

CURRENCY COMPETITION VERSUS GOVERNMENTAL MONEY MONOPOLIES

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Barriers to Currency Competition

Currency competition for the established national central banks can come from foreign central banks or from private money suppliers (at home or abroad). At present, currency competition from both sources is severely restricted in many countries.

Currency competition from *foreign central banks* can be restricted in several ways:

- The currency issued by the national central bank can be prescribed as a private unit of account;¹
- Contracts in foreign currencies can be prohibited by law or discouraged through discriminatory contract enforcement in the courts;²
- Governments can restrict or discourage the holding of foreign currencies by residents (or the holding of the domestic currency by foreigners) and thereby interfere with the choice of means of payments;
- Governments can refuse to accept any other currency than the one issued by their central bank.

Currency competition from *private money suppliers* is not admitted in any industrial country, but there have been many instances of

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¹For instance, the national currency is prescribed for the denomination of company capital in W. Germany, France, United Kingdom and for all obligations which enter the land register (W. Germany, France) or which have to be notarized (Belgium, France).

²In the United Kingdom, for example, the courts do not award foreign currency claims if the contract has been concluded between residents or in a "third" currency.

such competition in monetary history (see Vaubel 1978a, pp. 387–400). To the extent that money may be issued by private enterprises at all, it must usually be denominated in the currency issued by the central bank. Moreover, with minor exceptions, private enterprises are not permitted to issue currency (notes and coins). Their supply of deposits is subject to reserve requirements and many other regulations.

The existence of these barriers to entry raises three questions: (1) What welfare-theoretic grounds are there to justify restrictions of currency competition from foreign central banks? (2) If there is a case for free currency competition from foreign central banks, why doesn't this case extend to private banks as well? (3) If private banks should be free to supply currencies of their own, why should the government (its central bank) supply money, or a monetary unit of account, at all? These questions are the topics of the following three sections.

The Case for Free Currency Competition among Central Banks

The standard argument against barriers to entry is that they narrow the consumers' freedom of choice and that they raise the price, and reduce the supply and the quality, of the product in question. *Prima facie*, an increase in "price" and decrease of supply may seem to be desirable in the case of money. Do not a smaller supply and a higher "price" of money imply less inflation? No, because the argument confuses the price of acquiring money (the inverse of the price level) with the price (opportunity cost) of holding money³ and overlooks the fact that the holding demand for money is a demand for real balances. Since money is an asset to be held, demand for it depends on the price of holding it. The yield forgone by holding a money that bears no interest or is subject to non-interest bearing reserve requirements, is larger, the higher the expected inflation rate. An inflation-prone central bank loses real money demand to less inflation-prone foreign central banks.⁴ In this way, it loses both revenue and its power to affect the national economy through monetary policy. Thus, the removal of barriers to entry encourages less inflationary monetary

³Harry Johnson (1969) has pointed out the same confusion in the work of Pesek and Saving (1967).

⁴In the absence of a forced or legal disequilibrium exchange rate, the less inflationary money prevails ultimately not only as a store of value but also as a means of payment. "Gresham's Law" operates only under very specific conditions created by government interventions (Vaubel 1978a, pp. 82–89).

policies. In real terms, the standard case against barriers to entry applies to the product money as well: the removal of barriers raises the *real* quantity of money and reduces the relative price of *holding* it.

If the standard case for competition applies, it implies not only removal of barriers to entry but also prevention of collusion among the public producers of money. Collusion is the international coordination of monetary policies.⁵ In the extreme case, it takes the form of fixed exchange rates, an international holding-price cartel among money producers.⁶

Competition among central banks reduces inflation in at least three ways:

1. "*Exit*"⁷—The world demand for money shifts from the currencies that are expected to depreciate and to be risky to currencies that are expected to appreciate and to be more stable.
2. "*Voice*"⁷—Even if exit does not help, public opinion in the more inflation-ridden countries is impressed by the example of the less inflation-ridden countries. It makes the government (the central bank) responsible for its inferior performance. In politics, too, competition works as a mechanism of discovery and imitation.
3. *Acceleration Effect*—Even in the absence of exit and voice, an inflationary monetary impulse in one country affects the price level faster than a simultaneous monetary expansion of equal size that is common to all, or several, countries. This is because the uncoordinated national monetary impulse affects the exchange rate, and to that extent the price level, almost immediately. By rendering the causal connection between money supply and price level more transparent, international currency competition reduces the likelihood of inflationary monetary policies.

