On the Optimum Quantity of Money

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It is pretty well established within Austrian economics that the optimum quantity of money is whatever level is established at any given time. The logical implication of this claim is that any amount of the commodity that intermediates trade will do as well as any other in acquitting this task. This being the case, there is no social or even private gain to be obtained by anyone adding to the money stock.

The present paper challenges this view, but from within the praxeological tradition. That is, we shall argue that although prominent Austrian economists have indeed made this argument, they are incorrect from their own basic perspective, which is shared in full by the present authors. Our thesis, in contrast to theirs, is that "more is better," or, more strictly speaking, at the very least it is possible that additional stocks of money can make a positive contribution to economic welfare.

Given that we are making a frontal attack on economists with whom we agree on virtually all other issues[1] in the dismal science, it behooves us to be very careful in documenting the charge we are about to bring. Accordingly, we quote quite fully from several leaders of the Austrian School, in order to obviate any possible misconstruction of their position.

But before we introduce our extensive quotations from Mises and Rothbard, for these are the economists against whose views we shall be contending, let us mention a possible misinterpretation of our own position, and attempt to obviate it.

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[1]One referee commented, "What the authors [that is, us] fail to realize is that Mises's and Rothbard's hostility to the increase in the quantity of money was directed at its increase *by the government*." This, indeed, might well have been the *intention* of Mises and Rothbard. However, as we attempt to demonstrate below, these two justly renowned economists did not always limit themselves to this concept, but rather exceeded it.

According to this possible objection, we can be accused of attributing to Mises and Rothbard the view that any amount of *gold* in existence is an optimal quantity. That is, these two economists quite properly distinguish *money* from *gold*, even under a pure *gold* standard. Further, we might be interpreted as saying that it is not true that any given amount of *gold* in the economy at any given time is optimal. Very much to the contrary, if under free enterprise and a commodity standard gold mining occurs, and this adds to the stock of *gold* in contrast to money, then all is well, allocation wise.

This being the case, then, according to the critique that could be leveled at us, we are passing like ships in the night. Our correct thesis is not contradicting the correct analysis of Mises and Rothbard. Both claims can be true, since they do not contradict one another. That is, we claim that the optimal amount of *gold money* can possibly be increased with good effects, while Mises and Rothbard maintain that any increase in the stock of gold money is socially wasteful.

As against that, consider the following:

1. The optimal quantity of fiat money is zero (Hoppe, Hülsmann, and Block 1998, pp. 1–50). However, in a fiat-money-using society, the optimal quantity of fiat money is whatever is in existence, and, from an Austrian perspective, that quantity should never be changed, either increased or decreased, save for its complete elimination in shifting to a commodity money.[2]

2. Both Mises and Rothbard distinguish money from gold in that they both see the former as a subset of the latter; i.e., gold in teeth or jewelry, or for industrial purposes, etc., is not money; gold coins are money and, at least for Rothbard (1993, p. 169) "large bars of gold and silver have been used for storage or for exchange in larger transactions, while smaller, circular pieces, known as coins, are used for smaller transactions." Certainly commodity monies are included. To the extent Mises is saying that the extant quantity of fiat money should not be changed and it is socially wasteful to use scarce resources to add to the stock thereof, he is correct. However, to the extent he says that using resources (or goods in the case of conversion of the money commodity from nonmonetary uses to monetary uses) to increase the supply of monetary gold, e.g., any increase in the stock of gold money is socially wasteful, he is wrong in our view, as is Rothbard, who agrees with Mises on this, as we shall show.

Both are clear that using resources to add to the stock of a commodity money is socially wasteful; and both are clear that using resources to add to the stock of the money commodity is not socially wasteful *provided* that the increases in such stocks *are not* used for monetary purposes, but rather for their nonmonetary (tooth and jewelry) purposes. Other than as wallpaper or for numismatic purposes, fiat money has virtually no nonmonetary uses. We

[2]For Austrians, the crucial distinction is between commodity and fiat money, whereas for the mainstream it is that between real and nominal money (Friedman 1969, p. 1).

are saying, in contradistinction to them, that it is *not* socially wasteful to use resources to add to the stocks of the monetary commodity regardless of whether such additions go to nonmonetary *or* monetary uses.

