

# Myrmikan Research Report

## The Liquidity Theory of Money Applied to Operation Twist

December 15, 2011

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### Summary

The purpose of investing in the market is to make money. In aggregate, most investors succeed. Markets generally go up. But, money is only useful to the extent it reflects wealth. Since most investors lack a coherent theory on the nature of money, it should not surprise that most fail in their ultimate goal of acquiring wealth through the market.

This report examines the nature of money and explains why Carl Menger's liquidity theory of money provides a better model than the standard quantity theory to describe the historical development and usage of money.

Melchior Palyi's writings expand on Menger's framework to show that the liquidity of the asset side of a central bank's balance sheet determines the value of its liabilities. He argues that future assets are inherently illiquid and, therefore, as future assets accumulate on the balance sheet of a central bank, its currency becomes more unsound.

From this perspective, programs like Operation Twist are massively inflationary, though not immediately. History provides many examples of the dynamics described by Menger and Palyi. The only distinguishing characteristic of current affairs is the scale upon which central banks now operate.

### Money is Liquidity

Carl Menger founded the Austrian School of Economics by developing the concept of declining marginal utility. From his core principles emerged a coherent theory of money, something that had eluded philosophers over thousands of years. As Menger wrote in his 1892 essay *Origins of Money*:

It is obvious even to the most ordinary intelligence, that a commodity should be given up by its owner in exchange for another more useful to him. But that every economic unit in a nation should be ready to exchange his goods for little metal disks apparently useless as such, or for documents representing the latter, is a procedure so opposed to the ordinary course of things, that we cannot well wonder if even a distinguished thinker like Savigny finds it downright "mysterious."

Menger's theory is so elegant, it has defied improvement. Every asset or good has its own level of liquidity, a concept distinct from value. For example, a fine painting may be

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valuable, but may not be liquid. If a collector under financial stress must sell his art collection suddenly, the prices he receives will be less than if he can wait for decent offers.

Every person who holds a good beyond his marginal use wishes to trade that good for another of which he is more in need. Assuming he cannot find a barter counter-party who has precisely the goods he wants in exchange (nearly always the case), he will trade his goods:

for other goods which, while he does not want them himself, were nevertheless more liquid than his own. By doing so he certainly does not attain at once the final object of his trade, to wit, the acquisition of goods needful to *himself*; yet he draws nearer to that object. By the devious way of a mediate exchange, he gains the prospect of accomplishing his purpose more surely and economically than if he had confined himself to direct exchange.

Money is, therefore, not a thing separate and distinct from other things, but rather an attribute. All goods have different degrees of moneyness. The colloquial definition of “money” is simply that good that is the most liquid, allowing for the mediate exchange from one relatively illiquid good to another at the lowest cost.

Liquidity has both *spatial* and *temporal* attributes. For contemporaneous exchange: 1) the spread between bid and ask and general transaction costs must be small, 2) the amount available at the bid and ask must be large so that large trades do not move the market, 3) surety of contract arising from recognizability is critical, 4) uniformity and divisibility must allow for arbitrary amounts to trade, 5) transportation costs must be low to minimize settlement costs, and 6) general acceptance is required.

Temporal requirements include: 1) indestructibility, 2) low storage costs, and 3) a stable value over time and in all market conditions. This last attribute is critical. The more stable the value, the longer the holder of money can wait to perfect his mediate exchange, and the broader his options are. A long price history, therefore, is required to give confidence in both short and long-term price stability. Stable value is a prerequisite for savings, upon which all capital accumulation depends.

Menger’s theory explains the historical development of money. Copper was money before gold. Copper is plentiful, and thus it was the first metal of which primitive man was able to mine enough to make liquid. It was traded in shekels, a unit of weight. The ancient Greeks popularized coinage in the 7th century B.C., using silver as the preferred commodity. Silver’s inherent liquidity attributes are superior to copper, once supply and distribution had sufficiently expanded, and coinage added still more liquidity by standardizing quantity and grade. Gold coins first achieved general distribution under King Croesus in the mid-5th century B.C. Gold’s scarcity and high value, however, made it less suitable than silver for small transactions. Thus, a bimetallic system ruled for millennia with gold utilized for capital transactions and silver for daily transactions in goods (copper retained a role in subsidiary coinage). Gold and silver have performed as money in every society where available in sufficient quantity, except when suppressed by the state, because they are the most liquid elements yet known.

Many casual observers of current monetary debates (such as the wisdom of restoring a gold standard or the consequences of a collapse of the dollar) wonder why society will necessarily choose gold as money, as opposed to some other good, such as platinum or oil. The theory of liquidity provides the answer. Platinum is not widely distributed and the supply is unstable since the stock-to-flow ratio is low, and oil has large transportation and storage costs. If another good were to become more liquid than gold, then it would, indeed, replace gold as the primary monetary element. For example, cigarettes become money in prisons because they are the most liquid good in that environment. Yet, over thousands of years

no element more liquid than gold has appeared, and the requirement of a long price history makes it unlikely gold's role will be supplanted in the foreseeable future. However, if no good has been able to supplant gold, man's genius has discovered ways to increase gold's liquidity, first by the coin and then beyond.

## Credit Inflation

Coinage was a dramatic improvement to ingots, but there were risks to the money holder. The many sovereigns of the world issued coins of diverse purity and size, and older coins become worn, sweated, and clipped, making valuation difficult. Worse, whatever the stamp might say about the content of the coin, sovereigns often cheated by replacing a portion of the precious metal with base metal. Small variations were hard to detect, but coins could become debased over long periods of time. For example, the Roman denarius was 98% silver in 33 A.D., but only 1% silver by 290 A.D.

The Bank of Amsterdam was established in 1609 to improve upon the illiquidity of coinage. Its sole function was to accept deposits of gold coin and bullion, weigh them consistently, and issue its own notes against the gold collateral. All bank notes were backed 100% by gold. They were more liquid than coins because they were perfectly standard. This additional liquidity caused the notes to trade at a premium to gold itself, enabling the bank to profit by charging for its services. Traders did not seek the bank money because it was more valuable (the bankers took most of the value anyway), but because the notes were more liquid.

Modern economists closely follow the money supply, i.e., the number of bank notes issued by central banks and credit accounts at private banks. The *quantity theory of money*, the prevailing theory in current economic thought, holds that any issuance of additional fiduciary media causes inflation: money is less scarce and, therefore, less valuable. Though seemingly self-evident, this theory is directly challenged by the success of the Bank of Amsterdam, which supports Menger's *liquidity theory of money*. It should be obvious that no inflation could occur no matter how many bank notes the Bank of Amsterdam issued, as long as it complied with its charter. For all the new money issued (bank notes), an equal amount of money (gold) was withdrawn. The price level remained the same.

It should also be clear that Bank of Amsterdam notes were mere tokens. They had no inherent value beyond the backing given to them by the bank. If coinage involves trust in the minter, paper money requires trust in the issuer. The Bank of Amsterdam eventually yielded to the same temptation to which the more ancient goldsmiths had succumbed. Observing that few ever redeemed their bank notes for gold, the Bank of Amsterdam began to print unbacked notes to lend out their gold collateral at interest against productive assets. It soon collapsed.

Lending collateral causes credit inflation and an economic boom at first, then credit deflation and economic collapse. A good case study to illustrate the point is the Banque Générale, founded in 1716 by John Law. France's monarchs had driven the country into massive debt, and the overlapping privileges of the nobility made economic growth impossible. Misdiagnosing a lack of money to be the cause of the economic crisis as opposed to an effect, Law proposed a bank that would monetize the country's vast assets. Under Law's scheme, a person could provide a security interest on real property and receive a loan in bank notes in exchange. Law argued the bank notes would remain valuable because they were "backed" by the property.