In spite of these beneficial effects, free entry and, more generally, international currency competition are not usually advocated by national central banks, not even by the competitive ones. The Bundesbank, for example, launched a campaign in 1979 to convince the

⁵For a critical analysis of the welfare-theoretic arguments in favor of monetary-policy coordination see Vaubel (1983). Vaubel (1978b) shows that, in 1969–77, the average rate of European monetary expansion has always been negatively correlated with the dispersion of national rates of monetary expansion in the seven main countries.

⁶For a more detailed exposition see Vaubel (1978a, pp. 33f.). De Grauwe (1985) shows that, in 1979–84 the (full) members of the European Monetary System reduced their inflation less than the other major OECD countries on a weighted average.

⁷This is the terminology of Hirschman (1970).

German public and foreign monetary authorities that everything had to be done to prevent the mark from taking over a larger part of the dollar's position as an international currency, especially as an official reserve currency.⁸

Typically, central bankers object to international currency competition on the grounds that it renders national monetary management more difficult and risky, and it destabilizes exchange rates and the whole international monetary system.

It is true that a spatial money monopolist enjoys a quieter life than a competitive producer who must take into account not only the changes in total money demand but also changes in its composition. If the demand for money shifts among currencies, a simple x percent rule for monetary expansion is not likely to be adequate. The forward premium and a world portfolio growth variable will have to be included in the money demand function⁹ (or the monetary target has to be formulated for the "world" money supply or some proxy thereof).¹⁰ Each central bank has to allow for the money supply decisions of other central banks.

Is international currency competition undesirable from an international point of view? It disciplines those who try to supply their product at too high a price. For instance, if international shifts in the demand for money have been responsible for the dollar's and sterling's weakness in the seventies and for the weakness of the French franc in the early eighties, they have played a crucial role in bringing about a correction. International shifts in the demand for money are not the cause of monetary instability but its consequence and symptom. They are part of the corrective feedback mechanism. They impose a constraint which, in open economies, is more likely to be admitted than a constitutional money supply rule.

Why do even central banks that would be competitive object to international currency competition? It is tempting to adopt a public-economics approach: the benefits of currency competition accrue to private money holders and users (lower inflation tax and inflation risk) and to domestic taxpayers (larger external seigniorage), but the cost, the greater difficulty of determining the optimal rate of monetary expansion, has to be borne by the central bankers. After all, bureau-

⁸Deutsche Bundesbank, "The Deutsche Mark as an International Investment Currency," *Monthly Report*, November 1979, p. 33. For a detailed critique see Vaubel (1982a). In a more recent article under the same title, the Bundesbank calls foreign holdings of DM assets "neither too large nor too small" (*Monthly Report*, January 1983, p. 13 of the German edition).

⁹For a theoretical and econometric implementation see Vaubel (1980).

¹⁰See the proposal by McKinnon (1983).

crats tend to be held responsible for the errors they commit rather than for the opportunities they miss.

