as explained in section 1 keeps non transactional money from entering the loanable funds market.

This implies that high wealth concentrated in few tends to result in cash stuck in the hands of wealthy—also called “liquidity trap” as zero interest prevents such liquidity to be loaned. I’ve explained before that it would be helpful if the Fed would supply information on monetary velocity for important subgroups in the economy, but since they do not I will suggest here how low velocity could occur with high wealth inequality in an economy. In the US economy in 2019 the top 1% of wealth holders in 2019 held 25% of the economy’s cash. (See Table 1, page 31). To determine, or guess velocity we need to know the GDP of this group alone. We need to know what percentage of this money is used for exchange compared to cash being held only for saving. This can be guessed, using data from the US Bureau of Labor statistics: Consumer Expenditure Survey <https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error/cu-income-deciles-before-taxes-2019.pdf> which shows how much different income deciles spend money. These are not wealth deciles, so the assumption made here is that there is likely a rough correspondence to wealth. From this data I will guess that the top one percent (wealth or income) likely spends about ten times what the 0-50% wealth decile spends. However graph on page 31 (bottom row) shows that the top 1% holds 133 times the cash that can be used to purchase times more. That implies that much cash held by the 1% is being held as saving, not spending. I’m also assuming that the 30% decile holds only money that is high velocity, with virtually no money held non transactional for wealth. Using these assumptions, the top 1% should need about ten times more than the 30% group if it held money at the same velocity. The actual amount is much higher, so much cash it holds must be for only saving, not transactional. This is especially likely now when interest rates are extremely low, those with high wealth will be even more likely

to hold more cash at lower velocity, since the opportunity cost for holding cash compared with investing it is lower, which would cause velocity and GDP to reduce even further.

(2) Reversing the damage caused by “fundamental monetary constraint”: One important way is to convert non transactional to transactional cash by loanable funds: It will increase monetary velocity if the individual with cash savings puts the \$C saving in the loanable funds market, or possibly a initial offering stock which would again put that cash into transactional use. Conventional macroeconomics for some reason assumes that such “saved” money will be loaned for an “investment” purpose, which according to some economists creates more economic benefit, however in order to serve the function of maintaining velocity it does not matter whether it goes to investment or consumption purpose—so long as it is spent *within reasonable time*. As has repeatedly been said, one condition necessary to motivate the savers of money to place that money into the loanable funds market is that interest rates are not too low. So if interest rates are very low or zero, this method will not work.

Short term beneficial economic effect: Loanable funds have the immediate short term benefit of restoring \$C to be transactional cash again by loaning it to someone who will spend it.

Longer term reversal of benefit: Although it provides a fast immediate benefit, saving in the loanable funds market option has a long term disadvantage in that it begins a slow flow back of interest money that every year returns transactional cash back to the saver, quite possibly returning as non transactional cash. In addition, if at later time the principal money is returned to the saver, that original positive effect on the economy also may at that later time be completely negated. This is a “trickle up” of cash that typically goes from those of lesser wealth who owe money to those of higher wealth who have extra savings money, transforming transactional back to non transactional cash. This is the relentless force that causes debt, and hence, as we’ve explained, wealth for some to virtually always slowly goes up as percentage of GDP during “normal” or “good” economic times. Only rarely during “normal” times does total nominal debt decline. Therefore as more and more money is saved as loanable funds, wealth inequality tends over times to get worse. This “trickle up” process of interest flow is a much more plausible factor which occurs from poorer to rich than the so called “trickle down” effect from rich to poor, which is often asserted, but for which no mechanism is generally explained.

When debt repaid resulting in non transactional return: Eventually such loan may be returned to the original saver. If at that time the “saver” has no need or desire to spend returned principal or interest, then when transactional money is returned it could revert as non transactional. This also reverses the original benefit of making cash transactional. It would be better if the original saver immediately put the returned money again back into loanable funds—however this might not happen if interest rates were 0 which would eliminate the motivation that for making that decision.

If transactional return: However if for example, the original saver’s purpose was saving for retirement, and the principal or interest comes back to him/her being due during retirement, that money could be spent without much delay. This would keep the money as transactional, and there would not be the negative

consequence that would have occurred if the money had just been held rather than spent.

Default as another way to avoid returning money to non transactional cash: If the principal never gets paid back because of default, although that would be unfortunate for the lender who would lose wealth, it would mean that somehow the principal got spent, so no cash was left to return non transactional to the lender, and the negative effect on the economy of returning the debt would be avoided. Reinhart and Rogoff in their book “This time is Different” describe many examples of high wealth destroying inflation and defaults of this type, however the authors appear to believe defaults are never a desirable outcome—but according to this analysis it has a benefit in that it maintains monetary velocity by avoiding interest and principal transfers back to non transactional cash that could cause a reduction of GDP.