The illustration below reveals the problem:

1. Merchants go to market and set a price level with their gold.

2. The merchants go to the bank, pledge a future interest in their real property due in 30-years and receive bank notes in return.
3. The same merchants go to market again. They still have all their gold, but now they have bank notes as well. As they bid on goods, the price level rises.
4. As the price level rises, the price of property rises as well, enabling the merchants to borrow more against their property, introducing even more bank notes into the economy. The result is an inflationary feedback loop, in Law's case the Mississippi Bubble.

The operations of the two banks reveal the difference between cash money and the promise to pay value in the future. The Bank of Amsterdam merely swapped one current asset for another, superior current asset, increasing liquidity. The Banque Générale created a new current asset, additional purchasing power, backed by future interests in highly illiquid assets. Credit inflation is not caused by the number of bank notes issued, but by the nature of their backing.

Austrian Business Cycle Theory explains why credit inflations cannot continue indefinitely. In a free market, money (savings) is held by savers and demanded by borrowers. The interaction of supply and demand determines the interest rate, the price at which money is loaned. If the banks expand the supply of money substitutes (purchasing power), then interest rates decline, which fools the market into thinking there is more savings than actually exists. Artificially low interest rates create an excess of long-term projects because net present values appear higher when future cash flows are discounted at a lower rate. But, society lacks sufficient real savings to fund and sustain these long-term projects. When they fail, the savings expended on them and the credit lent against them are lost.

The Banque Générale's demise does not imply that banks should not make long term loans. On the contrary, if the bank has depositors willing to buy 30-year certificates of deposit, meaning they cannot withdraw their gold for 30 years, then 30-year bank loans will not be inflationary. In this case, when the borrower bids at market with his borrowed bank note, the gold coin backing it has been withdrawn from circulation defeating the inflationary cycle.

The problem with the structure of Banque Générale is that distinct parties, the depositor and the borrower, have use of the same gold coin at the same time. As long as the credit cycle is driving values higher, both parties remain blissfully ignorant of their situation. The crisis arrives when the credit bubble pops, and prices begin to fall. The nervous depositor attempts to withdraw his gold only to discover it is gone, lent out by the bank.

The liquidity theory of money argues that *inflation is independent from the number of bank notes issued by banks*. Banks can issue unlimited amounts of notes without causing inflation as long as they are backed by current, liquid assets such as gold or short-term commercial bills representing goods in the chain of commerce (see Appendix on why commercial bills are current assets). And, these tokens have value only because of the backing provided by the banks' assets, except in limited circumstances discussed below. Banks can also allocate capital by receiving long-term deposits to make long-term loans. However, if banks issue notes (current liabilities) against long-term loans (future assets) then a credit inflation occurs. Moreover, the more distant into the future the asset being discounted, the greater the temporal distortion created by manufacturing current purchasing power against it.

## Monetary Inflation

In ancient times, monetary inflation was caused by sovereigns' reducing the precious metal content of coins, making them less valuable and less liquid. The modern printing press is far more efficient, but the mechanism is almost universally misunderstood. There are few examples of governments that have simply printed unbacked paper money, yet paper money inflation is universal. Under modern banking systems, monetary inflation is the obverse of credit inflation.

Private banks generally accept claims on real estate as collateral, the reason there have been so many real estate bubbles in the model of John Law's Banque Générale. When a banking system issues current liabilities (purchasing power) against financial securities, the primary result is a stock market bubble. Central banks differ from private banks in that they generally issue liabilities backed by government bonds. In fact, most central banks were formed specifically to aid the state in borrowing money, such as the Bank of England, or were quickly co-opted for that purpose, such as the Federal Reserve.

Just as with private banks, when a central bank creates new current purchasing power against a future government promise it creates an economic boom. The new purchasing power surges into the economy via the government increasing aggregate demand and the size of the state. During the boom, the government easily collects the taxes it needs to support the enlarged state sector and the interest payments on its bonds. The artificially low interest rates seduce the government into borrowing ever more money for the public good and private graft. As long as the boom continues, the bonds will be well bid in the market, and the currency backed by the bonds will retain its value.

The government bond bubble is no less distorting than the real estate bubble. The additional purchasing power is not the result of savings or productivity gains, but is artificial and unsustainable. Money pours into malinvestments which eventually choke the economy and tax revenues. The increasing size of the state also diminishes economic activity. Tax revenues decline, and the market discounts the value of the government bonds. As the assets on the central bank's balance sheet decline in value, so do its liabilities, i.e., its currency.

The central bank can support the debt markets by buying bonds in the open market. This will slow the monetary inflation temporarily, as long as the bonds remain well bid in the market. But, the newly issued currency is backed by worthless government promises. It has ever less inherent value. When the bond purchases cease, then the value of the currency faces a disorderly decline.

Central banks do more than just sustain government debt markets; their stated mission is to protect the integrity of the banking system during liquidity crises. But, the liquidity they provide is artificial and actually reduces systemic liquidity.

Melchior Palyi was a Hungarian who became chief economist at Deutsche Bank and then an advisor to the Reichsbank from 1931 to 1933. His 1936 essay *Liquidity* describes the dynamics of how a credit collapse in the private banking sector transforms into a monetary inflation.

In a fractional reserve banking system, banks must continually roll over short-term obligations to finance their long-term loans. They must form quasi-alliances with borrowers to ensure solvency. If a borrower experiences a setback, the bank will be ready to aid it with additional short-term credit to prevent the total loss of the long-term obligation. In this way, the fractional reserve banking system distorts the economy toward the formation of large scale, vertical industry over small, horizontal commercial enterprise. For example, the small,

flexible commercial store, where the owner knows all of his customers and their preferences, cannot compete with the efficient but soulless chain store competitor that has access to manufactured credit. The result is every town in America is a clone of every other (except in rich enclaves).

The financial effect of artificial long-term credit creation reflects the distortion in the economy. Whereas gold is the most liquid asset, and discounted commercial bills are current assets because they self-liquidate into gold (see Appendix), long-term loans liquidate only over very long, stable time periods. In a liquidity crisis, the liquidity demands of the bank's creditors rise, but the long-term loans remains illiquid. There no way to force borrowers to pre-pay. An individual bank can liquefy its long-term loans by selling them, but such sales do not actually liquidate the loans, they merely shift them to the balance sheets of other banks. The banking system as a whole cannot liquidate long-term loans because they reflect the value of long-term, inflexible assets. When the short-term credits from which long-term loans were created are withdrawn, the long-term assets must be written down to their spot values. In Palyi's words: "A liquid structure never liquidates; only the illiquid one comes under the pressure of liquidation."

The Federal Reserve was formed at the behest of the large banks after the Panic of 1907. Its purpose is to be the lender (more accurately the liquidity provider) of last resort. Palyi points out that a central bank is not exogenous to the banking system. If a central bank discounts long-term loans from the commercial banks, then its balance sheet also becomes illiquid, and there is no further entity to which it can shift the offending assets. Stuffed full of long-term, illiquid malinvestments, a central bank loses any power to intervene to support its currency. If it sells its short-term liquid assets to buy back its currency (to reduce supply), it merely accelerates the decline by raising the proportional backing of its notes with illiquid assets. All the wealth destruction caused by the malinvestments of a credit cycle then falls to the holders of currency through monetary inflation as opposed to creditors of illiquid banks through default.