In the theoretical literature (notably Kareken and Wallace 1981), we find the objection that competition among central banks (outside monies) renders the equilibrium exchange rate(s) indeterminate because all, and only those, exchange rates which promise to be constant, are compatible with a rational expectations equilibrium. This objection is misleading because it assumes that monies are only stores of value and that they can be perfect substitutes. First of all, different groups of people who consume different baskets of commodities prefer different standards of value: since money serves as a standard of value, they would prefer different monies—i.e., monies that are stable in terms of different commodity baskets. Moreover, if for this reason (or owing to past government intervention) different monies coexist, currency transaction costs will reinforce the tendency toward the formation of (overlapping) payments circuits or currency domains. Thus, if money is also viewed as a standard of value and means of payment, two competing monies will hardly ever be perfect substitutes. The Kareken-Wallace view is not relevant to this world.¹¹

Currency Competition from Private Suppliers: The Case for Free Entry

If free currency competition between the central banks of different countries has the salutary effect of reducing rates of inflation below the monopolistic rates, it is difficult to see why the case for a competitive supply of money should not also extend to competition from private banks of issue. From a present-day perspective, the suggestion of an unrestricted competitive supply of (distinguishable)¹² private high-powered money must be regarded as truly (counter-)revolutionary, and even Hayek needed more than half a year to proceed, in 1976, from the demand for “free choice in currency” to the case for the “denationalization of money.”

Several justifications have been given for the prohibition of currency competition from private suppliers:

1. Profit-maximizing private issuers would increase the supply of their money until its price equals the marginal cost of producing it, namely zero; the result would be hyperinflation.¹³

¹¹Haberler (1980, p. 44) writes about the Kareken-Wallace view (in paraphrasing Keynes): “it is an extraordinary example of how remorseless logicians can end up in Bedlam, if they get hold of the wrong assumptions.”

¹²See Klein (1974).

¹³See Lutz (1936, pp. 4f.); Friedman (1959a, p. 7; 1969, p. 39); Pesek and Saving (1967, p. 129); Johnson (1968, p. 976); Meltzer (1969, p. 35); and Gehrig (1978, p. 454). This view has been criticized by Klein (1974, pp. 428–31); Vaubel (1977, pp. 449–52); and Girton and Roper (1981, pp. 21–24).

2. Private competitive supply of money renders the price level indeterminate.¹⁴
3. The private banking system is inherently unstable.
4. Monopolistic production of money by the state is an efficient way of raising government revenue.
5. The supply of money is a natural monopoly because of economies of scale in production or use.
6. Money exerts positive external effects; money, or the currency unit, may even be a public good.

The first argument repeats the confusion noted above: it mistakes the price of acquiring money for the price (opportunity cost) of holding money. What private profit maximization reduces to almost zero is not the value of money but the opportunity cost of holding it.

Some authors have objected that private suppliers of money may choose to maximize their short-run profits rather than their long-run profits, thus opting for hyperinflation at the time of their greatest success, when the present value of their confidence capital is at its maximum. Klein (1974, p. 449) and Tullock (1975, pp. 496f.) have replied that private enterprises tend to have a longer planning horizon than democratically elected governments and their central banks. However, this answer implies that central banks act as profit maximizers as well—in some cases a debatable assumption. The answer is rather that, if there is a danger of “profit snatching,” money holders will prefer currencies that offer value guarantees. This point will be further developed in the concluding section. It implies that private money is likely to be inside money. The first objection can only apply to outside money.

The second argument is correct in pointing out that the price level is indeterminate—indeed, under any system of money production, for the initial supply of nominal balances is an arbitrarily chosen number. To serve as an objection to private currency competition, the argument would have to show that the rate of change of the price level is indeterminate as well under such a system.

The third argument may justify money production by governments, but it does not justify barriers to entry. Whether claims on the private banking system are excessively risky is a question which each money holder can be left to decide on his own depending on his individual degree of risk aversion.

Fourth, even if a system of optimal taxation requires a tax on money balances in addition to the wealth tax, what reason is there to assume

¹⁴Gurley and Shaw (1960, pp. 255ff.); Patinkin (1961, p. 116); and McKinnon (1969, p. 316).

that the collection of government seigniorage is more efficient than the taxation of private money creation or of private money holdings?

