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MONEY, PRICES AND FINANCE IN THE NEW MONETARY ECONOMICS*

By KEVIN D. HOOVER

I. Introduction

MONETARY theory is founded upon the implicit premise that money and monetary institutions are fundamentally different from other economic goods and institutions and that monetary analysis, therefore, must itself be distinct from non-monetary analysis. Recently this view has been challenged by the so-called New Monetary Economics.¹ The only thing that makes money on this view different from other goods is the intervention of the government; and, consequently, monetary theory is simply a special case of the theory of government regulation. The purpose of this essay is to examine one version of this view in order to show that it does not succeed and that economists were right to treat money as worthy of special analysis.

The New Monetary Economics has taken two distinct lines of development. Each seeks to meet the challenge of Hicks (1935) to ground monetary theory in the same price-theoretic analysis taken as standard in other areas of economics. One line emphasizes money's function as a store of value and develops the class of overlapping generations models in order to highlight this function (e.g., Wallace 1980; Bryant and Wallace 1980, 1984). The other line of development concentrates on the relation between money and other mechanisms of exchange and attempts to apply results from the modern finance literature to monetary theory. It is this attempt to wed monetary theory and finance which will concern us here.

The roots of the effort to apply modern theories of finance to monetary economics go back at least to Fischer Black's paper 'Banking and Interest Rates in a World without Money' (1970). Recent contributions include Greenfield and Yeager (1983) and Lucas (1984). White (1984) and McCallum (1985) provide useful critical reviews of the literature. But it is Eugene Fama's widely known paper, 'Banking in the Theory of Finance' (1980), which has been called '... perhaps the most influential statement of the new monetary economics ...' (Hall 1982, p. 1553), that shall be the centre of our attention in what follows. Fama's paper is virtually identical with Black's in conception and conclusions. It differs in its specific application of the Modigliani-Miller theorem to banks and in its extension of Black's results to a world with government fiat money.

The conclusions of Fama's analysis are striking: in principle the economic system could function perfectly well without fiat money; fiat money could be introduced through government intervention; if it were introduced, control

* I would like to thank Peter Oppenheimer, Lawrence White, Peter Sinclair, Charles Goodhart, Steven Sheffrin and Thomas Mayer for comments on earlier drafts.

¹ This term seems to be due to Hall (1982).

of inflation would be a simple matter of controlling the stock of fiat money (cash and central-bank reserves); and, most striking of all, the price level would be independent of the composition of private portfolios—in particular, independent of the stock of bank deposits, which constitute by far the largest component of the money stock as reported by central banks. The policy implications of this view are that monetary control should focus on the monetary base and that the regulation of banks and related financial intermediaries is no more or less necessary than the regulation of any other industry.

Fama's attack on the problem of integrating monetary theory and value theory is a radical one: he simply abolishes monetary theory. The main lines of his argument are very simple. Wealth can be exchanged through two *distinct* mechanisms: either by exchanging an asset for currency and then exchanging this currency for another asset or by changing bookkeeping entries in an accounting system. Currency, Fama claims, is money, and has a well-defined demand because it is homogeneous and has well-defined uses. Deposits are not money but heterogeneous financial assets which provide access to an accounting system maintained by banks and financial intermediaries. Banks provide a real service by maintaining the accounts. This service is itself a well-defined good—separate and distinct from the bank's financial portfolios. So letting currency be the numéraire, the problem of price determination is no different in a system with currency and banking services than in the Walrasian system without money. Monetary theory collapses into value theory.

The crucial step in this argument is what might be called 'the separation theorem'—i.e., the belief that the real services of banks are independent of the compositions of their portfolios.² We shall argue that the separation theorem is false.

The remainder of this essay is divided into five sections. Section II discusses an example from Fama's paper in order to give the reader some intuitions in a concrete case of the nature of our objections to his analysis. Section III gives a more detailed sketch of Fama's argument. Section IV argues that money is essential to a developed financial system. Section V uses this analysis to show why the separation theorem fails. Finally, Section VI summarizes the conclusions.