The default option is surprisingly common for corporate bonds and is another option for converting non transactional cash to transactional. The *average* weighted yearly US corporate debt default from 1971-2006 has been 4.24%/year. For example, in year 2005 this was 3.37% which was a loss of over \$1T in bond value that no longer had opportunity to go back to non transactional cash. This is significant compared to a nominal GDP of \$13T for the same year, so would cancel out over \$1T formerly non transactional cash in 2005. See Table 15.1 in the following reference with this data:

<http://people.stern.nyu.edu/ealtman/AboutCorporateDefaultRates.pdf>

Investment into public debt that never gets paid back: Another loanable funds possibility that avoids paying back the principal likely occurs if Treasury bonds are purchased, which increases the national debt and is immediately spent by government, but which often avoids ever having to be paid back because in practice US public debt virtually never gets paid back in nominal (actual dollar value) terms. Despite the benefit this gives to the economy by not having money revert to non transactional cash, this increasing nominal debt causes discomfort for many critics of excessive public debt who believe it is important to keep debts as low as possible. However having to pay off debt is frequently avoided by using expansionary monetary policy to encourage enough inflation to cancel out the interest that needs to be paid, and simultaneously the debt becomes gradually lower in real terms, i.e. in inflated dollars. This is essentially an easy to collect flat tax on all wealth equal to the inflation rate. It is a wealth tax that cannot easily be avoided by clever accountants.

Nominal public debt 1965-2020 <https://fred.stlouisfed.org/series/GFDEBTN>

Public debt compared to GDP: <https://fred.stlouisfed.org/series/GFDEGDQ188S>

Inflation: <https://fred.stlouisfed.org/series/CPILFENS>

Effectively the original principal amount gets smaller and smaller in real terms over the years until it disappears to essentially zero. The game here is to inflate money at the same rate that the debt is rising to maintain, or even reduce the real value of debt. Although federal debt rarely gets paid down in nominal terms—when in those rare occasions it is paid down it is often called “austerity” which with tax dollars buys Treasury bonds back from bond holders—transforming transactional tax money to those who then may again hold dollars at zero velocity rather than the Treasury bond just sold of equal value. When those dollars are delivered they reduce money velocity and consequently GDP—which tends to reverse the original benefit which originally made money more transactional, occasionally being instigated by naive

Democrats who want to prove themselves more fiscally responsible than Republicans. Republicans often find great virtue in reducing public debt but only when they are not the ones in charge of government so they don't have to be blamed for the negative economic consequence. Such Republican virtue has recently become especially evident in early 2021, now that they are not in such control of government.

There is a similar negative situation with private debt when many in an economy try to simultaneously reduce private debt, which has been described as “debt deflation” by Irving Fisher in the 1930's and more recently was described as causing a “balance sheet recession” by Richard Koo. Mr. Koo also described this as an important cause of the 1930's depression. When debt diminishes it causes money to be converted to low velocity wealth rather than for spending, which has the disadvantage that it slows the economy, having the opposite economic benefit which occurred with the creation of the original debt as described in step 2 above. But unlike US public debt, 4.2% per year of private debt also disappears by suffering default, which disappoints holders of bonds and which reduces wealth of the bondholder, but is much more gentle on the economy than is a balance sheet recession. See these references that show total how private debt and total public debt virtually always go up over time in nominal terms—so over time debts become inflated away.

Nominal Private debt 1950-2020: <https://fred.stlouisfed.org/series/TCMDODNS>

Nominal Public debt 1965-2020: <https://fred.stlouisfed.org/series/GFDEBTN>

It should be also noted by people who decry such increasing debt as being bad, and advocate that there should instead be more “saving” that *all* this debt is necessarily exactly matched by the lenders of this debt, for whom this increasing sum is a graph of part of *their increasing savings*, or wealth—specifically that portion of wealth which is made up of bonds or other loanable funds. Wealth increases at the same rate as debt is created.

(3) Other ways to turn money back to transactional form: It is possible—even likely—that not all non transactional saved money gets transformed back to transactional by means of being converted to loanable funds or stocks (or asset purchases) as described in step 2 above. Therefore other methods that were listed in section 5 besides loanable funds have evolved to replace transactional money to maintain spending.

Taxation: Government taxation of income or wealth very directly converts non transactional cash to transactional by purchasing public goods/services. To be effective for the purpose such taxes need to come from those with low velocity cash, who have cash savings, not those who have dissaved. This is why taxing the wealthy is more beneficial to increasing an economy rather than taxing those who would have otherwise spent the money for consumption or investment to increase GDP.

Sometimes **tax cuts** are vehemently advocated as a means to recover from economic recessions. The previous analysis shows that only works if it converts lower velocity cash to higher velocity cash. Section ? showed that data from the Fed shows that tax money in the treasury has quite high velocity—so returning such money to taxpayers, especially when such cuts are delivered to the wealthy at low velocity will cause more damage than benefit. “Trickle down” is a slogan with mainly political

benefit, which is basically BS with no logic that I have ever been able to discern. Tax cuts, unless delivered from taxpayers of low velocity to others who hold money with higher velocity money, in other words tax cuts for people who save little and spend rapidly, this will have a detrimental effect on GDP.

Monetary policy: The monetary authority can print money which is used to purchase treasury bonds—or during “quantitative easing” even other bonds may be purchased. To be effective to end up as transactional cash it requires a climate of sufficiently high interest rates to encourage that the liberated money to be placed in the loanable funds market. Or it could be invested in stocks as an initial stock offering. This will not be so likely to happen if interest rates are very low, thus not providing the needed incentive to make this happen.

Inflation: Monetary policy can have another role to increase money stock to result in inflating prices which reduces the real value of non transactional money—and thus reduce the real value of loanable funds—which has an effect similar to a tax on cash wealth—and also tends to reduce wealth inequality.