Fifth, if money is a natural monopoly good, the central bank does not need a legal monopoly (although it may have to be subsidized).¹⁵ Since we do not even know whether money is a natural monopoly good and what its optimal characteristics are (for instance, whether it should be of stable or increasing purchasing power), barriers to competition from private issuers prevent us from finding out; the mechanism of discovery is blocked. A governmental producer of money is not an efficient natural monopolist unless he can prevail in conditions of free entry and without discrimination.¹⁶ Historically, the major central banks have not acquired their national monopoly position in this way.¹⁷

Finally, if money exerts positive external effects or is even a public good, there may be a case for subsidization, or even for governmental production, of money, but not for barriers to entry. The private supply of money would be too small, not too large.

Should Governments Supply Money?

The previous section has shown that governmental production of money may be justified, if (i) the private banking system is inherently unstable, and/or if money is (ii) a natural monopoly good or (iii) a public good. Whether arguments (i) and (ii) apply is an empirical question which cannot be answered as long as free currency competition from private issuers is not permitted.¹⁸ Monetary history does not provide a clear answer (Vaubel 1978a, pp. 387–401). Whether

¹⁵Subsidies may be justified even if marginal cost pricing is not the aim (because the additional taxation required would create excessive distortions elsewhere in the economy). They may be justified if the natural monopolist has passed the point of minimum average cost; for in this exceptional case, which Sharkey (1982, ch. 5) has emphasized, an efficient natural monopolist may be unable to produce the optimal quantity of output and to sustain himself against less efficient competitors if the government does not pay him a subsidy (which it should offer to all producers who supply at least as much output). Under Sharkey's assumptions, the subsidy must be sufficient to keep the net-of-subsidy average cost of the most efficient supplier of optimal output at the minimum average cost attainable for any smaller quantity of output.

¹⁶Nondiscrimination also implies that the government is willing to accept or pay any currency preferred by its private counterpart. Otherwise, a superior private money may not prevail in the market, merely because the government uses only its own money.

¹⁷The Bank of England, for example, was granted its monopoly not because it was gaining ground in the market but because it was losing out to the other joint-stock issuing banks which had emerged after the Bank's joint-stock monopoly had been abolished in 1826 (for details see Vaubel 1978a, p. 389).

¹⁸See Vaubel (1984) for an econometric test of the natural monopoly hypothesis and for a list of previous studies of this issue. The results are not conclusive.

money is a public good, as has often been claimed, is largely a matter of definition and needs to be clarified.¹⁹ There is no generally accepted definition of a public good. However, most authors seem to consider nonrivalness a necessary and sufficient condition.²⁰ Others regard nonexcludability as an alternative sufficient condition.²¹ A few treat the term public good as synonymous with positive consumption externality.²²

In this paper we shall retain the benefit of being able to distinguish between the general concept of consumption externality and the polar case of a (pure) public good which, in terms of production units, is equally available to all members of the group in a quantity or quality that is independent of the size of the group (nonrivalness).²³ We shall call a free good a good for which exclusion is not profitable (nonexcludability). The question of whether there are also more limited Pareto-relevant consumption externalities will not be pursued here because they would merely justify subsidies to money holders and users.²⁴

One group of authors ascribe a public good nature to money because "any one agent, holding cash balances of a given average size, is less likely to incur the costs of temporarily running out of cash, the larger are the average balances of those with whom he trades."²⁵ However, money balances do not satisfy the nonrivalness criterion (nor the nonexcludability criterion): as long as one person holds a unit of money and benefits from its "liquidity services," nobody else can own it and benefit from it. If he gives it away, he increases his own risk of temporarily running out of cash. Therefore, he will ask for a quid pro quo—a good, service, or some other asset.

For the same reason, it is not true that "the provision of a convertible currency is an international 'public good'" because "a convertible currency can be held and used by foreigners" (McKinnon 1979, p. 3) or that "the dollar is an 'international public good'" because "the United States provides the world's reserve currency" (Schmidt 1979, p. 143). Otherwise, any exportable good or asset which happens

¹⁹The remainder of this section is adapted from Vaubel (1984).