II. The parable of a world without money

Fama concludes his paper with a seductive but flawed tale of our future in which computerized banking and exchange is so well developed that cash has ceased to exist altogether. In the absence of coins and banknotes, accounts have come to be denominated in units of a real good—in particular, in steel ingots. The steel ingots are a pure numéraire. They are

² Peter Oppenheimer suggested the term 'separation theorem.'

not used as an intermediary in exchange, they merely serve as a convenient unit for expressing the value of a good when bargaining, setting a price or keeping the (fully computerized) books. In such a world, if I buy a spaceship from you for, say, 6,000 ingots, I merely key in the transfer of 6,000 ingots worth of my financial assets to you; and the computer at my 'bank' ('broker' or 'financial intermediary'), which is linked to other banks' computers and, presumably, to the various stock and bond exchanges, registers the transfer.

Obviously, in such a world the supply and demand for steel ingots and other real goods determines the price of steel ingots. The fact that steel ingots are used as the numéraire has no effect on their price and, hence, on the general level of prices at all. Financial assets are merely claims to the yields of real assets. As such their prices are simply derived from the current and expected future prices of those real assets and do not affect them.

Given the advanced technology of the spaceship age, the only loser from the withering of the currency system is the government, which can no longer gain seignorage from currency creation. But Fama observes that the government could itself start supplying abstract 'units' by entering them into the accounts of various people as transfers or in exchange for services or goods needed by the government. If the government then placed a tax on spaceships payable in units, the demand for spaceships would be depressed somewhat; but at the same time a demand for units and an opportunity for seignorage would be created. Units could replace steel ingots as numéraire and the level of prices in terms of units would then depend on the supply of units (controlled by the government) and the supplies of and demands for spaceships and other goods, but not of financial assets.

This tale is seductive because it is easy to imagine projecting the current trend in transactions technology until cash is no longer used. The central flaw in the tale is the implication that the essential real service provided by cash is that of an efficient surrogate for a bookkeeping system. If that is so, then a highly developed computerized bookkeeping system, which may someday eliminate cash from hand-to-hand transactions, would be an efficient substitute for cash in all of its uses. But in fact it is not so. In stressing the possibility that the use of cash can relieve us from the need to keep complex accounts, Fama ignores its role as a preferred good of settling outstanding debts.

Whenever we purchase a real good—except in direct barter—we create an incipient debt. Cash settles such a debt. In Fama's spaceship economy these debts are settled by transfers of assets of equal value. Unfortunately this ignores the fact that we usually have preferences over what sort of assets we wish to accept in exchange. The only situation in which such preferences can be dismissed as irrelevant is when there is an economy-wide Walrasian auction: for then no matter what combination of assets I choose to sell in order to transfer 6,000 ingots (or units) worth of value to you, you may purchase *any* combination of 6,000 ingots worth of assets you choose.

With such an auction it is always the case that it is only the *value* of one's endowments not their actual composition that limits one's choice of consumption goods or acquisition of assets.

The spaceship economy works by a sleight of hand. The fact that computerization may allow us to dispense with notes and coins does not transform our economy from one in which transactions are made in a higgledy-piggledy, uncontrolled manner into one in which they are coordinated by a central auction. Without the auction, cash serves in a middleman role, severing my obligations to the seller of goods I buy and allowing him to buy other goods without incurring obligations. It is clear that cash can replace the bookkeeping system. It is not clear, however, that anything in the spaceship economy's bookkeeping system adequately replaces money's role as a middleman in transactions.

The story seems plausible only because the nature of financial assets and exchange have not been sufficiently analysed. Fama's argument for the fundamental unimportance of money does not, however, rest simply on a plausible tale, but on a more formal analysis—to which we now turn.

III. A sketch of the separation theorem

Fama's major contention is that the banking system has no special role to play in the establishment of the price level. He begins by imagining a world with banks and financial intermediaries but no currency or other hand-to-hand means of exchange. The unique function of banks is that they maintain a system of accounts for the transfer of wealth. Banks constitute a transactions industry and so provide a real service to the community. They are competitive profit-seeking firms with a different product, but not otherwise distinct from other firms.³ They are also financial intermediaries, selling deposits and buying portfolios of (riskier) assets. Intermediation is a real, but secondary service; for clearly banks need not hold the assets just in order to provide accounting services.