When the Fed removes cash by monetary policy this has a different effect on interest rates compared to non transactional cash held as savings: There are two ways cash can be removed from the economy. The Fed can do this by contractionary monetary policy, (selling bonds) or it can happen if people increase savings of cash (“hoarding”) which has the same effect of removing spendable cash. However these two actions differ in their effect on interest rates. The Fed’s action to remove cash *increases* interest rates because the supply of money is also being restricted by their action, thus raising the interest rate price to borrow it. Contrary to this, when money remains in the economy as non transactional cash, it *decreases* interest rates, because such cash is now available to be lent, causing greater supply of money to be available for lending, thus *reducing* the cost of money and therefore interest rates.

(4)The tension between increasing and decreasing monetary velocity:

Saving cash *reduces* velocity. The methods in section 5 of this essay, plus investment in loanable funds oppose this to *increase* velocity. Where velocity ends up depends on the result of these forces.

Section 2 of this essay (p 14) describes how the numerical value of velocity for an entire economy is “crowd sourced” depending on the totality of each individual decision about how many months of cash expenses are chosen to be held, when all such decisions are combined together.

Different wealth groups can each be characterized by a different total velocity number, depending on the cash spending and holding behavior of the individuals within that group—with generally *higher* wealth cohorts having *lower* monetary velocity, as the ratio of amount of cash they hold compared with the rate of their cash spending is generally higher. All these groups acting together collectively determine velocity of an entire economy. One insight expressed in this essay is that the velocity in one group can affect GDP economic performance in other groups. Because higher wealth groups hold money at lower velocity, they reduce velocity for an entire economy, and therefore reduce GDP for other groups. This was explored in section 2, and step 1 on page 49 . How this works was made visually obvious with the geometric plots of velocity and monetary quantity in section 4, pages 28.

There is no natural equilibrium (that I have been able to understand) that keeps velocity reliably regulated to a steady value—however velocity does correlate well with interest rates. (Section 3, p 22). Actual data showing good correlation between interest rates and velocity from before 1940 to 2000 is also shown in the web reference a few blue lines below this. As is shown there, for reasons explained above, people typically want to hold less cash, thus increasing velocity, if interest rates are higher.

(Reference:) Money velocity and the natural rate of interest Luca Benati, University of Bern.
Refer to figure 2A on page 11. Interest rate is black, velocity red for ten different countries.
<http://www.hec.unil.ch/documents/seminars/deep/2362.pdf>

One way that I will explain recessions and depression is by examining how velocities of different groups change. $GDP = M \times V$, and so by definition directly correlates with velocity. And if one high wealth group reduces velocity, that will reduce the cash held by other groups, and therefore their GDP, and therefore reduce GDP for an entire economy.

(5)Explanation for why if people always save money, economies must always increase in GDP: Economic performance is usually described by citing an increase of percentage of GDP. If the GDP number remains only the same as before, this is not regarded as good enough. But why does it always need to go up for satisfactory performance?

The logic for this can be understood from the explanation in section 1 of this essay, which describes the “fundamental monetary constraint.” When people desire to save cash money in an economy with a total amount of money that is fixed, or changing only very slowly they must obtain money by producing more value than they consume. Which means another group must be consuming more than they produce, and that group has over time has an equal amount less cash than before. That cannot continue forever because they will eventually run out of cash to purchase anything—including the extra goods/services that were produced by the overproducers. But the underproducers must have cash which they are running down. One possibility is to borrow money from the overproducers. Another would be to get money from government taxes that pay for unemployment insurance or social security. For those that borrow money, they must pay that money back. To get such money they need to get a job—which requires creating new goods/services—which will increase GDP equal to the value the overproducers saved. So those underproducers must earn an amount that was saved by the original amount by overproducers. So the act of saving requires that the underproducers to earn cash required to earn the amount that was saved—if they don’t they will eventually be broke.

This process accelerates when productivity rises. As economies advance they tend to become more efficient at producing goods/services: examples in the US : many fewer people are now required to produce food for everyone compared to 150 years ago. Because of production robots many fewer people are required to produce automobiles or electronics than 50 year ago. The first thought could be: “Oh, that must mean that more people can have leisure” which I remember was a common sentiment expressed in magazine and newspapers in the 1950’s when prognosticators wrote what would happen in the future when goods were more efficiently produced; they assumed fewer jobs would be needed. However, as our discussion in section 1 indicated, the catch is, that to obtain those goods/services people must have money to possess them. To get money you might

get government, or other money not requiring work from taxes paid by overproducers, but if it is necessary to pay off a loan you have to have a job. But when fewer are required than before to make what is produced, these production jobs are scarcer. That requires that those people with loans to pay off will not have extra leisure—they must have some kind of new job to obtain money to purchase extra goods. The economy has in fact expanded to produce new jobs—many of which in the US are now “service” jobs, which were much harder to automate. They are usually less “productive” than factory jobs—meaning they require more labor time to produce a given amount of value. High productivity is a value often touted by economists—however while it requires fewer worker hours to produce the same goods/services what it ignores is that it requires more new jobs to provide money for the formerly redundant over consumers to buy the more efficiently produced goods. As the economy gets more efficient at producing the goods/services that people need, that reduces the number of people to produce them, but the redundant consumers nevertheless need jobs—not to produce more stuff, but necessary to *obtain the money* to purchase the more efficiently produced goods. This is how saving money in an economy with the “fundamental monetary constraint” has the consequence of needing to replace the redundant ones, in order to get money to *purchase* the more efficiently produce goods.