In the appendix to his essay, "Illiquid Central Bank: Graveyard of the Currency," Palyi emphasizes why a central bank should never accept long-term assets onto its balance sheet:

When the national credit and the national currency are "tapped" in order to maintain "full employment," full employment might be maintained. The money market can be kept liquid indefinitely if the Treasury prints certificates and the Federal Reserve monetizes them. But what happens to the liquidity of the monetizer?

. . . The old-fashioned technique of paper money inflation "worked" faster than its modern, seemingly less reprehensible counterpart that camouflages the production of fiat money by channelling it through the money market and the central bank. The latter's liquidity consists exclusively of its gold reserve that tends to decline in proportion to its liabilities. The attrition of the gold reserve accelerates when the gathering of inflationary expectations induces non-resident owners of dollar balances to withdraw them (with residents joining, too). There can be little doubt of the final outcome, unless the process is brought to a halt.

A central bank that holds only gold and commercial bills maturing into gold can produce a bank note more liquid than physical gold itself. But, as Palyi warns, a central bank that replaces its gold backing with illiquid assets creates first volatility in and then destruction of its notes, as the fates of most central banks have shown. Menger's liquidity theory of money rejects the possibility that a token backed by illiquid assets could long perform the function of money.

## The Fallacy of Fiat Currency

The liquidity theory of money is not the mainstream view. Virtually all academics adhere to the quantity theory of money. Henry Thornton, considered the best monetary theorist of the 19<sup>th</sup> century, was an eloquent defender of the quantity theory. Perhaps his most frequently cited quotation on the subject reads:

There remains, therefore, no other mode of accounting for the uses to which the additional supply of it [Bank of England paper] can be turned than that of supposing it to be occupied in carrying on the sales of the same, or nearly the same, quantity of articles as before, at an advanced price, the cost of goods being made to bear the same, or nearly the same, proportion to their former cost, which the total quantity of paper at the one period bears to the total quantity at the other.

Because he believed quantity of bank money determines the price level, Thornton argued that in a liquidity panic the central bank should never allow “materially to diminish the sum [of paper money] in circulation, but to let it vibrate only within certain limits.” He then prescribed how this is to be accomplished in a redeemable currency:

. . . the holder of a note of 1000 pounds . . . carries it to the Bank and demands 1000 pounds in gold. The Bank gives the gold. . . . The Bank, therefore, having paid away this 1000 [pounds] in gold, and having received for it their own note for 1000 pounds must now re-issue this note, if they are resolved *to maintain the amount of their paper circulation*. How, then, is the Bank to issue it? The only means which the Bank, on its part, is able to take for the extension of its paper circulation is to enlarge its loans. [Italics in original]

Thus, the theory of the central bank as lender of last resort was born along with the fallacy that replacing gold reserves with loans has no effect on the value of paper money if its supply remain constant.

The Bank of England took Thornton’s advice. In the late 1810s England returned to redeemability of notes into gold, which had been suspended during the Napoleonic Wars. Suffering a period of deflation as the excess paper naturally drained away in anticipation, the government agreed to let the bank discount mortgages to add more paper money back into the economy. These mortgages were completely illiquid – some of the original mortgages stayed on its books until the late 1860s. Sensing the danger, the bank stopped the practice in 1824, precipitating the Panic of 1825. Mortgages made up a small enough portion of the Bank of England’s assets that the bank survived, but Henry Thornton’s bank collapsed.

If Thornton was misguided about the nature of bank notes, at least he understood that notes require backing to have value. Current monetary theory expands the quantity theory to claim that the entire world now operates under a fiat currency system. The technical definition of fiat currency is token money that has no backing. It has demand from interest payments and taxes with supply limited by a (hopefully responsible) central bank. Changes in the quantity, which affect supply and demand, directly cause changes in its value. Without state sanctioned demand and scarcity, it would be worthless. The economic school of thought devoted to this idea is called “chartalism” from the Latin *charta* meaning token.

Yet, there are no examples of this kind of currency. There are many historical instances of commodities that took on monetary attributes through the process described by Menger, such as wampum, cigarettes, and gold, but never a worthless token that had value without

backing. All paper currencies have had assets backing them, including in socialist states such as the Soviet Union and totalitarian states such as the Yuan Dynasty.

It is instructive to note that all so-called fiat currencies have emerged from commodity standards. For millennia, gold and silver had coexisted in the market playing their different roles. When states first took control of money, they set established ratios of gold to silver. If the market price deviated, then one of the metals would disappear. For example, if the ratio were set at 16-1 silver to gold, and the market ratio fell to 15-1, economic agents would rush to the treasury to convert their gold into silver. They would then melt the coins, export the metal, buy back the gold at a profit, and repeat. Managing a bimetallic standard proved impossible.

The solution was brilliant. States became mono-metallic on a gold standard and turned silver into subsidiary coinage. For example, they would issue a \$20 gold coin containing the full \$20 of gold, while at the same time issuing \$1 silver coins containing only \$0.90 of silver. Because the silver content was less than the face value, there was no incentive to melt the coins. In reality, the silver coin represented a credit claim on the gold coin that was 90% collateralized and convertible on demand. Gradually, the silver collateral was reduced. The gold coin was replaced with a gold certificate, a bank note collateralized by the gold reserves at the central bank. Finally, governments defaulted on the obligation to redeem the gold notes, even though the gold at the central bank remained intact.

Chartalists argue that modern bank notes are not redeemable for gold or anything else, and therefore the backing cannot influence the value. The assertion is incorrect. The market will impose a value on the notes equal to the value of their backing whether or not they are redeemable. To illustrate, in colonial America private bank notes would tend to depreciate the further they traveled from the issuing bank. Healthy banks would sell sound assets for gold and send agents to distant towns to buy back their own notes at the discount, making a free profit and maintaining the soundness of their notes. In contrast, unhealthy banks with impaired assets were powerless to act, and their notes would properly depreciate. Publicly traded companies operate the same way. Healthy companies buy back their bonds if the value of the securities falls below par. Just the threat of action keeps market discipline.

Conversely, notes will generally not trade above their asset value. Market players holding overvalued notes risk that the note-issuing institution will issue new notes at the above value price and earn a free profit. They will convert into other assets by spending them, before others do the same. Banks and companies are in a position to create volatility in their own notes and profit by trading them. But, the more volatile the notes, the less temporally liquid they become, and the fewer agents will accept them in trade. In this case, the notes may retain value, but the spread between bid and ask will widen, and they will not circulate.

In a credit inflation, borrowers tend use debt to bid up asset prices beyond where cash flow can support the interest payments. They rely on rising asset prices to stay solvent. Any disruption in cash flows causes the Minsky moment of collapsing liquidity, falling asset prices, and the scramble for currency. There is no doubt that during cascading debt collapse the value of a currency can spike sharply higher, especially as the largest debtors, the banks, default. It is in this case that the quantity theory of money makes a temporary appearance: increasing demand of a good relative to supply must increase its value, even in the case of worthless tokens. In fact, the market provides many examples of this phenomenon, for example, worthless equities that, on their way to zero, often experience short squeezes as overeager speculators are forced to deliver suddenly scarce stock certificates. But, these squeezes do not alter the inevitability of the equity value of an insolvent firm heading toward zero. As the shorts either deliver *or default*, demand dissipates, and the plunge toward true economic value will continue.