Banks in such a world might offer various sorts of deposits—some risk-free, others with varying degrees and types of risk. For example, there might be ordinary demand deposits or deposits whose values were tied to a stock market index or deposits which were claims on a money market mutual fund. In any case, deposits would be heterogeneous and, thus, not suitable as the numéraire or unit of account. Efficiency demands, however, that accounts be maintained in some common numéraire. Fama suggests choosing one of the real goods of the system and does not agonize over

³Fama seems to support the 'new view' of Gurley and Shaw (1960) and Tobin (1961; 1963). At the same time, he insists on currency's distinctiveness in the manner of Pesek and Saving (1967). Both Fama and Pesek and Saving agree that money is not debt but real wealth. He differs from them primarily in that he places current accounts with the debt of financial intermediaries in the category of 'financial assets' and therefore excludes them from net wealth rather than placing them, as Pesek and Saving do, with currency in the category of 'money.'

which. He does observe, however, that it need not be portable or storable—crude oil or sides of beef would do quite well. The numéraire is just an accounting device; it need not be transferred.⁴

The last part of the argument is simple. Fama applies the Modigliani–Miller theorem to banks in order to show that the amount and composition of their liabilities does not affect the level of prices. There are many versions of the Modigliani–Miller theorem, but they have in common that, under a set of more or less reasonable assumptions, how a firm finances its real activities has no effect on its own market value or on the production and consumption decisions of other economic agents.⁵

One set of assumptions that Fama uses for the ‘strong’ form of the theorem is:⁶ First, that there are perfect capital markets—i.e., no taxes, transactions costs or danger of bankruptcy. Second, that there is informational efficiency or rational expectations. Third, that agents are concerned only about the pattern of returns of their financial assets under different states of the world—i.e., risk and return matter only inasmuch as they affect wealth. Fourth, that firms’ investment decisions are made independently of how the investment is financed and according to fixed rules. Fifth, that agents have equal access to capital markets—in particular, if a firm can issue a liability, an individual can issue one on his own account with the same pattern of returns under various states of the world.

The assumption of equal access to capital markets can be replaced by two other assumptions to yield a ‘weak’ form of the theorem. The first is that no firm produces any security monopolistically—i.e., there are always perfect substitutes for any financial asset. Second, the firm’s goal is always to maximize profits at prevailing prices. These imply that, even if an individual is barred from full participation in the capital market, some firm will provide him any asset or liability he chooses, giving him effectively equal access.

In either its ‘strong’ or ‘weak’ form, the intuition behind the Modigliani–Miller theorem is the same. Agents’ tastes for risk and return are derived from their tastes for real goods in different states of the world. If a firm alters the composition of its finance (say, its debt/equity ratio or the type of debt or shares it issues) this may *ceteris paribus* adversely affect other agents’ (say, shareholders’) real opportunities. The *status quo ante* in the real economy can always be restored, however, under either set of assumptions, if agents make compensating changes in their own portfolios. Arbitrage guarantees—and this is the importance of the assumption of equal

⁴ Contrast Fama’s position with Friedman (1951), who makes storability and portability the prime requirements for a successful commodity standard.

⁵ The original statement is Modigliani and Miller (1958); the most influential restatement is Stiglitz (1969).

⁶ For the ‘strong/weak’ terminology, see Fama (1980), p. 45. For the assumptions, see Fama (1978).

access or of perfect substitutes—that neither the real opportunities of agents nor the market value of the firm is altered by the firm's portfolio decision.

Banks, Fama argues, provide real services just as other firms do, and their deposits finance their real activities just as other firms' liabilities finance their real activities. Hence, the Modigliani–Miller theorem can be applied to a competitive banking system without currency, and the conclusion drawn that the composition of bank portfolios does not affect the details of the general equilibrium with respect to real goods. Furthermore, the price level in terms of the numéraire is not affected (cf. Fama 1982, pp. 6, 7).

Since deposits, even of the sort we are in the habit of calling money, do not affect the price level, the problem of determining the price level in an accounting system of exchange reduces to the question of whether there exists a stable solution to the general equilibrium system without money.⁷

Regulating the sort of portfolios banks may hold against deposits or the interest rates they may pay on certain types of assets which they offer may affect bank behaviour, but, Fama believes, it does not alter the banks' essentially passive nature with respect to the real economy and the price level. Imposing reserve requirements is the equivalent of imposing a tax on certain types of assets. Again, this does not alter the fundamental conclusion: taxes of course have real effects, but the banks as deposit creators are nonetheless passive.