This is what drove Keynes to suggest in jest, that people needed be hired to dig ditches, and for which others to fill them in to find a way to provide employment for those who become redundant.

Bottom line— because of the monetary constraint defined in section 1, as the economy becomes more productive the economy must expand, not because people need to produce even more goods, but it is necessary to produce more jobs which most importantly yield necessary cash just to consume the more efficiently produced goods, which forces the economy to “grow” to produce even more stuff. The paradox is that: if not everyone is necessary to produce all goods/services, everyone who wants those goods/services must still find a new job to obtain them.

This is why our economy now requires two people to earn income for a family, whereas when I was a teenager in the 50’s in Palo Alto most householders could cover all expenses with one income earner. Yes, we have more stuff, but that was mainly because redundant people needed money to buy the more efficiently produced goods/services.

(6) Why do economies go through alternating recessions and booms?

It is well known that economies tend to oscillate up and down somewhat, often described as going from “expanding” to “contracting” and then from time to time “recession.” There is not always agreement on what causes this seeming economic instability to happen.

Recessions are defined by the National Bureau of Economic research as a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales.

But what causes an economy to ride up and down? This wouldn’t be surprising if there were some obvious factor that would cause an interruption of the process of producing goods/services, or a pandemic such as Covid 19 that could reduce opportunities to purchase, which would reduce spending, and could be considered a supply problem. Or

such as a sudden spike in foreign oil cost could cause a sudden lack of income for domestic products/services. But frequently recessions occur without such obvious cause. The fundamental explanation for economic slowdown was given in section 1, page 8 of this essay when discussing how a jam up of excess non transactional (low velocity) cash could result in insufficient transactional cash to provide necessary demand to maintain flow of goods from producer to consumer. This is likely the fundamental cause of some recessions, some of which can be helped by expansionary monetary policy so long as interest rates are not so low that money gets stuck in a liquidity trap.

The following section presents an hypothesis that I believe gives a general description for why recessions/depressions occur using what has been presented to far about monetary velocity. This hypotheses forms a very basic framework that describes the likely reason why such economic fluctuations exist. Unlike the assumption which forms the historical basis of much economics, it does not assume there is a “natural equilibrium” that maintains a smooth flow of goods/services from producers to consumers using money as a conduit for this flow.

A highway driving puzzle analogy to contemplate: I wish to start by discussing a very different highway driving problem, which seems to me bares some interesting resemblance to economic recessions that seem to pop out without obvious explanation.

The puzzle: Have you ever been driving on a freeway going at a nice fast speed, like 72 mph when suddenly you see brake lights ahead, where traffic appears to be slowing down—could there be an accident ahead? You slow down, and shortly afterwards you are going average just 4 mph—traffic is starting and stopping, then starts and stops at the same pace for perhaps two miles taking 1/2 hour. But no accident? No obvious reason why the traffic slowed down. Then finally often fairly slowly, speed increases again, and after a short time it magically is going the same speed as before. On a moderately busy highway the same thing might then again occur after driving successfully for 10 miles at high speed. What causes these occasional slowdowns for seemingly no reason—which reminds me of recessions that suddenly attack an economy?

I’ve thought about this question, and to analyze it decided to do a little math. How can this happen when there is no traffic coming on and off the highway, and no accident or blockage? The most important physical fact to note is that everywhere on the highway, to maintain this same flow rate everywhere on the same highway it must be that the *number of cars passing per unit time* at every point of the highway must be on average constant on the entire highway length—at both fast and slow points. This must be true if there is insignificant traffic flow coming on or off the highway. Translating that requirement mathematically for each highway location means the following: the time between the passage of each car at every point on the highway must be (on average) the same. That time is car spacing distance divided by the speed at that point in the highway. During a slow period, we can suppose that the highway can safely accommodate cars going at a parking lot speed of 4 mph with spacing 20 feet apart (headlight to headlight). That represents a time between each car at each point of the highway of $20 \div 4 = 5$ (ft-hour/mile) $= (3.41 \text{ sec/car})$. The same highway could accommodate 72 mph cars at 360 feet spacing $360 \div 72 = 5 = (3.41 \text{ sec/car})$. In either case the time per car past one point of the highway location would be the same. That’s plenty of safety space for 72 mph—about 3 seconds of time between cars. It is not, as one might think, that there must be too many cars in the slow section for the highway to accommodate much higher speeds.

Then why was everyone going only 4 mph for that short distance? And how did that get fixed?

After some thought and observation, I began to understand why. I observed that most cars maintained a very reasonable and safe distance for the speed they were driving—although some few going even a little too close. But a safe speed often suggested to be at least two seconds apart. However, there were a *very* few drivers who were messing it up for everyone by leaving way more space than necessary. I found when the traffic started to go faster, getting towards the end of the jam up there were a few people who were so used to going slow for a half hour, and obviously in no hurry at all, as they were maintaining leisurely distances much farther from the next car than was needed for safety. They were thinking (I suppose) what's my rush, since it's only going really slow anyway. Now at the end of the jam up after accelerating up to 15 mph, but instead of maintaining a safe 40 ft spacing, were still 200 ft away from the car in front, causing a very unnecessary clear space on the highway. If everyone were doing that, all traffic would go even far slower than it was. Fortunately only relatively few laggards, but those very few were unknowingly slowing it down for everyone else behind them. Just like other very few similar drivers up ahead who did the same to them. Another way to think of this is that every car takes up a space not only by the length of their car, but also by all the space they leave in front of them to the next car. When they leave a very unnecessarily long distance, they are essentially taking part of the highway out of commission (that empty highway space moving along) that could be used by other cars behind them to be travelling in. They are using much more of the highway than cars need.