A short squeeze in a stock will soon dissipate as equity holders exploit above market prices and distribute shares to the shorts. A squeeze in a currency may persist. To illustrate, imagine a private bank that issues its own notes, as in the 19th century. It issues 100 each to three farmers at 10% interest due in one year secured by the farms. A year later the farmers owe collectively 330 notes. But there are only 300 notes in existence. Each of the three farmers must scramble to obtain notes to pay their debts. Not all can. The one that doesn't loses his farm. The value of the notes shoots up.

As an aside, the origin function of gold clauses in debt contracts was to avoid the situation described above -- the farmers could pay back in gold if they so chose, protecting them from manipulations by the bank. Only later did the purpose of gold clauses change to protect the lender from a diminution of national, legal tender currencies.

Assume one farmer defaults. The bank takes his farm. But, he still has his 100 notes or, at least, they are still in circulation. Now, there are 300 notes in circulation, and only 220 notes worth of demand. The value would collapse -- except, the bank has a farm it can sell and go into the market to buy its notes back, supporting demand. If, instead, there were no collateral (perhaps the bank overlooked a senior lien), then the bank would not be able to do anything to support its notes. The market would face a supply/demand imbalance that would cause the notes to plummet in value, since, in this latter case, they were only held aloft by demand and not by assets backing them.

Applying this analogy to current affairs, there is the view that demand for dollars to service interest payments is the primary force that maintains their value (collected taxes are usually immediately spent back into the economy neutralizing their effect on aggregate demand for dollars). Dollars are created by the Federal Reserve when it buys bonds denominated in dollars. This means every dollar is loaned into existence and carries an interest obligation. Even if one economic agent holds a dollar debt-free, there is some other agent who owes that dollar plus interest back to the central bank (mostly via obligations to a private bank). In other words, the entire dollar economy is caught in a continuous short squeeze. But, where do the dollars to pay the interest come from? The Federal Reserve must issue new dollars, and those new dollars also carry interest obligations. As a result of this positive feedback loop, the Federal Reserve must increase the supply of dollars at an exponential rate to avoid a debt collapse. The Federal Reserve has never shrunk the monetary base for a continuous period, nor can it without dire consequences.

If the liability side of the Federal Reserve's balance sheet grows at an exponential rate, so does the asset side. The Federal Reserve is already the largest holder of Treasury bonds and the largest incremental buyer of mortgage debt. As the need to grow accelerates, it will buy other assets, perhaps following in the Bank of Japan's example of buying equity securities and ETFs. The final maneuver is the "helicopter drop," issuing currency with no liabilities, in an effort to defeat the exponential curve and allow debtors to pay interest. As it expands its balance sheet, the quality of assets backing the currency must continually diminish, and the disconnect between the economic value of the dollar and its artificial value, held aloft by squeezed borrowers, increases relentlessly.

When the Federal Reserve issues more dollars than needed for societal interest payments, the squeeze on borrowers lessens, and the value of the dollar *qua* token declines. However, aggregate future interest payment requirements will increase, forcing future issuances to accelerate. Conversely, if the Federal Reserve fails to issue enough dollars to fit the exponential demand curve, the initial result is a short-squeeze followed shortly thereafter by collapse. It is the demand for dollars from *performing* debtors that raises the value above its backing.

Hyperinflations always affect highly indebted countries and always strike suddenly. The common explanation is that there is a psychological moment when holders of currencies realize it is worthless and abandon it. But, pleading “animal spirits” is not a satisfactory answer. A better theory is that a society-wide short squeeze can elevate a currency’s value for a period of time as long as debts are near universal and serviced. But, once a critical mass of borrowers actually defaults, demand dissipates, and the currency plunges to seek its economic value as determined by the asset side of the central bank’s balance sheet. Private defaults merely rearrange which parties hold the currency. It is defaults by assets held by the central bank, or alternatively the helicopter drop, that break the short squeeze. And, since central banks hold mainly government bonds, there is no collateral to be had. The asset side of the balance sheet is left barren and the currency worthless.

Dying currencies experience huge volatility. As a central bank prints ever faster in the attempt to devalue its currency to allow debts to be serviced, there is a scramble to borrow funds as an increasing number of economic agents realize there is a free-profit in borrowing currency to buy hard assets. The long-term analysis may be correct, but as the short positions build, the short squeezes become ever more violent. All but the lucky (or connected) are wiped out.

The quantity theory of money is applicable only in the limited circumstances described above, which cannot be sustained. When central banks print money in this context, money devalues not because of a supply/demand shift in the relationship of money to commodities, but a supply/demand shift in the temporal relationship of present currency to future debt repayment obligation. For private debts, collateral is what binds the monetary plane to the physical world of assets and goods. For public debts, the willingness to use police power to enforce taxes keeps the system intact. But, in the physical world, exponential trends must peak and collapse. Such a monetary system may be possible but not sustainable.

Historical evidence supports the liquidity theory of money over the quantity theory. In a 1981 paper for the Federal Reserve Bank of Minneapolis, Thomas Sargent (who recently won the Nobel Prize in Economics) examined the balance sheets of the central banks of Austria, Hungary, Poland, Germany, and Czechoslovakia during their hyperinflations and subsequent stabilizations in the 1920s. In all five cases, the central banks bought large quantities of government debt that had no hope of being repaid because of large government deficits. In other words, the banks emitted a stream of new notes that had almost no backing at all. In all cases, depreciation initially lagged the decay in the assets on the balance sheets, but then devaluation occurred at a much greater rate than the quantity theory of money would suggest. For example, in 1921-1922 the Austrian note circulation increased 39 times, but the retail price index surged 110 times. The other cases are similar.

The most persuasive part of the paper concerns the periods of stabilization. In Austria, the value of the currency stabilized in August 1922 and remained so even as the monetary base sextupled over the subsequent two years. Unlike in the hyperinflationary period, the new notes were issued against gold, foreign assets, and good commercial paper. The cases of the other countries was exactly the same: bank note issuance grew rapidly after stabilization, but the notes were backed with good collateral, and there was no inflation.

The flaw in the quantity theory of money is that it assumes there are two and only two classes of asset: monetary and non-monetary. Because of this false dichotomy, the definition of money has continually fluctuated: first just specie, then specie plus bank notes, then Thornton expanded the definition to include demand deposits, then silver was removed, later abstractions such as M2 and M3 were added. Irving Fisher, who lost his fortune in the crash of 1929, refined the theory to quantify interactions with velocity as a plug to explain why prices did not respond as predicted to changes in the quantity of money. In a 1989 report,

the Bank of Canada examined 46 different ways of determining the money supply. Milton Friedman concluded: "There is no unique way to express the real quantity of money," yet he and most other academics and policy makers continue to use it as their theoretical foundation.

There is a more elegant solution. Money exists in the market to facilitate trade. The quantity and even identity of money is amorphous, defined by liquidity. The attempt to control money, such as imposing a fixed ratio of silver to gold, or squeezing the populace through debt contracts, causes the great monetary dislocations. Banks have a role to play in making current assets more liquid, but it is beyond their power to redefine what money is.

## **A Brief History of the Federal Reserve**

Central banks in the gold standard era held mostly gold and short-term debt as assets (unless they were hyperinflating). The Federal Reserve's first balance sheet, in 1914, reports that it held 70% of its assets in gold with almost all the remainder in legal tender notes and short-term bills. The original Federal Reserve Act stated: "Notes, drafts, and bills admitted to discount under the terms of this paragraph must have a maturity at the time of discount of not more than ninety days." Moreover, the Act constrained the central bank to traditional banking activities:

any Federal reserve bank may discount notes, drafts, and bills of exchange arising out of actual commercial transactions; that is, notes, drafts, and bills of exchange issued or drawn for agricultural, industrial, or commercial purposes, or the proceeds of which have been used, or are to be used, for such purposes . . . but such definition shall not include notes, drafts, or bills covering merely investments or issued or drawn for the purpose of carrying or trading in stocks, bonds or other investment securities, except bonds and notes of the Government of the United States.