Fama next considers a second case in which his moneyless world is complicated through the introduction of currency supplied by the government.⁸ Currency may be more efficient in some sorts of transactions than the accounting system. The demand for currency will depend on the opportunity cost of holding it (interest foregone), the real transactions in which it has a comparative advantage and the minimum real cost of executing those transactions through other means (cf. Fama 1983, pp. 11–13). With a well-defined demand, if supply is also well-defined, then, Fama believes, this complication again leaves his main conclusion that non-money financial assets do not affect the price level intact. Indeed, if the currency unit is the numéraire, the price level, which for Fama in the system without currency was the various relative prices of goods in units of barrels

⁷ Fama's use of the term 'price level' is somewhat misleading. The barrel of oil price of each good is a *relative* price, while the price level is usually taken to refer to *absolute* or *nominal* prices. What Fama claims is that, since the activities of banks can be split between real (accounting, exchange and intermediation) services on one side and finance on the other and because finance is irrelevant, there are only relative prices. The distinction between absolute and relative prices, then, is itself misleading. The term 'absolute prices' has no other meaning than the relative prices of goods in terms of money (currency). In a system in which currency does not exist and deposits are, by virtue of the Modigliani–Miller theorem, irrelevant to the relative prices of any real goods, there are no absolute prices. Compare Pesek and Saving (1967), p. 58 and Black (1970), p. 13.

⁸ We follow Fama's usage throughout the paper in restricting the word 'money' to inconvertible real goods used in exchange. Even checkable bank deposits are not money on this definition.

of oil, is now the various relative prices in units of currency. The government need only fix the supply of currency and its demand will determine the price level, no matter what the composition of financial portfolios.

Fama's position is that Patinkin (1956; 1961) and others err in their analysis of the financial system by assuming that certain heterogeneous financial assets are on a par with hand-to-hand currency—that both are money. The mistake arises from the fact that both can be used in the exchange process and both are denominated in the same units. The similarity, Fama argues, is an illusion. At each point that currency changes hand a transaction is complete; currency acts as an intermediate store of value (a temporary abode of purchasing power). Currency is thus a good. This is clear in the case of gold coin or other commodity money but equally true for fiat paper (a point we shall return to in due course). In contrast, exchange through banks, is, Fama believes, very different. There are no intermediate stores of value, and transactions involve only entries in the bank's books or computer. Most important is that the transactions services of a bank (i.e., bookkeeping) do not require that the bank hold the assets exchanged: portfolio management is a separate activity from providing transactions services. Only government regulation distinguishes banks from other intermediaries. There is, therefore, nothing special about the services provided by banks as economic goods. Along with currency they may enter into the list of goods in a Walrasian general equilibrium system. The problem of a determinate price level is, he argues once again, simply the problem of the existence of a stable equilibrium.⁹ If currency is the numéraire and its relative price is fixed along with the prices of all other goods, the price level is fixed.

Fama's strategy is to separate the transactions/intermediation complex into three well-defined real economic goods (currency, accounting exchange services, and intermediation services) on the one side and the financial system on the other, and then to use the Modigliani–Miller theorem to assert the independence of all real goods from the financial system, thus leaving relative prices to be established in a Walrasian system in which the composition of agents' portfolios is irrelevant.

The conclusion of Fama's analysis is what we have called the 'separation theorem.' It is the claim that in any economy relative prices, including the relative prices of the real services provided by financial assets, are independent of the volume and composition of financial portfolios. It follows from this that, if an economy has a real good (commodity or fiat money) which is used in transactions, absolute prices are simply relative prices expressed in terms of this good; and these absolute prices (and

⁹ Fama ignores the difficulties—well-known since Hahn (1965)—of demonstrating the existence of a Walrasian equilibrium in which the transactions role of money is left implicit.

therefore inflation) are themselves independent of financial assets, including bank deposits.

IV. Money and the nature of financial assets

The argument that the price level is independent of the volume and composition of bank deposits depends crucially on the assumption that it is sensible to consider a financial system without money. The fundamental flaw in Fama's account is that such a system is not a practical possibility.¹⁰ The mistake arises from a failure properly to analyze the nature and function of financial assets. In this section we argue that a financial system cannot function without money, and that the value of money cannot, therefore, be separated from the volume and composition of financial portfolios.