In sum, neither we nor they think that, except by sheer and temporary happenstance, the quantity of gold in the economy at any point in time is the optimal quantity; however, they are saying that the quantity of gold used as money at any given time is optimal, and we are saying that, if anyone voluntarily adds to the stock of gold used as money, that alone proves,[3] that the stock of monetary gold was not previously optimal. Thus, there is a real, not a semantic difference between them and us.

In section I we consider the evidence, section II is devoted to our critical analysis of Mises and Rothbard, and we conclude with section III, in which we consider several objections to our thesis.

The Evidence

In his *magnum opus*, *Human Action*, Ludwig von Mises states that

> The services money renders are conditioned by the height of its purchasing power. Nobody wants to have in his cash holding a definite number of pieces of money or a definite weight of money; he wants to keep a cash holding of a definite amount of purchasing power. As the operation of the market tends to determine the final state of money's purchasing power at a height at which the supply of and demand for money coincide, there can never be an excess or a deficiency of money. Each individual and all individuals together always enjoy fully the advantages which they can derive from indirect exchange and the use of money, no matter whether the total quantity of money is great or small. Changes in money's purchasing power generate changes in the disposition of wealth among the various members of society. From the point of view of people eager to be enriched by such changes, the supply of money may be called insufficient or excessive, and the appetite for such gains may result in policies designed to bring about cash-induced alterations in purchasing power. *However, the services which money renders can be neither improved nor repaired by changing the supply of money.* [Emphasis added] There may appear an excess or a deficiency of money in an individual's cash holding. But such a condition can be remedied by increasing or decreasing consumption or investment. (Of course, one must not fall prey to the popular confusion between the demand for money for cash holding and the appetite for wealth.) The quantity of money available in the whole economy is always sufficient to secure for everybody all that money does and can do.
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> From the point of view of this insight one may call wasteful all expenditures incurred for increasing the quantity of money. The fact that *things which could render some other useful services are employed as money*

[3]We abstract, for argument's sake, from the possibility that this accretion was mistaken.

> [emphasis added] and thus withheld from these other employments appears as a superfluous curtailment of limited opportunities for want-satisfaction. (Mises 1996, pp. 421–22)

Murray N. Rothbard, in his treatise, *Man, Economy, and State* restates and elaborates upon this position:

> Goods are useful and scarce, and any increment in goods is a social benefit. But money is useful not directly, but only in exchanges. And we have just seen that as the stock of money in society changes, the objective exchange-value of money changes inversely (though not necessarily proportionally) until the money relation is again in equilibrium. When there is less money, the exchange-value of the monetary unit rises; when there is more money, the exchange-value of the monetary unit falls. We conclude that there is no such thing as "too little" or "too much" money, *that, whatever the social money stock, the benefits of money are always utilized to the maximum extent.* [Emphasis in original] *An increase in the supply of money confers no social benefit whatever*; [emphasis added] it simply benefits some at the expense of others, as will be detailed further below. Similarly, a decrease in the money stock involves no social loss. For money is used only for its purchasing power in exchange, and an increase in the money stock simply dilutes the purchasing power of each monetary unit. Conversely, a fall in the money stock increases the purchasing power of each unit.
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> David Hume's famous example provides a highly oversimplified view of the effect of changes in the stock of money, but in the present context it is a valid illustration of the absurdity of the belief that an increased money supply can confer a social benefit or relieve any economic scarcity. Consider the magical situation where every man awakens one morning to find that his monetary assets have doubled. Has the wealth, or the real income, of society doubled? Certainly not. In fact, the real income—the actual goods and services supplied—remains unchanged. What has changed is simply the monetary unit, which has been diluted, and the purchasing power of the monetary unit will fall enough (i.e., prices of goods will rise) to bring the new money relation into equilibrium.
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> One of the most important economic laws, therefore, is: *Every supply of money is always utilized to its maximum extent, and hence no social utility can be conferred by increasing the supply of money.* [Emphasis in original]
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> Some writers have inferred from this law that *any factors devoted to gold mining are being used unproductively, because an increased supply of money does not confer a social benefit.* [Emphasis added] They deduce from this that government should restrict the amount of gold mining. These critics fail to realize, however, that gold, the money-*commodity*, is used not only as money but also for nonmonetary purposes, either in consumption or in production. Hence, an increase in the supply of gold, although conferring no *monetary* benefit, does confer a social benefit by increasing the supply of gold for direct use. (Rothbard 1993, pp. 670–71)