²⁰The seminal modern contribution is Samuelson (1954).

²¹See notably Musgrave (1959, p. 9).

²²Samuelson (1969).

²³This is essentially Buchanan's definition (1968, p. 54).

²⁴See Vaubel (1984, pp. 32–45) for a discussion of confidence externalities, price level externalities, and transaction cost externalities. The analysis shows that there may, but need not, be Pareto-relevant externalities in the demand and supply of money.

²⁵Laidler (1977, pp. 321f.). A similar view seems to be taken by Kolm (1972, 1977) and Mundell (Claassen and Salin 1972, p. 97).

to be supplied by a government would be an international public good.

Kindleberger refers to "the public good provided by money as a unit of account" (1972, p. 434) and "standard of measurement" (1983, p. 383) and applies the term public good to "money" (1978a, pp. 9-10), "international money" (1976, p. 61; 1978b, p. 286), "an international unit of account," and "international monetary stability" (1972, p. 435). International monetary stability in the sense of stability of purchasing power or exchange rate stability is not a good but a quality characteristic of the product money. Quality characteristics, it is true, meet the nonrivalness test: enjoyment by one does not detract from enjoyment by others (nor can they be excluded from them) provided they have bought the good itself. However, this applies to the quality characteristics of all goods. If the publicness of its characteristics made a good a public good, all goods that are sold to more than one person would be public goods.

It might be argued that the benefits of a unit of account (and a price index) can be enjoyed by a person independently of whether he holds and uses the money which it denominates (Yeager 1983, p. 321). More specifically, a person or organization, by adopting a certain unit of account (and by publishing a price index for it), may convey information, a public good, to all others. This would imply that government should suggest a unit of account and publish a price index for it, but not that it should supply money, let alone the only (base) money²⁶ or monetary unit.

Brunner and Meltzer (1964, 1971) have emphasized that money itself is a substitute for information because it also reduces transaction costs, and because transaction costs can largely be reduced to the costs of information about possible transaction chains, asset properties and exchange ratios between assets. Since money is a substitute for information and since information is a public good, Hamada (1979, p. 7) and Fratianni (1982, p. 437) conclude, there is a "public good nature of money." However, to show that X is a substitute for a public good is not sufficient to prove that X is a public good. A fence, a dog, and an alarm system are all to some extent substitutes for police protection but they are not public goods. What has to be shown is not that money is a substitute for information but that it provides the public good of information.

Several authors have argued that "public consensus" or "social agreement" on a common money is a way of creating generally useful

²⁶This conclusion is in fact reached by Engels (1981, pp. 10f.); Hall (1981, p. 21); and Yeager (1983, pp. 324f.).

knowledge and is thus a public good.²⁷ The knowledge in question is the predictability of individual behavior. What becomes predictable is not only the money which each individual accepts but also that each individual in the country accepts the same money.

Public decisions by definition meet the nonrivalness test. However, not all public decisions are public goods—they can be public bads (Tullock 1971). Since the aim of securing predictability of individual trading behavior, if taken to the extreme, may serve to justify the most far-reaching central planning by an omnipotent government (Hirshleifer 1973, p. 132), the mere fact that a certain act of government generates knowledge is not a sufficient justification. It has to be shown that the knowledge in question is worth its cost and that it is provided more efficiently by the government than by a competitive private sector. Both contentions are controversial.

The only operational proof that a common money is more efficient than currency competition and that the government is the most efficient provider of the common money would be to permit free currency competition. Whether the imposition of a common money or monetary unit is a public good or a public bad depends on whether money is a natural monopoly good or not. Hence, there is no independent public-good justification for the government's money monopoly. The public good argument is redundant.²⁸

Forecasting Monetary Arrangements under Free Currency Competition

If currency competition is to serve as a mechanism of discovery, government must not prescribe the characteristics of the privately issued currencies nor the organization of the private issuing institutions. Contrary to some proposals,²⁹ for example, it must not prescribe the monetary unit of account nor the types of assets that may be held by the issuing institutions.