As we observed of the spaceship economy (Section II above), Fama implicitly assumes that prices are set in a Walrasian auction. Obviously, such an assumption is meant to be taken not as an accurate representation, but as a good approximation (Fama 1980, pp. 46, 47). Unfortunately, it is not even that. A fictitious auction serves to eliminate two distinct problems from real life trading. The first is the establishment of market-clearing relative prices. In Fama's as with other accounts this function holds centre-stage. Still, even if market-clearing prices are set, a second problem remains—namely, actually to execute the trades that are needed to establish the equilibrium. An auction hall where traders all meet is one way to imagine this second problem being solved. Other institutions, such as trading posts, might also work equally well. Once we look past any of these fictitious systems, however, the problem of guaranteeing that desired trades can in fact be executed looms larger than that of establishing relative prices. In practice matching buyers and sellers is a fairly haphazard business, and mostly there will be only a coincidence of wants not the vaunted double-coincidence of pure barter. Traders are, then, constantly faced with a balance of payments problem in which one has made a desired purchase while the other must hold some sort of debt—at least temporarily—until he in turn is able to find a seller.

In a Walrasian system, with a once and for all auction, financial assets are simply claims to goods which may be exercised given well-defined contingencies.¹¹ They serve as devices to alter the risk characteristics of one's endowments, and are priced derivatively in relation to the underlying real goods which stand behind them. Actual economies are sequential in the sense that trade occurs continuously and no institutions guarantee a match between buyers and sellers. In sequential economies financial assets serve

¹⁰ Impracticality is a legitimate criticism as Fama's analysis is not meant to be purely hypothetical (see Fama 1983).

¹¹ Financial assets will be similarly characterized in a sequence of markets with perfect foresight or rational expectations.

the additional function of permitting unbalanced trade and of redistributing purchasing power through time.

A developed financial system in a sequential economy is practically possible only if there is money. This follows from two critical characteristics of financial assets. The first is convertibility: all financial assets represent a claim on something else—a good or another asset. The claim may be on an infinite stream of payments alone as with a consol; or on a fixed amount on demand as with a current account; or on a definite stream as with any bond or short-term note; or on an indefinite stream as with common stock; or on another financial asset as with stock options. Whatever a financial asset is a claim on, it is on something besides itself. It is inconvertible, for example, that the *only* right a consol holder had to interest was payable in consols. It might be that such an option existed, but there must be the other option to receive cash as well. Similarly, while corporate shares that did not pay dividends are conceivable and even desirable in order to avoid taxes, it is hardly possible that they should be valuable if they were legally restricted from *ever* paying dividends.¹²

A financial asset may be directly convertible only into another financial asset. Ultimately, however, there must be a chain of conversions that ends in a valuable good which carries no further right of conversion. This is not a logical but a practical necessity. Hicks (1982), for example, imagines a banking system in which deposits at one bank are convertible into those at another but not by right into anything else. But he goes on to the case in which there is one dominant asset or competing dominant assets. Such dominant assets or *ultimate goods of conversion* are needed in this system: first, because chain letter valuations of financial assets are more fragile the longer the chain—without an ultimate good of conversion all chains are circular (effectively infinite); second, because the banks are subject to the same problem of settling payments imbalances that arise in a non-Walrasian barter economy—an ultimate good of conversion serves as an ultimate good of settlement of interbank claims.¹³ Hicks' banking system is very like Fama's accounting system of exchange, yet Fama does not discuss the necessity of an ultimate good of conversion. He does, however, provide evidence elsewhere that privately produced banknotes in the United States before the Civil War were successful only when they maintained convertibility at par with dominant Federal coin (Fama 1982; cf. Klein 1974 and

¹² This may not be strictly true if the power enjoyed by having a controlling shareholding in a company is considered to be of value even without a direct share of the profits. I owe this point to Lawrence White.

¹³ Inconvertible deposits (or private banknotes) might circulate between banks or individuals out of force of habit or custom if their convertibility was quietly removed. Not all assets used in settlement are ultimate goods of settlement. It is, however, difficult to imagine that once inconvertibility became widely known because of a public announcement or because of an unsuccessful attempt at conversion that they would continue to circulate. The history of speculative attacks on private banknotes and of runs on banks illustrate the point (see Fama 1983, p. 19).