Rothbard then confuses the issue in a subsequent publication

> Thus, we see that while an increase in the money supply, like an increase in the supply of any good, lowers its price, the change *does not—unlike other goods—confer a social benefit*. . . . Our law—that an increase in money does not confer a social benefit—stems from its unique use as a medium of exchange.
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> An increase in the money supply, then, only dilutes the effectiveness of each gold ounce; on the other hand, a fall in the supply of money raises the power of each gold ounce to do its work. We come to the startling truth that it *doesn't matter what the supply of money is*. Any supply will do as well as any other supply. The free market will simply adjust by changing the purchasing power, or effectiveness of the gold-unit. There is no need to tamper with the market in order to alter the money supply that it determines.
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> At this point, the monetary planner might object: "All right, granting that it is pointless to increase the money supply, isn't gold mining a waste of resources? Shouldn't the government keep the money supply constant, and prohibit new mining?" This argument might be plausible to those who hold no principled objections to government meddling, though it would not convince the determined advocate of liberty. But the objection overlooks an important point: that gold is not only money, but is also, inevitably, a *commodity*. An increased supply of gold may not confer any *monetary* benefit, but it does confer a *non-monetary* benefit—i.e., it does increase the supply of gold used in consumption (ornaments, dental work, and the like) and in production (industrial work). Gold mining, therefore, is not a social waste.
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> We conclude, therefore, that determining the supply of money, like all other goods, is best left to the free market. Aside from the general moral and economic advantages of freedom over coercion, no dictated quantity of money will do the work better, and the free market will set the production of gold in accordance with its relative ability to satisfy the needs of consumers, as compared with all other productive goods. (Rothbard 1990, pp. 33–35)

The Analysis

As is obvious from Mises's and Rothbard's statements (see particularly those we have emphasized), both are referring to a commodity money. In what follows, we restrict our comments to such money, and assume that in the free market gold coins would evolve as the money.[4]

[4]It is possible—even likely given historical experience—that the free market process might yield more than one money commodity, e.g., silver or copper, but this would not affect the analysis.

Consider, then, the case of gold. As it does not affect the argument, let us consider only three uses for gold: as money in the form of coins; as jewelry, in the form of rings, etc.; and, as electrical contacts in electronic equipment. Although the total stock of gold available to human purposes could also be increased by the discovery of gold that had been available at some time in the past but then had been lost, we ignore such examples, as the analysis is not affected in any substantive way by examining only the case where additions to the stock of gold come from mining operations.[5] We assume that newly mined gold is immediately refined and formed into bullion, and such bullion is then sold for one of the three aforementioned uses.

If Mises and Rothbard are correct, then any additions to the stock of gold should be allocated only to uses as jewelry or as contacts. To allocate any to the third use, specifically, money, would be socially wasteful as it would yield no "social benefits" while there would be a cost associated with the non-use of any such gold for either of the other two uses.[6] Rothbard says that an increase in the quantity of gold money confers no social benefit, that any supply will do as well as any other, and that it doesn't matter what the supply is. This is necessarily erroneous. Gold has nonmonetary uses that do confer social benefits. Therefore, it does matter what the supply of money is: as little gold should be used for money as is possible and still have a quantity sufficient for it to retain the necessary characteristics a commodity must have if it is to serve as money. To use any gold beyond this bare minimum for monetary purposes deprives society of gold that could be used for socially beneficial nonmonetary purposes. Moreover, given his law that additions to the stock of monetary gold do not confer a social benefit but that additions to the nonmonetary stock do, it does not follow, as Rothbard says it does, that "the supply of money, like all other goods, is best left to the free market." Rather, it follows that the market should determine the supply of gold for nonmonetary purposes, but there should be a prohibition on socially wasteful additions to the stock of monetary gold. In other places, Rothbard recognizes that the free market *always* increases social welfare; e.g.,