²⁷Hamada (1977, p. 16); Frenkel (1975, p. 217); Tullock (1976, p. 524); Tobin (1980, pp. 86–87); and, with respect to the unit of account, Hall (1983, p. 34); and Stockman (1983, p. 52).

²⁸Currency competition might even be desirable if the process were known to converge to the government's money; for the government may not know in advance what type of money to converge to: "The monopoly of government of issuing money . . . has . . . deprived us of the only process by which we can find out what would be good money" (Hayek 1978b, p. 5).

²⁹Engels (1981) suggests that the government "has the task of defining the monetary unit . . . in terms of the market valuation of real assets . . . and of securing the solvency of issuing banks" (pp. 9f.). Hall (1983) believes that private money must be denominated in an interest-bearing reserve certificate which is issued by the government and is indexed to the price level. See Vaubel (1982b) for a critical review of Engels.

Refusal to prescribe specific arrangements does not prevent us from trying to forecast monetary arrangements under free currency competition; even Hayek (1978a, pp. 70ff., 122ff.) has done so. Hayek believes that private money would be stable in terms of "the prices of widely traded products such as raw materials, agricultural food stuffs and certain standardised semi-finished industrial products" (p. 71) and that "competition might lead to the extensive use of the same commodity base by a large number of issue banks" (p. 123). Vaubel (1977) has suggested that "value guarantees . . . are likely to be a necessary condition for acceptance of a competing money" and that "in the presence of unpredictable fluctuations in the determinants of the demand for money, value guarantees can only be maintained with precision and instantaneously, if they can be validated through exchange rate adjustment vis-à-vis another currency for which a price index is calculated" (p. 451). He believes that this reference currency, which cannot also be indexed (owing to the *n*-th currency problem), would be the outside money supplied by the government.

Another group of authors argues that the optimal money would appreciate relative to goods. Not all of them claim that the money which they regard as most efficient would also be most attractive to money users and prevail in the market, but this possibility should be considered. One variant is the so-called theory of the optimum quantity of money expounded by Friedman (1969), Johnson (1968), Samuelson (1963, 1969), and others; as Mussa (1977) has emphasized and criticized, it views money only as a store of value and ignores its standard of value function. According to another variant, which is due to Alchian and Klein (1973), the optimal monetary unit is stable in terms of a price index of all assets because the money cost of a given level of lifetime consumption utility ought to be held constant. Engels (1981) has recommended a real asset or pure equity standard because it would stabilize Tobin's *q* and thereby the business cycle. Engels suggests that such a unit would minimize the monetary risk for borrowers who invest in capital goods. However, the same is not likely to be true for all other debtors nor for all creditors. Bilson (1981) wants to transform money into an equity claim on a portfolio of real and nominal assets in order to render movements in the unanticipated rate of inflation countercyclical. A system of competing private mutual-fund monies is also envisioned by Fama (1982) and Greenfield and Yeager (1983). White (1984) predicts that they would not displace the government's outside money as a general medium of exchange.

Whether privately issued money would appreciate relative to, or be stable in terms of, some composite of goods, cannot be predicted

with certainty. However, experience with hyperinflation shows that the value of alternative monies, some of them private monies, tends to be linked to the price of one or more commodities. At times, for example in Germany in 1922–23, several commodity standards were used side by side. Chen (1975) reports a case in which this occurred over two centuries. Whether convergence toward a common standard of value and money is efficient and occurs depends on how similar the purchase and sale plans of different market agents are and how variable they expect the relative prices among commodities to be.³⁰

What assets are private issuing institutions likely to hold if they are not restricted by government? They would minimize their balance sheet risk by having their assets and their money denominated in the same unit of account. The intermediation risk is zero in the case of equity or mutual-fund money. It is also zero in the case of commodity reserve money, however at the price of a zero real rate of return. The issuer of a money whose value is linked to a commodity price index can earn a positive real rate of return without incurring a monetary intermediation risk, if his assets are indexed as well; but he (and his creditors) cannot avoid a real intermediation risk. Thus, under free currency competition—even more than now—the composition of banks' assets will depend on the risk-yield preference trade-off of money users. Their degree of risk aversion is likely to differ, and it may vary over time. It cannot be reliably predicted—not even by governments.