Except for the proviso concerning government securities, one could argue that the Federal Reserve looked similar to the Bank of Amsterdam, balancing one current asset against others. The drafters even understood that discounting bills is inflationary if they fund investment, no matter how short-term, rather than commercial bills, which are current assets because they self-liquefy into gold (see Appendix for a discussion of the Real Bills Doctrine).

But, the last phrase in the last sentence was critical. Almost immediately the Federal Reserve's true mission became clear. From the end of 1916, the year before the U.S. entered World War I, to the end of 1919 total assets at the Federal Reserve grew more than eight-fold from \$750 million to \$6.3 billion. More importantly, the percentage of government securities held increased from less than 9% to over 28%. The Federal Reserve managed to create a credit bubble merely three years after it began operations, resulting in the Panic of 1921.

Perhaps chastened by the experience, government debt on the Federal Reserve's balance sheet remained fairly stable during the 1920s. By the middle of 1929, assets at the Federal Reserve totalled \$5.1 billion with gold comprising 56% and government debt comprising 13%, a significant part of the war debt having been paid off. It would be hard to conclude by examining its balance sheet that the Federal Reserve had recklessly caused the largest financial bubble the world had then seen.

The 1920s experienced a credit bubble from a different source: commercial banks. As Murray Rothbard wrote in *America's Great Depression*, "Only a negligible amount of this [monetary] expansion resulted from the purchases of government securities: the vast bulk represented private loans and investments." The nature of the fractional reserve banking

system causes banks to accumulate long-term debt which they funded with on-demand deposits, resulting in extreme maturity mismatch.

When the bubble burst in 1929, bank balance sheets were loaded with long-term, illiquid debt representing the malinvestments of the 1920s. In an effort to relieve the banking system, Congress amended the Federal Reserve Act in 1932 to allow temporarily the Federal Reserve to lend on “time or demand promissory notes secured to the satisfaction of such Federal reserve bank,” a change soon made permanent. In other words, the Federal Reserve could now accept anything it wanted onto its balance sheet.

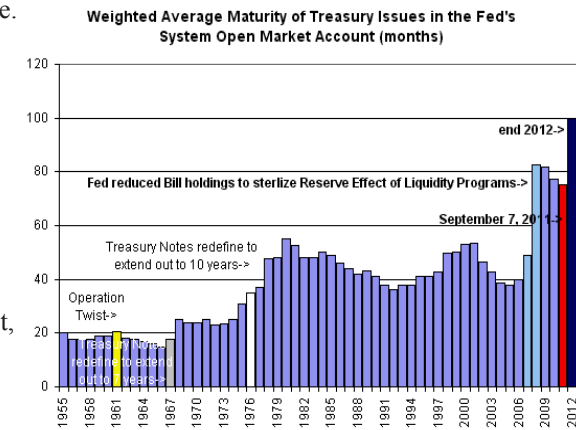
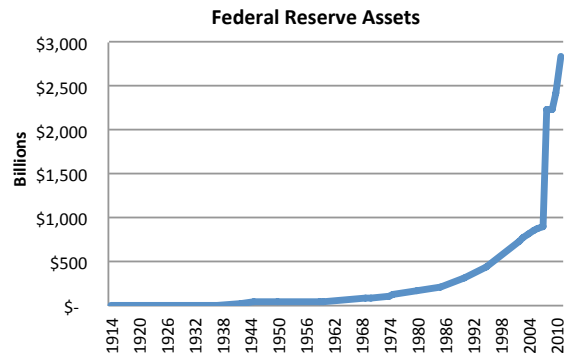
And it did. But not at first. Through 1933 the banking system imploded in a deflationary debt spiral as the illiquid long-term loans held by the commercial banks were forced into liquidation, wiping out the short-term deposits backed by them. Even armed with its new powers, the Federal Reserve was too constrained by the habits of traditional banking to act. But, the destruction of basic central banking principles in 1932 altered the central bank’s traditional role. Since then, the Federal Reserve has expanded its balance sheet at an ever faster rate and, more importantly, has lengthened the maturity of its assets.

By 1970, when the U.S. was still officially on a gold standard, gold had declined to 12.4% of the Federal Reserve’s assets, with government debt at 70%. In its most recent balance sheet, the Federal Reserve reports its official gold holdings as 0.39% of its assets and government debt as 59%. The government debt component (which had reached 90% of assets by 2006) has been partially replaced by a blend of exotic mortgages of unknowable duration (if interest rates fall, the holders will tend to refinance, shortening duration, and vice-versa).

The Federal Reserve began based on the model of the Bank of Amsterdam. It was designed to increase liquidity using a basket of current assets to create a uniform, superior current asset. Now, near the end of its existence, the Federal Reserve looks like the Banque Générale, creating purchasing power against long-term, illiquid assets.

### Gold as a Measure of Inflation

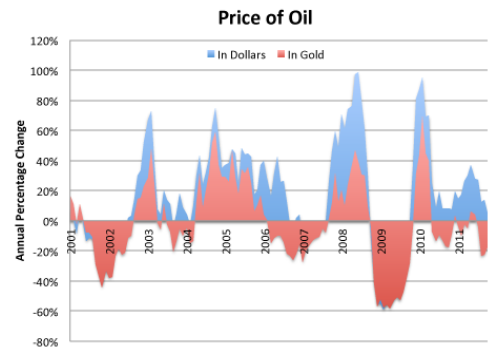
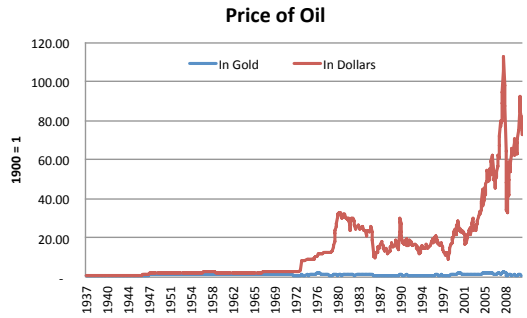
Money is the asset which allows the swapping of illiquid goods at the least cost. In terms of contemporaneous exchange, the dollar is unquestionably the world’s money: it is accepted nearly universally, the spread between bid and ask is tiny, and there is great market depth (virtually unlimited amounts of dollars can be sold or bought at the bid or ask).



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However, as the chart at right shows, anyone using the dollar for mediate exchange needs to act quickly; the dollar has not been an efficient store of value since the link to gold was broken in 1971. The chart below shows that since 2001 the dollar price of oil has been more volatile on increases in price, and the gold price of oil has been more volatile on decreases in price. In other words, when going to market to perfect a mediate exchange, the holder of dollars is more likely to be surprised by a diminution of value, whereas the holder of gold is more likely to be surprised by an increase in value. Oil is the most important commodity in an industrial economy, and other commodity charts are similar.

As ever more retail gold exchanges open worldwide, and new wholesale gold exchanges spring into existence, such as the Shanghai exchange where gold can now be traded directly for yuan, spatial liquidity for physical gold will increase. As physical gold's spatial liquidity increases, economic agents will be less willing to hold credit money such as the dollar.