The final question—if one wanted to reform the situation, what could be done to avoid this kind of jam up? After analyzing the problem, it became obvious to me that if everyone were required to always drive with speed such that no less than two seconds apart (to maintain safety) and no more than four seconds, whenever one is travelling less than the speed limit. (That would be an additional safety limit.) In other words no one leaving 200 feet of spacing when finally getting speed up to 15 mph. A rule, or perhaps automatic driving cars could fix this problem. The point of this is to suggest, and propose that it is this kind of problem that causes the sometimes unexplained economic slowdowns, with a relatively small problem that could be fixed. The question is whether their might be a similar rule to reduce sudden economic downturns.

So is there a similar way of describing economic slowdowns? Could we think relatively few could be unintentionally jamming up the economy because they are holding more cash than they need? I'm thinking that could be the case. The objective of the following is to analyze recessions and depressions using the monetary description, considering different ways that such recessions and depressions are described. For example, it can be helpful to define the commonly used description "loss of consumer confidence" with more precision than it generally is given. I will suggest such analysis here by using the "monetary analysis" shown in section 2. The reason I believe it could be superior than what is often offered using conventional (Samuelson) macro is that conventional macro is oblivious of the importance of high enough velocity. We should be attentive not only to quantity of money, but also velocity—since these are the two important components of GDP. There is a reasonable question as to whether this is really a useful approach—the hypothesis here is that it would be. But only collecting actual velocity data from the

groups described below could either verify or discard this hypothesis. I believe it would be very useful for the Fed to add this to its large collection of observed data. We can start with the monetary expression for GDP.

$$GDP = V \times M = \sum_{k=1}^n (M_k \times V_k)$$

In this case we would like to know what action or policy should be invoked to keep an economy going at a steady speed. If GDP begins to decline, by this definition it must be caused by a reduction in total money M or total velocity V, so both parameters should be examined and questioned for changes that would change GDP. Note that a change in money M or velocity V of just 5% would alter GDP by 5%, which if it were a general velocity slowdown would be defined as a recession. If velocity changed by 10% it could be a depression. Since M is supposed to be somewhat controlled by the Fed, they do not have direct control of V which is controlled by crowd behavior, I'll consider that reduction of V may be the variable we need to consider as the recession culprit. However, perhaps I'm overlooking a way in which M is being disturbed. But this is a way to at least open the question.

$$GDP = V \times M = \sum_{k=1}^n (M_k \times V_k)$$

Velocity V in an entire economy is regulated by the individual values of cash M_k and time of holding cash determined by V_k . Everyone affects velocity V to a degree, but those with highest values of M_k and V_k have the greatest influence on the economy. That is seen from the equation, since the sum is obtained by adding up each person's contribution, GDP for those with higher amounts of cash M_k , typically those with more wealth, have more influence on the total velocity V, hence higher influence on GDP in the economy. Also, not completely obvious from the equation is that because total money M is fixed, when one person has reduced V by definition they hold more cash, which also unintentionally reduces how much M others hold as well, which will tend to lower their GDP contribution as well.

$$GDP = V \times M = \sum_{k=1}^n (M_k \times V_k)$$

Lowered consumer confidence: One often heard explanation as a recession cause is “lowered consumer confidence”. Here are a few variations on a theme to imagine what that could actually mean in terms of spending. These are intended to describe several different cases for what could be called “lowered consumer confidence” whose effect could depend on what happens to V or M.

Someone receives regular income and decides to slow spending and hold unspent money as cash: With the same income but reduced spending, if cash thereby accumulating, that means that person is transforming more transactional cash to non transactional cash—aka reducing velocity. That person will reduce GDP because of a

slower rate of spending, and also reduce velocity to others, because additional cash is being held because it is not spent, reducing transactional cash from reaching others, therefore reducing other's spending and therefore GDP. Many people doing this could slow the economy.

Someone receives regular income and decides to slow spending but invest the extra savings into a bond: A newly produced bond is likely to be spent, since it doesn't make sense to pay interest on a bond and hold it as wealth. This individual should not cause reduction in GDP because no new non transactional cash has been produced.

Someone has lost a job, receiving no unemployment, spending down savings for expenses: This person may slightly increase GDP, not because of his/her spending, but because saved money is being spent, leaving him/her with less cash, and others with more to spend.

Employer has laid off the worker above, but not increasing spending, but saving laid off person's salary. : This person, by saving additional non transactional cash, is reducing GDP. However, **if this employer's former labor expense was invested in a bond, then there should be no reduction of GDP** as the bond creator typically creates a bond to spend the cash.

Another description applicable to some recessions: Balance sheet recession/paying off loans. Richard Koo characterized another type of recession as a "balance sheet recession." He described this as caused by many people simultaneously deciding to pay off loans, particularly what he described as the consequence in Japan of a sudden nation wide reduction of asset values on business balance sheets which resulted in negative equity. When many attempted to "repair" their balance sheets, meaning reattaining positive equity by paying off loans, a lot of cash transactional money was transformed to non transactional money, also described in section 2 as reducing velocity and therefore GDP. This was essentially reversing the process referred to in section 1 and restrained Japan's economic recovery: instead saving in the loanable funds market by transforming non transactional cash to transactional, this was the reverse, which would be expected to undo the benefit of maintaining GDP by to placing money into transactional funds. The housing bust of 2006 in the US could be classed in this category as well. Koo also assigned this same cause to the long 1930's depression in the US.