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³⁰See Vaubel (1978a, 1982b).

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COMPETITIVE MONIES: SOME UNANSWERED QUESTIONS

Phillip Cagan

Professor Vaubel (1986) has in mind competitive currencies with varying rates of exchange with each other and government money. We already have relatively competitive bank money today, but with fixed rates of exchange with the dominant government money. Competitive money at varying rates of exchange can occur if a country starts using a foreign currency, which happens when inflation is rampant. But wide use of a currency with a fluctuating value in terms of the unit of account is very inconvenient and, as far as I can see, would not last for long. It would soon become the unit of account itself. Moreover, in introducing a new money from scratch, it seems to me there would be a strong attraction to fixing its value in terms of the existing unit of account. Who wants to deal with a fluctuating rate of exchange? So, no matter who issues the dominant money, it is likely to become fixed in terms of the unit of account. This tendency I believe is crucial to a problem which I take up in a moment.

The main motivation for allowing private money, I presume, is to achieve a greater stability of value than government monies have recently provided. There may be other quality characteristics of money than stable value, but I cannot think of any of comparable importance that are not related to this characteristic. If so, it would seem that the gold standard would be acceptable for achieving the same result. The interest in competitive money apparently reflects a belief that the gold standard is no longer practicable, and a dissatisfaction with the lack of stability of government fiat monies. I too share this dissatisfaction.

I personally have no aversion to competitive money issues, and I have learned a lot from Vaubel's writings on this subject. I am

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skeptical, however, that competitive monies could develop in modern economies against the likely government opposition. In explaining the basis for this opposition, I shall point to a couple of crucial problems that Vaubel has left out of his discussion. Yet, if the instability of government money continues to create a demand for stable money, I think competitive monies may develop through the back door in a way that governments would not prevent even though they would not encourage it.

I start from the observation already noted that prices will tend to be stated in terms of the most widely used money, and I believe a dominant currency acting as the unit of account will be hard to avoid. And prices in this unit are and will be sticky. There is considerable uneasiness among economists as to why prices should be sticky, but I take it to be empirically established except in periods of extremely volatile inflation. The stickiness is due to explicit as well as implicit contracts and to what I have referred to elsewhere as the difficulty of coordinating price changes in industries that are less than atomistic.

The consequence is that monetary changes initially affect real output and affect prices only in the long run. The fluctuations in aggregate demand over the business cycle show up as fluctuations in money supply or demand. The OPEC oil price increases which affected output were a special case of such fluctuations. Governments want to be able to deal with these disturbances, primarily through monetary policy. Under competitive monies their ability to do so would be lessened or eliminated. Whether a downgrading of monetary control is desirable or not depends, of course, on how well governments stabilize aggregate output while at the same time maintaining the value of the currency. The record has not been very good in recent decades. My only point is that governments will not readily give up this capability. They always claim, of course, that they will learn to do better in stabilizing economic activity and prices. Moreover, there is great fear by all but confirmed *non*interventionists that crises and depressions can develop that governments must have the tools to deal with. Perhaps they could do so without maintaining power over the money supply, but the latter is clearly the traditional and well-known instrument for such intervention. Thus, this attraction of government control over the money supply rules out competitive monies unless one believes governments should not have such control. On this issue both sides have good points, but for political reasons government control dominates the debate at the present.

Among those who want to remove government control, the debate is whether competitive monies would be better than a constitutional rule of monetary conduct that would guarantee price stability. Lack

of experience in modern times with competitive monies is obviously a practical drawback in gaining support for them. We have had a little more experience with monetary rules than with competitive monies, but opponents of rules claim the experience has not been satisfactory. I will not pursue that question here.