> Economics, therefore, without engaging in any ethical judgment whatever, and following the scientific principles of the Unanimity Rule and Demonstrated Preference, concludes: (1) that the free market always increases social utility; and (2) that no act of government can ever increase social utility. (Rothbard 1956, pp. 252–53)

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[5]The stock of monetary gold could be increased by minting either newly mined gold or existing nonmonetary gold into coins. If the case can be made that no newly mined gold should be monetized, it follows, *a fortiori*, that neither should any existing nonmonetary gold be monetized, as that would require a reduction in the quantity of nonmonetary gold with attendant reductions in utility therefrom, something not required if newly mined gold is used for monetary gold.

[6]It must be noted that Rothbard's argument on pages 33, 34, and 35 of *What Has Government Done to Our Money?* is a *non sequitur*.

This, however, brings us to the horns of a dilemma. Any *voluntary* increase in the stock of gold coins[7] from any source whatsoever, whether by minting newly mined gold into coins, or by converting gold already in use as jewelry or contacts into coins, will necessarily have one of two possible effects. Either, first, despite the fact that this will take place as a result of individuals going peaceably about their business engaging only in voluntary interactions with others, they would be utilizing scarce labor and other resources to add to the stock of money, which addition would have to be deemed by Mises and Rothbard as "socially-valueless." The difficulty, here, is that this would truly be a case of "market failure," a great bugbear of mainstream economics,[8] and something that Austrians have strived mightily to show as highly problematic (Cowen 1988; Hoppe 1989, pp. 167–86; Rothbard 1997a, 1997b).

Or, second, individuals would *voluntarily* choose not to mint additional coins from gold, whether newly mined or in use as jewelry or contacts; any additions to the stock of gold would be used only as jewelry or contacts, although gold could be reallocated between these two uses.

Certainly, in the first case governmental intervention into the market to control the money stock at whatever quantity is extant not only cannot be ruled out on principle, but as a matter of fact, is implied by the analysis; after all, if Austrians (e.g., Mises and Rothbard) are calling for an unchanging stock of the monetary metal, and this is changing purely through the activity of "capitalist acts between consenting adults" (Nozick 1974, p. 163), it is hard to resist the notion that the state must step in to overcome this supposed market imperfection. We are thus forced to arrive at the mainstream position with respect to "market failures"—one must weigh the costs of governmental intervention against the benefits thereof and intervene in cases where the latter exceeds the former. Nor will it do to note that costs and benefits are subjective—neoclassical economists maintain that we can and do use expenses and revenues as measures thereof (the present authors, of course, as Austrians, stipulate that they are attempts to measure objectively that which is necessarily subjective) (Barnett 1989, pp. 137–38; Buchanan and Thirlby 1981; Buchanan 1969; Mises 1996; Rothbard 1997a and 1993) in, for example, cases of tortious liability.[9] However, it is a certainty that neither Mises nor Rothbard

[7]As to why one might wish *voluntarily* to increase the stock of commodity money, see the argument "the second case," p. 46, *infra*.

[8]It is unnecessary to document this claim, as it is practically the defining characteristic of neoclassical economics; consult any introductory or intermediate textbook—the distillation of the thinking of most practitioners of the dismal science, for confirmation.

[9]Although there is no subjectivist warrant for such cost-benefit analysis, it is absolutely required that the courts, whether they are governmental or an anarchist dispute resolution institution, undertake it, and, *to boot*, as an everyday occurrence. Judges do this, but not as scientists, rather as laymen, economically speaking. Take the case of A who causes B to lose a part of his body. Here, the courts are forced, willy-nilly, to determine

would find a voluntary minting of newly mined gold into coins to be a "market failure."