Another cause: Crash in value of assets, stocks or bonds.—This is related to balance sheet recession—or what could happen *before* the balance sheet recession when some type of asset loss suddenly happens. A sudden loss in stocks, bonds or other assets can cause many to sell to reduce wealth losses as stock, bond or other assets suddenly decline—causing sudden increase holding of cash as wealth rather than the former asset that lost value. This can rapidly reduce cash velocity which directly can reduce GDP, especially if there are not other perceived places to "invest" such money. I believe this is a very likely initial rapid cause of the 1930's depression. Koo blames the balance sheet recession described above—however it could have very possibly been started by a great amount of increased cash held as wealth, which in the 1930's was held by relatively few—exaggerated because it was a period of high wealth inequality. This would explain the very rapid decline of GDP immediately after the 1929 crash. It was also a period of low nominal interest rates which made to opportunity cost low for holding cash. It was

also for a time a time of high “real” interest rates, due to deflation—so cash was itself increasing in purchasing power which was another reason cash was being held.

(7) How can recessions be fixed? There are two types of recessions events—one type is more serious, and the other less serious—which one takes root depends on whether *interest rates are very low*. Most recessions are not long, and not super serious. The two examples which I will cite in the next section as being the “serious, difficult to fix” ones are (1)the decade of 1930’s in the US and (2)Period in US beginning 2008 which hasn’t yet been resolved in 2021. The term “secular stagnation,” first used by economist Alvin Hansen in the 1930’s has sometimes been used for the difficult ones.

For both types I will assume are *not supply type* recessions/depressions, meaning not those that occur because of physical disaster such as war or famine where there is obvious lack of supply. These supply side type recessions can be diagnosed by a visit to Walmart or Target by examining the stocking shelves to judge if there is an adequate quantity of goods on the shelves to buy. If they are packed to the brim with goods, the problem is very unlikely to be a supply problem. Some so called “supply sider” economists make the non credible claim that even if there are no obvious shortages in such stores that increase of supply is all that’s needed—usually meaning more and deeper tax cuts for businesses and capital gains tax.

I will describe the types of slowdowns that can be attributed to lack of “demand,” which does not usually mean lack of *desire* for what’s on the shelves, but rather a lack of adequate cash on the part of many who would like to buy them and would also be glad to have a job if it were available to obtain money. One common reason for such lack of cash is high unemployment in the economy.

So this analysis claims that both more serious, and less serious types are a result of insufficient demand in the real economy caused by a lack of transactional money in the hands of those that desire to purchase goods/services. That lack of demand begins to strangle economic demand.

What actions can be taken to re stimulate the economy? We have already discussed why the solution is to provide more transactional cash in the economy.

Typical appropriate responses:

(1) **Monetary stimulus** The Fed buys bonds with newly printed money to stimulate purchases and lower interest rates to encourage borrowing—both to increase money velocity and quantity. It is necessary to supply money in some manner that such cash does not get stuck in non transactional form—that is, not simply being held as someone’s unspent wealth. As described below, this response does not work on the “difficult to fix” recessions.

(2) **Fiscal stimulus** The treasury issues new Treasury bonds to obtain cash to quickly spend on “shovel ready” projects in the economy. Bonds are purchased from those who have non transactional cash. This transforms non transactional money used to purchase a bond into money spent for government products/services which increase velocity and GDP. Cash that the government holds usually does not last long—cash government holds usually gets spent rapidly at high velocity.

(3) **Tax policy:** Tax policy means taking taxes from some part of the economy where it is at lower velocity and placing it in another place where velocity of spending is higher.

When this is done any action must be carefully analyzed to insure that money is taken from low velocity taxpayers and given to higher velocity recipients. Taking money from one place and placing it to another with same velocity will not serve the objective of improving GDP, and if taken from a high velocity source will make the economy worse, not better. The whole point is to increase velocity. The Fed has data that demonstrates that money the US government is spent at high velocity—usually higher than the sources from which the money came, so arbitrarily just cutting taxes and expenses will usually decrease velocity, and thus hurt, not help an economic recovery.

Bad Tax strategy: give tax cuts mainly to the wealthy using money that would have otherwise been spent on **government products/services**. The political slogan “trickle down” is often cited as something that will definitely happen, which is essentially “faith based,” having no known basis in economics. The Fed has data showing that money spent from the treasury has unusually high velocity. Cutting taxes to the wealthy makes situation worse by reducing overall reducing monetary velocity

Good Tax strategy: Tax those with high wealth (low velocity) paying benefits to the unemployed (high velocity).

Good Tax strategy: Increase tax credits to those of low income (usually high velocity) while maintaining spending: This policy reduces money taken from a high velocity source. To maintain spending at higher velocity taxes should be taken increases tax on medium and low velocity citizens. This increases monetary velocity.

Bad Tax strategy: Sales taxes, which also includes value added taxes, which apply to all sales/services are a direct flat tax on GDP. It does slightly reduce the effect if they are not imposed on food since people of low wealth (high velocity) spend a higher amount on food.