Let me turn instead to innovations underway in the U.S. payments system and abroad that could eventually result in the development of a competitive monetary system that would satisfy Vaubel, and which the government shows no signs of stopping, until perhaps it will be too late. I refer to the extension of transactions services to the liability deposits of various funds outside the traditional banking and thrift institutions. These are now offered by mutual funds, brokerage houses, and are being developed by retail businesses such as Sears and Roebuck, though so far on a limited scale. These deposits are far from becoming common transactions media yet, but as costs of transferring funds decline, some of them could become common means of payment. Eventually, the government could be eliminated from money creation, as these funds develop a clearing mechanism that uses federal funds less and less. Regional banks could eventually handle most of the transfers among funds, and only net balances to be cleared among regional banks would require them to hold a small amount of federal funds. Perhaps Treasury bills might be used to settle net clearings, eliminating the Federal Reserve entirely. Whether the government would allow its money to be eliminated from such a payments system is unclear. It might not be able to stop it.

Whether this demise of traditional monetary policy would be a good thing depends on one's view of past aggregate demand management. In this new system the issuers of money would have no incentive to regulate aggregate demand, and the government could not engage in open market monetary operations. Its own money might not, as I say, be used widely enough in the economy to be of significance. For monetary operations it would have to hold a large inventory of privately issued money, which it would not do. Under these circumstances the government could no longer have a viable policy of stabilizing the price level. Stabilization would depend on the private issuers. Individually, they could rely on convertibility into gold, for example, to guarantee a stable value. The government could define a unit of account in terms of commodities that gave it a stable value, but private monies could not guarantee a fixed rate of exchange in this unit without convertibility. If there were many private issuers and convertibility were not adopted, however, individual issuers could actually guarantee a stable value of their currency only through indexing.

If the unit of account were subject to inflation as now, some of the private issuers could find it attractive to offer stable values rather than maintain a fixed value in terms of the unit of account. Indexing would be one method, made possible for accounts which had fluctuating market values through marking to market, as our money market mutual funds do today. Some funds could be indexed to a price index of the dollar in which prices are expressed. Such indexing would require, of course, that assets of the fund also be indexed in the same way, to provide balance that eliminated inflation risk. But large institutions could probably expand their assets in indexed loans to match indexed liabilities. This is now legally possible in the United States. As Huston McCulloch (1980) noted in the *American Economic Review*, previous legislation passed in 1933 to abrogate gold clauses, which also prevented any form of indexing of contracts, was repealed in 1977—apparently without much thought at the time about these consequences. Of course, the government would maintain a monopoly of currency. But this could become even less important than it already is through charge cards.

Yet I see a flaw in the development of private monies with indexing. If they are successful and become generally used, prices will come to be expressed in their units, not the traditional dollars, because the economy naturally expresses prices in terms of the common medium of exchange, for convenience and simplicity. But a money that is the unit of account cannot be indexed. Indexing of such money would make price movements explosive.

So I am not sure we can in fact develop an indexed money that can be maintained. Its very success would lead to its general adoption as the unit of account and make the indexing no longer feasible. If that is right, we must rely on convertibility or monetary rules to maintain a stable value of money, though the money could be issued by a private as well as government institution. But if a rule is to be enforced, it does not allow a free monetary system.

In the future, I do not think stability of the value of money will be a major issue, except that an inflationary environment can disrupt non-monetary investments. It is becoming increasingly easy to avoid any inflation tax by holding a variety of other assets and converting them into money to make payments as needed. We want stability in monetary policy to keep economic activity on a stable path as well as stable price path. I am skeptical that competitive monies will provide an acceptable stability of general economic activity. The government monopoly of monetary control has not done very well either, but there is a belief, or at least hope, that it can do better.

Until that belief is shattered, for the general public, we shall not see
of discretionary monetary rules or competitive monetary reforms.

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