Consider the second case. One would expect that in an even relatively-free enterprise society, over time there would be great increases in labor productivity and, probably, significant increases in population, the consequences of which would be vast increases in output. In such a situation, with a fixed stock of money, prices would tend to decrease continually. Eventually individuals would find that their gold, whether newly mined, or in the form of jewelry or contacts, would have such great purchasing power as money, that they would voluntarily mint gold into coins. Therefore, this scenario could not last indefinitely. That is, in a free society, eventually individuals would decide to add to the stock of money. The only way to prevent, or at least lessen, such a "socially-valueless" use of resources would be governmental intervention. In which event, see the analysis of the first case, above.

Moreover, the logic of the positions "[e]ach individual and all individuals together always enjoy fully the advantages which they can derive from indirect exchange and the use of money, *no matter whether the total quantity of money is great or small*" (Mises 1996, p. 421 emphasis added) and "[w]e conclude that there is no such thing as 'too little' or 'too much' money" (Rothbard 1993, p. 670)[10] implies that existing gold coins should be converted into use as jewelry or contacts. And, this conversion should continue so long as the benefits therefrom exceed the cost of conversion, bearing in mind that the reduction in the stock of gold money would, at some point eliminate one or more of the attributes requisite for a commodity to be money; e.g, divisibility, recognizability, and portability.

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what is the cost to B of this loss. In other words, sometimes we *must* quantify that which is inherently nonquantifiable, based upon technical praxeological considerations. Therefore, if "we" can do it in the case of torts, why not in the case of money? This holds particularly strongly if in fact we have correctly interpreted Mises and Rothbard as logically implying (even though they would of course not explicitly accept this characterization) that this is an example of "market failure." In such a case it would make just as much sense to say "we" need to do a "cost-benefit" study to determine if, and when, additions to the stock of gold money are warranted as it does to say "we" need to do a "cost-benefit" study to determine if we have the optimal level of good X, or have correctly hit upon the true costs to B of the loss of his body part. Therefore, unless we are prepared to agree to that proposition, and accept the concept of "market failure," including its application to gold money, it is difficult to see how the Misesian-Rothbardian position on this matter can be defended.

[10]Elsewhere, Rothbard modifies this position: "once a commodity is in sufficient supply to be adopted as a money, no further increase in the quantity of money is needed. *Any* quantity of money in society is 'optimal.' Once a money is established, an increase in its supply confers no social benefit" (Rothbard 1994, pp. 19–20). But this obviously supports the argument that any quantity in excess of this minimum is socially wasteful, given alternative valuable uses. This supports the (false) position that a voluntary increase in gold money in a free-market economy is a case of "market failure," and invites governmental intervention to correct the "problem."

Why? This stems from the fact that if we go back in time far enough[11] to reach the period of barter, right before the advent of money, there was an occasion when gold was first used to intermediate trade, not merely as a valuable commodity on its own. At that point in time, the amount of gold used for this purpose was presumably minuscule. If so, then given Mises's and Rothbard's insistence that any amount of gold money will serve as well as any other, and there is no need to expand this supply (indeed, if this somehow occurs it is equivalent to a "market failure"),[12] then it logically follows that this teeny tiny amount of gold which was first used at the dawn of the creation of money should always suffice, even unto the present day.

Thus we again arrive at a fork in the road, facing two possibilities. First, the free market is inefficient, i.e., it allocates some of the new or extant gold to a valueless use as money, when it could and should have diverted it to a valuable use in jewelry or contacts, and this after first allocating other scarce resources to mining and refining, or to the conversion, thereof. Or, second, Mises and Rothbard are wrong. It staggers the (individualistic) mind to think that people would voluntarily commit valuable resources to the creation of socially-valueless goods.

Whence, then, the source of the value as money, if any there be, of the newly mined gold? (Its value in jewelry or contacts is obvious.)

The value of the new money would arise out of the additional transactions that would be made possible by its existence. That is, there would be transactions, previously impossible to undertake because the cost of using valuable gold to mediate such was excessive, which would now be made possible because the new monetary gold reduced the value of money at the margin. There are, at any time, a variety of potential exchanges. Some of these would create a great deal of value; others only a minute amount. The value that would be created by some potential exchanges is so small that the utility of gold in facilitating such exchanges would be less than its utility in nonmonetary uses. In such cases the potential exchanges would not occur.