Income tax better than sales taxes: Highly progressive income taxes place a tax both saving and spending, with higher taxes going to those with lower velocity money. Placing some tax on income does put some tax on saving, which tends to keep velocity higher than if it were all placed on only spending—which is what a sales or value added tax does.

Alvin Hansen “secular stagnation

(8) Much more serious type of recession/depressions are caused by stuck high wealth inequality and low interest rates. We can distinguish two types of “depression/recessions” one type of which is markedly worse. What makes the “bad” recessions/depressions worse is not how they differ qualitatively from what has been described in step 7, above. What distinguishes the “bad” ones is that they are much more stubborn to fix because very low interest rates cause monetary velocity is stuck low which makes a liquidity trap for money. This could be the type that has been called “secular stagnation.” The liquidity trap makes it difficult for the loanable funds market to transform non transactional money to transactional money as described in section 1 and section 5 of this essay, and also keeps monetary policy from working because of very low interest rates. The two examples in the US that could fall in this category are the US depression in the 1930’s and the “great recession” that began in 2008 and hasn’t yet been satisfactorily resolved.

High wealth inequality causes low interest rates: The factor that is different that puts these into the possible category as “secular stagnation” is first (1) *high level of wealth inequality*, which tends to cause (2) *very low interest rates* and (3) *low monetary velocity*. Very low interest rates, below the “zero limit bound for monetary policy” tends to lock in low monetary velocity—which has also has been described in other words as a “liquidity trap” by Keynes. Monetary policy increases more non transactional cash, which just pushes velocity lower, enhancing the liquidity trap.

Shows high wealth inequality for both secular stagnation events. Percentage of total wealth held by top 0.1% of wealth holders. See figure 1, page 2: <https://live-equitablegrowth.pantheonsite.io/wp-content/uploads/2014/10/102014-wealth-brief.pdf>

Both economic events also had uniquely low interest rates: 1934-2020. <https://fred.stlouisfed.org/series/TB3MS>

How velocity and interest rates track each other, and were both uniquely low during both of the events. You need to go to figure 2A on page 11. The US data is the top left graph. Interest rates are black. Velocity is in red. [Money velocity and the natural rate of interest](http://www.hec.unil.ch/documents/seminars/deep/2362.pdf) Luca Benati, University of Bern. <http://www.hec.unil.ch/documents/seminars/deep/2362.pdf>

Fed data on velocity 1959-2020: interest rates: <https://fred.stlouisfed.org/series/M1V>

Why high wealth inequality causes low interest rates: With great wealth concentration the wealthy hold high amount of wealth in loanable funds market, which is matched by high equal quantity of debt among many that are less wealthy, so there are a lot of people at the low end who are (1) not credit worthy or (2) do not want to borrow to commit to even more debt. The very wealthy have a high supply of loanable funds, but there is low demand from somewhat depressed lower wealth potential borrowers. It is the classical supply and demand case where high supply of non transactional money along with low borrower demand that results in low price to borrow, meaning low interest rates. For the same reason opportunities do not exist for savers to find borrowers with low risk to get a reasonable return on their savings.

High debt load means economy is hampered by interest payments which do not count as GDP. Velocity is low because interest rate is low. Demand is weak because velocity is low which demonstrates much cash is held non transactional by the wealthy, leaving less cash for the less wealthy who hold higher velocity money that does the most efficient job of producing GDP.

Monetary policy fails: Interest rates are below the “monetary policy fail” limit. The Fed can try to push cash into the economy by buying bonds. People may be willing to sell bonds to the Fed, but such cash is likely to remain held safely rather than invested with the only choice is either buying corporate bonds that have low risk and deliver very low interest, or interest return on bonds higher, but not high enough to justify the higher default risk.

Tax policy that increases an income or wealth tax on the wealthy could be one effective solution—but with a serious political problem: Another reason these recessions are serious is the high political power of the rich that effectively prevents taxing of wealth, which is one solution that could work. Taxing the rich is an important way to provide money for public spending that does not increase public debt, and comes from a large source of stuck low velocity cash without producing new debt. This would directly move non transactional cash to be spent for public purposes, and simultaneously tends to reduce wealth inequality which led to the economic slowdown. The problem is

that the very wealthy are usually in a position to block such policy, because they give large amounts of funding (more truthfully, “legal bribes” or “wealth insurance money”) to public officials who are responsible for deciding how taxes will be allocated. The Republican party has been very effective at blocking or lowering taxes, especially for the rich—and Democrats are also be equally reluctant, knowing that imposing such taxes would likely severely cut those money sources (“bribes”) for their campaign spending.

Fiscal policy can work for one round of spending but is less efficient when velocity is low: Extending public debt, which effectively means borrowing money from the wealthy to spend it to produce one round of government spending which would contribute to GDP. With additional spending, some part of that increase will stimulate further increase on a second round of spending, which will trigger more rounds of increase. The amount that ultimately the GDP increases compared to how much tax stimulus is originally injected is often called the “multiplier,” which is intended to be a measure of the effectiveness possible with fiscal stimulus. But in a climate of low velocity cash, that cash can get trapped quickly as savings during successive rounds,—which means the multiplier is low. With high wealth inequality the public debt will usually increase, which has the bad effect of the future interest that must be paid in taxes to service the public debt, generally to those of higher wealth.