However, contrasting gold against the dollar misses the point. The link from gold to dollars was broken in 1971 *de jure*, but the liquidity theory of money suggests that the dollar is still *de facto* backed by the gold on the Federal Reserve's balance sheet. Dollars are merely tokens, mostly backed by Treasury bonds. And Treasury bonds are merely contracts . . . to deliver more dollars. The reasoning is not as circular as it seems, as the following example will illustrate.

Imagine a bank that starts with 100 ounces of gold and issues 100 notes. Each note is worth 1 ounce. Now imagine the bank lends 100 notes to a merchant against good collateral, worth more than 100 ounces. The bank's assets now consist of 100 ounces of gold plus a secured bond worth at least 100 ounces. Its liabilities are 200 notes. Each note will trade at 1 ounce if the market is confident either that the merchant will repay or that the merchant's collateral is available and really is worth at least 100 ounces of gold.

Then the government demands a loan for 200 notes. It offers no collateral, but promises to use its police powers to extract taxes from the citizens to repay the note. The bank's assets are now 100 ounces of gold, a 100 note bond from the merchant, and a 200 note bond from the government. Its liabilities are 400 notes. The notes will still trade at 1 ounce per note, even though the gold backing is only 25%, the balance being backed by promises to deliver the very same bank notes.

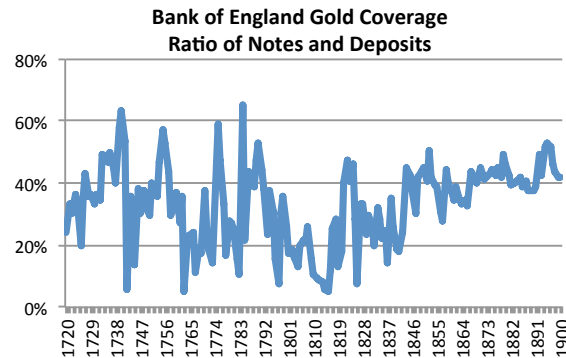
Finally, assume the government grows so large as to impair the real economy – it loses the ability to extract taxes from the citizens. The market discounts the government's promises to zero. Now the bank has only 200 ounces worth of assets, its gold and the merchant's bond, balancing liabilities of 400 bank notes. The bank's notes immediately lose 50% of their value. In other words, the price of gold in that currency doubles.

It gets worse. The merchant discovers it is now much easier to obtain bank notes to repay his debt, so he pays back his 100 notes, which are retired by the bank as it loses its claim on the collateral. The scenario ends with the bank having merely the 100 ounces of gold in assets balancing the three hundred notes outstanding, causing the notes to trade at 1/3 ounce per note, gold having tripled in price. Even though the default of the government represented only half of the bank's assets, the notes lose two-thirds of their value.

As discussed above, the Federal Reserve's official gold holding is currently 0.39% of its assets and liabilities (which are nearly identical). But the official price of gold used is \$42.22 per ounce, whereas the market price is \$1700 per ounce. Using the market price, gold represents 16% of Federal Reserve liabilities. In other words, at \$1700 gold, 16% of every base dollar is backed by gold, the remainder being backed by the Federal Reserve's portfolio of government bonds and exotic mortgages. Events that cast doubt on the mortgage portfolio or the government's willingness or ability to repay its bonds cause the bonds to lose value and the dollar's value to decline in terms of gold.



The fact that the dollar is only 16% covered by gold is not itself a problem. If the balance were made up of other current assets, such a level could be theoretically sustainable. For example, the bullion coverage ratio at the Bank of England vacillated wildly during the gold standard era, mostly in a range between 20% and 45% with extreme periods of 5% during the Napoleonic Wars and over 65% during the Panic of 1783. However, the value of Bank of England notes was fairly stable because most of the other assets on the bank's balance sheet were current assets such as commercial bills. In contrast, the Federal Reserve holds only future assets like government bonds. The credit collapses of 1921, the 1930s, and the 1970s are clearly visible on the top chart above. The current credit reset will have the same result.

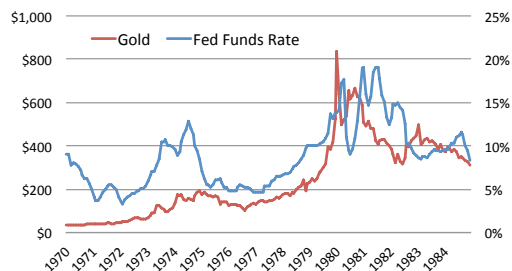


Perhaps the largest threat to the government bond market is rising interest rates, and therefore this is also the largest threat to the dollar. Rising rates cause interest payments to be more expensive, and there is a tipping point beyond which the government cannot afford to refinance its debt, as Italy and Greece have recently discovered. Moreover, a basic fact of finance is that bonds lose value when interest rates rise. And, the longer the duration of a bond portfolio, the more sensitive its value to interest rates.

During the inflation of the 1970s, there were two peaks in interest rates: one in 1975 and again in 1980. The next graph shows that as interest rates rose the market discounted the value of the Federal Reserve's bond portfolio forcing the price of gold in dollars to rise. Moreover, the first peak in rates had dramatically less effect than the second. This is partly

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because rates went higher the second time, partly because the duration of the balance sheet in 1980 had doubled since the previous episode in 1975, and partly because the Federal Reserve had sold gold into the market, reducing their reserves.



## Operation Twist

On September 21 the Federal Reserve announced it would sell \$400 billion of Treasuries of up to 3 years duration and buy \$400 billion Treasuries between 6 and 30 years duration. This policy will have varying short term and long term effects, mostly unintentional.

Federal Reserve Chairman Bernanke believes that lowering long-term rates will encourage businesses and perspective home buyers to borrow more money restarting the economy. The immediate effect, however, is to flatten the yield curve. Since the credit crash of 2008, the Federal Reserve has kept the yield curve steep. Banks are in the business of borrowing short and lending long: they were able to borrow at 0% and buy “risk-free” Treasuries at yields above 3%. This free money was providing the liquidity to help the banks stave off insolvency (and, of course, keep the government funded).

The day after the announcement, the 10-year yield fell to 1.72%, shrinking the main source of bank funding. Not surprisingly, bank equities plunged over the summer as expectations of Twist grew. The policy will not work – the banks cannot lend if they are illiquid.

The Federal Reserve claims it initiated Operation Twist to “support a stronger economic recovery and to help ensure that inflation, over time, is at levels consistent with the dual mandate.” Because of the flattening yield curve, it will not achieve the former. Thinking about the Federal Reserve’s balance sheet in the context of the liquidity theory of money reveals it will not achieve the latter either.

As discussed above, the average duration of the Federal Reserve’s balance sheet has been growing since 1932. When Operation Twist II is complete, the duration of the Federal Reserve’s Treasury bond portfolio is projected to be 100 months. Given the duration and size of their portfolio, and the other toxic mortgage debt it holds, the Federal Reserve will lose approximately \$200 billion for every 1% rise in interest rates. Given the price of gold, the market is already discounting the bond portfolio by \$430 billion, or 16%. Interest rates at 1% would imply a 50% greater loss in the portfolio and, therefore, a 50% increase in the price of gold. Interest rates normalized at 5% would imply gold at roughly \$4000, a 58% devaluation of the dollar.

Once inflation starts, the Fed will likely have to allow rates to raise far beyond 5% to reign it in. This is why gold will enter a super-spike before the bull market ends, as it did in the 1970s.