As to whom might be hurt by an increase in the stock of a commodity money, by the very fact that it was voluntarily minted, it is certainly not the individual(s) who voluntarily minted it (save in the case of a mistake). Nor, again, by the very fact that they accepted the new gold money voluntarily could it be any individual(s) who voluntarily accepted it. No, the individuals "harmed" by such a voluntary minting of new gold coins would be those who own gold coins at the time and those who have financial assets denominated in terms of gold coins, such assets not being indexed for changes in the value of the coins. But the same logic applies in those cases as it does in the cases

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[11]We refer to the Austrian theory of the money regression here. See on this Mises (1963, pp. 409–10).

[12]The authors of the present paper have resolved never to employ that phrase in the absence of quotation marks.

of other goods, as Mises himself proved in his pathbreaking *Theory of Money and Credit* (1971).[13] That additional gold money decreases the value of previously existing gold money, or assets denominated therein, is no more a problem (or whatever pejorative one wishes to use) for the free market than is any other case of an increase in a good causing a decline in the value of previously existing units thereof. The logic of seeing that as a problem is that we should never produce anything for, ultimately, all goods are substitutes for each other, and therefore, the production of any of them must reduce the value of others already extant. Moreover, if gold is voluntarily mined it is because it has value to someone. Unless we are to outlaw gold mining, it will be mined and the new gold will be put to some use. To the extent that this use is as money, the value of extant stocks of gold in other uses is not, *ceteris paribus*, decreased. Were the gold that otherwise would have been coined not so monetized, it would have gone into other uses which would decrease, *ceteris paribus*, the value of the existing stocks of gold in those other uses. Furthermore, monetary gold can always be demonetized if the owner thereof values it more in a nonmonetary use.

Moreover, to quote Rothbard (1983, p. 38), to the extent that newly coined gold money becomes part of the supply of credit, unlike "bank credit expansion [that] *distorts* the market's reflection of the pattern of voluntary time preferences[,] the gold inflow *embodies changes* in the structure of voluntary time preferences."

The optimum quantity of money is not, then, whatever quantity happens to exist, but rather whatever amount of gold as coins the free-market process creates. As long as mine owners can unearth gold at a sufficiently low cost to make it worthwhile, and minters outbid those with other potential uses for at least some of the new gold, the money stock should be, and is, increased. Further, even in a situation where the cost of mining gold was not sufficiently low to make it worthwhile, and therefore there were no additions to the total stock of gold, if people's subjective values changed so that they placed a reduced value on gold in its nonmonetary uses or greater value on gold in its monetary use, and therefore withdrew some of it from nonmonetary uses and caused it to be converted to monetary uses, the stock of money again should be, and is, increased. In appropriately reversed circumstances, the money stock should be, and is, decreased.

We see, then, that, contrary to Mises and Rothbard, the quantity of money available in the whole economy is not always sufficient to secure for everybody all that money does and can do. Rather, the optimum quantity of money, as with any other good, is that quantity determined in the free market process, and, contrary to Mises and Rothbard, when the free market process causes additions to be made to the stock, such additions do confer a social benefit, in the form of additional voluntary exchanges facilitated.

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[13] See also Salerno (1994, pp. 71–115).

Objections

In this, our concluding section, we consider several objections to our thesis, and offer replies to them.

1. Even the teeny tiny amount of gold which first erupted onto the market as money at the close of the barter system would be sufficient to undergird all transactions. Therefore, there are no social benefits to increasing the amount of gold used for monetary purposes. One way this could occur—an "infinitesimal"[14] amount of gold sufficing for all trade—is through the intermediation of silver and copper. But even in their absence, gold, too, could do it, even in this minute amount. This could be accomplished if that minuscule amount of gold money came to be extremely valuable, or, what is the same thing, if prices in terms of this monetary commodity were very, very low.