Tax policy was very successful after great depression in the 1930’s: Nevertheless it was possible to implement successful policies to transfer money from the rich to pull out of the “great depression.” That was managed because of the World War 2 emergency. Such taxation opened up rich wallets, because it could be sold by government as necessary and patriotic duty. It is sad to reflect that it took such a terrible event to get those of high wealth and privilege to be willing sacrifice their wealth. The scare was intense enough to overcome the greed factor that normally makes this policy seemingly impossibly difficult—although the effect on the economy in this situation was fabulously successful. Taxes were increased on the wealthy and the public debt was increased, with low interest rates, all of which transferred cash from wealthy new bondholders to produce transactional cash for workers that manufactured military aircraft, tanks and other items that were consumed at a high rate to keep many more employed. Top income tax rates in 1940 went to 40%. Federal debt started rising rapidly after 1942, but private wealth of the top 1% wealth holders decreased. Federal debt increased by selling Treasuries presumably to those who were wealthy at historically low interest rates a little over 2%—which converted likely non transactional cash rapidly to spending for war. The first reference above on page 62 shows a rapid decrease of wealth for the top 0.1% of wealthy in the early 1940’s.

<https://live-equitablegrowth.pantheon.site.io/wp-content/uploads/2014/10/102014-wealth-brief.pdf>

Austerity--Paying down the public debt: very bad solution: When a household has a economic problem it can be appropriate to pay down personal debt to reduce expenses. Although because this is often sensible for a household, some think it must also be beneficial for an entire economy to pay down the national debt. I’ve already explained why paying down national debt is a very bad way to fix any sluggish economy. Building such debt up was beneficial to keep an economy functioning, and was how people could save their money as treasuries. Although paying of debt does reduce a longer term “trickle up” effect of interest, that effect is small compared to the immediate large amount of money required to pay off bonds, which would be a very bad solution because

it converts lots of transactional cash collected from taxes and pays off treasury bonds which money is likely to be held for wealth, which would reduce national monetary velocity, and GDP, and make the economy worse.

Inflation—would work, but not a great idea: Severe inflation could effectively reduce wealth inequality, and simultaneously reduce the interest burden of our economy with very high debt. If inflation were to occur equivalent to what has actually happened from 1955 to 2020 would reduce wealth to 10% of present value. That rate of inflation was an average of 3.5%/year from 1955 to 2020. If we had severe inflation of 53%/year for 3 years that would achieve the same (questionable!) effect. This would be a flat tax on all financial wealth which even the wealthy could not evade. But it would be most harmful to those with low wealth for whom all their savings may be necessary for a decent retirement. Those with wealth in the hundred million dollar range would likely still have enough to get by even with very severe inflation, which would be a sufficient amount to make an important dent in wealth inequality. One of the loud arguments heard against a wealth tax is that people with high wealth could avoid it with clever accountants. An advantage with the inflation solution is that there is no way that anyone, including the wealthy, could fail to pay the full financial amount of the tax. Inflation would not touch the “real” value inherent in real assets, such as housing, which is often the largest wealth component of many people of lesser wealth, and it would reduce the burden on those who have mortgage on their housing. It also would not touch industrial production capital capable of producing real goods/services. This could fix the high wealth inequality problem, but causing very severe hardship on far more people of lesser wealth.

Very high crash in bonds and stocks: An instantaneous bond or stock market crash that happened so fast that no one would even have time to substitute cash—so no cash would suddenly be sequestered. If it happened slowly, however, as it occurred some considerable quantity of wealth could be transferred to cash instead while the markets collapsed. With a bond market of \$40T, and a cash market of \$10T, this could convert a large amount of cash into non transactional form, such as happened just after 2010 as demonstrated by the rapid loss of velocity at that time.

Debt jubilee: This is similar to a crash on bonds. Just eliminate all debt, which would also, since financial debt is wealth possessed by the wealthy, this would eliminate high wealth inequality.

Summary on fixing a vexing problem: To fix a “difficult to fix” recession/depression caused by high wealth inequality, such inequality needs to be counteracted. Debts must disappear, thus reducing the “trickle up” effect of interest that puts a drag on GDP. That would allow new debt to be created with an economy not dragged by interest payments, which, as explained in section 2, would enable new debt to be created to serve the purpose explained in section 1 and 2 that allows saving. Not only would the burden be reduced by interest flow draining the economy of demand for goods/services, interest rates would likely rise again allowing velocity to rise as well, increasing the ability of money to serve the exchange of goods and services, rather than being held as wealth, increasing employment and GDP for participation of a larger percentage of citizens. This appeared to be the pattern following the 1930’s depression, during the WW2 period from 1940-1945. Could this be accomplished today without the terrible consequences of that war?

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The situation now: Describing the economy in 2021, using the analysis based on this essay. This will be written later.

Wealth inequality-high

very low interest

very low monetary velocity

Very high wealth and therefore corresponding debt.

Fed that sees its duty to guard the wealth, as a consequence unprecedented money printing, that is used to substitute questionable bonds and stocks to prevent “economic disruption.”

Fed fears monetary expansion will cause severe inflation. But low interest rate causes monetary velocity makes liquidity trap.

Fed fears monetary contraction will cause crash of bond/stocks. Financial wealthy interpret expansion as necessary crash insurance.

Try to steer a “middle path” requires slow, infinite increase of money to substitute for bonds/stock when they wobble. Meanwhile increase of money creates more risky stock.

Concern for possible inflation—but during period of high unemployment.

Impossibility of the wealthy relinquishing their money, thus political influence.