Bernanke recently explained his plan to prevent inflation: “the main thing we need to do when it’s time to tighten monetary policy is to raise interest rates. That’s what we always do.” After outlining various implementation strategies on how to raise rates, Bernanke continued: “those things will definitely work, but if for whatever reason we want to do additional draining, what we can do it sell the assets. That will tighten policy in two ways. One is it will raise interest rates on that class of assets and, secondly, when you sell assets,

that automatically extinguishes the reserves that correspond to those assets. So, assets and liabilities will both come down together.”

When the Federal Reserve raises rates, the dollar will fall along with the entire Keynesian intellectual edifice. If it tries to sell its assets, it will discover there is no market for the long-term bonds, except at fire-sale prices causing huge losses. If it attempts to sell its few liquid assets first, only the valueless, illiquid assets will remain, and the dollar’s decline will accelerate.

In one sense, this analysis offers room for hope. If the federal government were to default completely, or if the Federal Reserve were to receive absolutely nothing for its bonds, the dollar could only fall in value to the extent that it would become 100% backed by gold. This implies a limit for the gold price at \$11,000, an 84% devaluation of the dollar. It is unlikely a default would be close to 100%, and, while an 84% devaluation would be economically dislocating, it is insignificant compared to true hyperinflations.

The existential threat is not that the Federal Reserve allows rates to rise, but that it attempts to support the government debt markets, continually overpaying for its bonds, following in the example of the central European central banks of the 1920s. It may have no choice. There was no FDIC insurance in the 1930s. Banks were allowed to fail and to wipe out their depositors. In a similar scenario today, Congress would likely force the Federal Reserve to “lend” dollars to the FDIC, which is currently broke. All such future expansions of the Federal Reserve balance sheet would suggest a much higher price of gold.

It is impossible to predict to what extent the Congress will force the monetization of government obligations and deduce how high gold can trade. It is quite easy to understand the dynamics of a government bond bubble and how the currency will react once that bubble pops to conclude that gold must rise in price dramatically from current levels.

## Conclusion

John Law arrived in Amsterdam in 1694. He witnessed the Bank of Amsterdam secretly mobilize its reserves to lend to the East India Company. He was Europe’s greatest gambler, and he understood risk. He knew the chances were slim that a material number of depositors would want their money all at once, and he realized the potential.

The initial subscription for Banque Générale was 25% specie and 75% government bonds. At first, the bank specialized in discounting commercial bills, using a discount rate of 6% as opposed to the going rate of as high as 30%. The liquidity he added to the market attracted enormous amounts of capital. As his deposits rose, Law was able to lower the discount rate to 4%. But, almost immediately, the bank began discounting future income from real estate, trade monopolies, and government bonds. In fact, in 1719 Law purchased the entire stock of French government bonds, claims backed by no productive assets save police power over an impoverished nation.

The rise of the speculators was swift and glorious, but the end came as it always does. The intelligent began quietly redeeming their bank notes and exporting their gold and silver abroad for safe-keeping. As inflation began to mount, Law ended redemption and banned the possession of gold and silver. The clever began converting bank notes into hard assets, which perhaps had less spatial liquidity than bank notes, but were sure to have more temporal liquidity. Only the dull-witted, the infirm, and the dreamers were left holding the paper claims when the system collapsed.



Despite the spectacular failure of Law's scheme, the past hundred years has seen every banking system in the world organized according to his principles. They all follow the same life cycle. First, the banks creates liquidity by issuing liabilities backed by current assets. Then, they discount future assets in a doomed effort to create wealth from nothing. Finally, illiquid, they collapse.

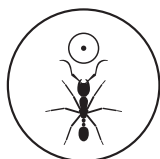
Palyi wrote:

The theory [of liquidity] is borne out by more than four centuries of experience with business cycles. Witness the history of modern crises, reaching back to the recurrent waves of Venetian bank failures in the early sixteenth century. In every instance, the wholesale liquidation of debts was the focal point, brought about by a credit expansion along non-commercial lines, financing long-term loans, speculative ventures, and governmental expenditures on a substantial scale.

The developed world is involved in all of the activities Palyi describes for the third time in a century. In the first instance, during the 1930s, private banks financed long-term loans and stock speculations, though the central bank remained pure. In the second, during the 1970s, the Federal Reserve took the lead by discounting large governmental expenditures, while the private banking system was still neutered by New Deal laws. In our current episode, private and central banks worldwide have unwittingly coordinated the creation of the largest credit bubble ever known. The credit and monetary bubbles will likely collapse in close proximity.

Those valuing gold in terms of dollars, or who think of gold as a way to "diversify risk," or who think of gold acquisitions as purchases rather than conversions, do not understand money or the monetary system. Banks can and should create money based on gold that is more liquid than gold. But, neither banks nor the state can replace gold. The state can ban money, but then trade will die.

The establishment is ignorant of sound monetary theory and history. Central banks have misunderstood their mission and destroyed their balance sheets. When Treasury market liquidity dries, the dollar will cease to trade as money, and the market will revert to physical gold, a sub-optimal medium of exchange. Trade will suffer, as it must when a currency dies. The next financial system must distinguish between liquidity generation for current assets and capital allocation to future assets if it is to avoid the business cycles that have plagued society since the introduction of debt.



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## Appendix: The Real Bills Doctrine

Adam Smith developed the Real Bills Doctrine in his seminal work *The Wealth of Nations*. In brief, the doctrine states that commercial bills maturing into gold within 90 days are current assets and, therefore, bank notes backed by real bills are not inflationary. The doctrine is currently in disrepute. But, the controversy continues to “slumber, rather from the exhaustion of the combatants than from the acknowledged defeat of either party,” a characterization given to it by Baron Farrer in 1898. Revisiting the Real Bills Doctrine is a necessary adjunct to a discussion of Menger’s liquidity theory of money for those interested in policy.

In normal commerce, commodities are transformed into goods as they move through a series of intermediate producers, then to the wholesaler, the retailer, and finally the consumer. More than just custom, it is an essential feature of commerce that bills presented in the stream of commerce carry terms of 30, 60, or occasionally 90 days.

To illustrate, let us assume that W the wholesaler buys a good on 30-day terms from M the manufacturer. It then takes W 15 days to sell the good to R the retailer, who also pays on 30 day terms. W thus owes money on M’s bill 15 days before he receives cash from R. Long before banks existed, it was common practice for W to take the bill he had presented to R and offer it to M as payment of M’s bill. Since M’s relationship with R was more distant than his relationship to W, M would discount the bill by a certain percentage, called the discount rate.

The original function of commercial banks was to facilitate the process described above. W, instead of offering his bill on R to M, would take his bill on R to the bank. The bank would typically also have a direct relationship with R and, therefore, would offer a lower discount rate (i.e., a higher price) than M would offer, and would be willing to issue bank notes to W against the bill. Assuming the bank had a good reputation, M would accept the bank note from W as payment at par since the bank note was covered by the anticipated payment by R, any security interest the bank might have on R, and also by the bank’s own capital. The bank’s profit came from facilitating commerce by putting its own capital at stake to lower the discount rate and capturing part of the gain.

The Real Bills Doctrine holds that banks should discount with bank notes or deposit accounts any and all commercial bills presented and that doing so is not inflationary. The question thus becomes: is discounting real bills similar to the activities of the Bank of Amsterdam or the Banque Générale?

Conventional theory holds that discounting real bills is inflationary. The argument is that there is no essential difference between a promise to pay on goods or real estate, as long as the collateral is sound. Similarly, there is no essential difference between a promise to pay in 30 days or 30 years. The example of Banque Générale demonstrates that creating money against future assets is inflationary, and therefore discounting real bills must be inflationary as well.