It is true that this infinitesimally small amount of gold could intermediate all of modern trade, but it could not do so *efficiently*. If it could have done so efficiently there would have been no additions to the stock of gold money as such uses have non-zero opportunity costs. That is, this may be true, in the physically possible sense; theoretically, an infinitely small mass of gold money could mediate an infinitely large number of transactions provided the prices of goods were sufficiently low in terms of gold money (e.g., all of New York, Tokyo, and London would be sold for a teeny tiny fraction of a grain of gold).[15] But, that would not happen for economic (i.e., praxeological) reasons. This is because it would not be efficient. The source of the inefficiency would be increased transactions costs and the form would be forgone exchanges of such minute value that the increased transactions costs would preclude them. Note that as the limited initial quantity of gold money were to be used to mediate an ever greater number of transactions, the value per mass unit of this monetary gold would increase toward "infinity" (imagine if all of the transactions of 2000 A.D. had been mediated by 1 kg of gold money, what each atom thereof would have to have been worth. With gold that valuable it would not pay to use it to mediate transactions that increase value only a tiny bit. Moreover, we would be back to "market failure," for, surely, as gold's monetary value increased greatly, existing nonmonetary gold would be converted to, and new additions to the gold stock would be put to, monetary uses. Were this

[14]Infinitesimal is used herein to refer to the minimum quantity sufficient for gold to retain the necessary characteristics a commodity must have if it is to serve as money.

[15]In the limit, the lowest possible price of a good, x, would be one atom of gold per x. No lower price would be physically possible, as one atom is the smallest possible quantity of gold.

not the case, the original piece of gold money would still suffice and the entire rest of stock could, and *indeed* would, be put to valuable monetary uses.

2. This is not a praxeological issue but rather one having to do with chemistry. The correct way to interpret the benefits of increasing the amount of gold used for monetary purposes is that it saves us from undertaking heroic chemical costs. That is, with a teeny amount of gold available today, all that could be spared for even the most valuable coin would be a relatively small number of atoms, and that is beyond our technological capabilities.

Whether it is the knowledge problem or the resource cost of trying to handle such infinitesimal quantities, or both is immaterial. Can you imagine the cost of trying to deal with coins of fractional-grain mass? And, yet, with gold so valuable in such small masses, most people would likely want physical possession thereof. It would no more do to keep records of transactions without physical media than it has been in the past or does today. And, imagine what would happen with an even partial run on the banks as has occurred recently in Argentina.[16]

Thus, just as it is costly to use other valuable resources to facilitate exchanges because they have alternative uses, so also with gold used in coins as money. This gold *also* has alternative opportunities, and its use as a resource to facilitate exchanges is not costless. Thus, gold will be used in the free market process to facilitate exchange only if, and to the extent that, such use is relatively more valuable than its alternative nonmonetary uses. The source, then, of the value of additions to the stock of money is the additional value-enhancing transactions that are made economical, and occur, because the additional gold decreases the value of money at the margin and therefore it can be put to less valuable uses whether as additional less value jewelry *or as a mediator of additional less valuable transactions*.

3. All this talk of chemistry, and coins with only atomic amounts of gold in them, is beside the point. It may have been relevant in a bygone era, but we now know that a gold standard can function quite adequately without, strictly speaking, placing some of this commodity in each and every single coin. Token or fiat coins can be used as an alternative, and this would obviate the need to "stretch" in effect what would be subatomic particles

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> Argentina has been struggling for months to prove to creditors that it can stay current on its $130 billion government debt. Fearing a default or a freeze on deposits, *Argentines have been pulling their money out of banks at a rapid clip*. Argentine officials say they'll use at least some of the new IMF aid to shore up the nation's financial system. (Druckerman 2001; emphasis added)

of gold to all modern coins, if we were limited to the amount of this metal available when first it began to be used for money.

This solves one problem, that of "stretching" a minute amount of gold to cover all coins and bullion needed for modern commerce, but only at the cost of opening up a Pandora's box. It would take us too far afield to show why this scenario would not constitute a pure or 100-percent gold standard. Fortunately, this work has already been done and all we need do now is cite some of it (Block 1988, pp. 24–31; 1989; Block and Garschina 1996, pp. 77–94; Cochran and Call 1998, pp. 29–40; Hoppe 1990, pp. 55–87; Mises 1978).

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