Defenders of the doctrine argue that the market itself accepts commercial bills for payment, like gold and unlike mortgages. Therefore, when a bank issues a bank note against a commercial bill, it withdraws simultaneously a kind of money in the manner of the Bank of Amsterdam. There is also a more nuanced defense that explains why the market itself accepts real bills as money.

Assuming a strict 100% reserve gold standard, it is a general principal that if money supply is constant, and more goods and services are added to an economy, then the price level must fall, the money being distributed among more goods. If money supply grows at the same level of economic growth, the price level remains stable.

Imagine the following scenario with the above principle in mind:

1. M, W, R, and P the purchaser go to market with their gold setting a price level.
2. M creates a good from a raw commodity. W purchases the good from M on 30-day terms and 15 days later sells it to R, also on 30-day terms. M has a bill due from W in 15 days, and W has a bill due from R in 30 days. W factors his bill on R to the bank and receives a bank note. He pays the bank note to M to extinguish M's bill.
3. They go back to market. Collectively, they have the same amount of gold as before plus M has a bank note (R has a liability to the bank, but it's not due for 15 days). Purchasing power has increased. But, the amount of goods at the market has also increased. *In fact, the money supply has increased to the exact extent of the increase in goods, so the price level remains stable.*
4. P the purchaser decides to purchase with his gold the finished good from R, removing it from the stream of commerce. R uses P's gold to pay and extinguish W's bill, now held by the bank. M comes to the bank and redeems his bank note for gold, extinguishing the note.
5. M, W, R, P go back to market. Gold and goods have been rearranged, but all the notes have expired. The price level declines slightly, since there is one more good in society and the same amount of money.

Pure Austrians reject the Real Bills Doctrine. They argue that the source of inflation is a system that allows distinct parties to have a simultaneous claim on the same gold coin. In the example above, let's say M redeems his note as soon as he receives it, at the end of step 2 and not in step 4. In this case, the bank must pay him 30 days before it receives P's coin. For those 30 days, two parties have a claim on the same coin, setting in motion the distortion in consumer time preference that causes the business cycle.

Real Bills defenders counter by distinguishing between loans for investment (fixed capital) versus credit against intermediate goods in the stream of commerce (circulation capital). The distinction is critical. A loan against inventory would not be a real bill. Only once an intermediate good has been sold and the money due within 90 days does the bill against it qualify as a real bill because it then become self-liquidating.

Under a strict gold standard that does not allow banks to issue credit against real bills, as business throughput increases, adding more intermediate goods, prices must fall. The same amount of money must be distributed across more goods. When prices fall, it is more difficult for debtors to pay back their debts. Businesses would thus discover, paradoxically, that the brisker business conditions became, the harder it would be to pay back the loans that had financed their fixed capital.

Professor Antal Fekete is one of the only academics writing on the Real Bills Doctrine currently. He recently posed the following example:

Consider a hypothetical product . . . . Its production cycle takes 91 days, with as many as 90 firms participating, so that the sojourn of the semi-finished product at every one of the 90 stops takes one day [and all bills presented have 90-day terms]. The ultimate consumer is willing to pay \$100 for a bottle while the producer of the 90th order good has paid \$11 for raw materials. We shall also assume that the value added to the maturing product at every stop is \$1. Now if you want to finance the movement of one [unit] through the various stages of production, then [in the absence of bank notes

financed by real bills] the pool of circulating gold coins will have to be invaded 90 times, and you have to withdraw savings in the amount of:

$$11 + 12 + 13 + \dots + 98 + 99 + 100 = \frac{1}{2}(11 + 100) \times 90 = 45 \times 111$$

or \$4995, almost 50 times retail value. In other words, there must be savings in existence in the amount of almost \$5000 to move just one [unit] through the production process all the way to the consumer. This sum does not include fixed capital that also has to be financed out of savings!

The \$4995 worth of capital to finance the journey of one unit isn't really the problem. The gold price could be initially set to encompass all the uses required by circulation capital. The problem arrives under the scenario where the above manufacturing stream is operating at less than full capacity. If consumer demand for the good in question increases, it is easy to increase production. No additional capital investment is required. But, under a strict gold standard, each extra unit, which only costs \$99 to produce, will demand an additional \$4995 worth of savings, driving all prices dramatically lower and making debt virtually impossible to repay.

Gold has increased in value steadily over the past few hundred years because, first, economic wealth has grown faster than the increase in the above ground supply of gold, and, second, gold has become the sole monetary metal, becoming liquid enough to supplant silver's role. The supply is responsive. There is natural attrition, through the slight industry use and loss, and additions through mining. If the price rises too much, mining activity increases to hold prices down, which keeps gold's value more stable than it would be otherwise. But, mining is a difficult, expensive business involving large temporal gaps between planning and production. A real bills system keeps the equilibrium price of gold stable with much less effort and expense.

Henry Hazlitt defined inflation as: "an increase in the supply of money that outruns the increase in the supply of goods." The Real Bills Doctrine shows how a free banking system will naturally expand money supply when called to by commerce, and must naturally contract it when commerce slows, keeping the price level constant. In opposition to the quantity theory of money, the quantity of bank notes must fluctuate in order to keep prices stable. Since stable value is one of Menger's primary attributes for moneyness, bank notes would thus fulfill that function better than physical gold in a more sophisticated version of the Bank of Amsterdam. They would not replace gold, since the bills mature into gold and the notes must be redeemable, but they would improve gold's liquidity.

The record is clear that banks operating under real bills principles do not face runs. In a recent speech, Jim Grant presented the model of a good banking system. After a series of panics, Louisiana banking law was changed in 1842 to distinguish between "movement" capital, "90-day commercial bills that paid off when consignment of merchandise, against which the loans were secured, changed hands," and "dead weight" capital, such as mortgages.

According to Grant:

Under the Louisiana law, a bank could invest its own capital in dead-weight assets, including mortgages and long-dated commercial loans. Its depositors' funds, however, being liquid, had to be placed in gold and silver (at least one third) and self-liquidating commercial loans and discounts (the remaining two-thirds).

The Louisiana banking system was among the most stable in the country. Banking figures show that the Panic of 1857 actually resulted in a rise in both money and real

income for its banks. Not until the Civil War, when the Southern banks were forced to end redemption and accept Confederate bonds for political reasons, did the banks fail.

Current bank reforms such as the Volcker Rule are a step in the right direction. But, the problem isn't just rogue traders losing depositors' funds in the casino markets, it is the structure whereby current liabilities are used to fund future assets.

There is an acrimonious debate among hard money advocates about the Real Bills Doctrine. Most recoil against the doctrine because it holds that the supply of currency should be "flexible." Providing a flexible currency was the original justification for the formation of the Federal Reserve. It turned out "flexible" was code for "depreciating." The theoretical question hinges on whether discounted real bills are current assets, such that issuing bank notes against them is non-inflationary, or future assets, against which bank notes are inflationary. The free market itself enables real bills to trade as money because they contain the attributes that Menger theorized were necessary for moneyness. And banking systems based on this principle are sound.

Presently, the debate is strictly academic. Neither the Federal Reserve nor any large commercial bank discount commercial bills. There are some institutions that do factor bills, and interest rates are currently very high, exceeding 10% per year, but it is not a material part of the banking system. It is interesting to note that since the Federal Reserve no longer manipulates discount rates, the high rates may serve as a better indication of the scarcity of capital than interest rates set at zero by the state. In any case, it is critical that policy makes consider the Real Bills Doctrine when, in the near future, it becomes necessary to construct a new global financial system.