Fama 1983, pp. 12, 13, 19). Currency or central bank reserves are typically *the* ultimate good of conversion in developed financial systems in that most financial assets are convertible by right into them through some chain of conversions. Even assets which are convertible into some other real good—say, a future contract into wheat—may generally be settled in currency or central bank reserves either as a convenience or because of default. The role of terminal good is so important that ‘money’ might well be defined as the ultimate good (possibly goods) of conversion or settlement in a developed financial system.

The second characteristic of financial assets in a non-Walrasian economy is the absence of direct connection between the claims represented by the asset and the underlying goods that it is a claim against. This is clearest in the case of current accounts convertible on demand into cash at a bank. When too many attempt to convert the asset, the bank is forced to default (unless it is itself able to borrow enough cash from another source). The same is true of other financial assets as well. Default is sometimes prevented simply because people are willing to hold new financial assets in the place of old ones falling due. This lack of necessary connection between financial assets and their goods of conversion opens up the *possibility* of default. It also reinforces the importance of any single good which is generally accepted as settling accounts (money), since such a good will be more readily obtainable because of its special role than other goods, diminishing the chance of *actual* default. Wheat can be had usually only from a farmer or a grain factor, while money can be had in exchange for almost any good including new financial assets.

Money is, then, practically necessary to any developed financial system: first, because there must be some ultimate good (or goods) of conversion for all financial assets. Second, the lack of necessary connection between the amount of outstanding claims to goods of conversion and the amount of those goods available enhances the importance of some possible goods of conversion over others. If there exists one good that no one much objects to being stuck with—gold, beaver pelts, cowrie shells or currency—it tends to become the good in which accounts are settled and in which financial assets are ultimately convertible.

V. The invalidity of the separation theorem

If the analysis of money and the financial system developed in the last section is correct, Fama’s separation theorem is false: the volume and composition of financial portfolios and the value of money (or the price level) are not independent. The argument against the separation theorem begins with three essential points of that analysis. First, any realistic and interesting economy is non-Walrasian (i.e., trade is not coordinated in such a way that all markets are always cleared), and such economies require some good or goods to settle accounts. Second, of their nature financial

assets must be ultimately convertible—directly or through some chain of conversions through other financial assets—into a real good. Money is the most common ultimate good of conversion. Third, the roles of good of settlement and ultimate good of conversion naturally tend to converge, so that a single good is used commonly in financial and non-financial transactions and is the good that the holder of a financial asset may claim by right when it becomes due. This good is exactly what is normally called money.

A controversial claim about what determines the value of money lies at the heart of Fama's argument. It is, therefore, necessary to examine what light our analysis casts on this issue. Fama's own answer to this question is, in one sense, unexceptionable: the value of any good depends on its demand, a function of its real services, and on its supply, a function of the cost of production for a commodity and of government fiat for an unbacked currency. Notice that Fama's is a narrow definition of money—a commodity or inconvertible paper (currency or central bank reserves) used in exchange. This definition implies according to our earlier analysis that money is not a financial asset because it is not convertible by right into anything else. Money, even fiat money, is a real good.¹⁴

The real problem is not to observe that money's value derives from its real services, but to say what those services are. This Fama fails to do. Instead he simply notes that the cost of production governs the value of commodity money in the long run (Fama 1982, pp. 23–26). Similarly in the first version of the spaceship economy it is the supply and demand for steel ingots and other goods that determines their value. Since ingots are a pure numéraire, the volume and composition of financial assets can have no effect on their price. In the second version, abstract units are introduced, and their value derives from their fixed supply and the supply of and demand for spaceships. Since finance does not affect the value of spaceships, it does not affect the value of abstract units.

Fama means for us to see a clear analogy between his abstract units and currency as we know it in actual economies. Unfortunately, the analogy is imperfect because currency is not simply a clever revenue-raising device, but also a means for conducting transactions; and Fama gives no satisfactory account of how it functions in this latter role.¹⁵ Yet it is clear how currency works. Currency is a real good and exchange using currency is a form of non-Walrasian barter. I accept currency in exchange generally not because I want to hold it in equilibrium, but because it is a preferred means of settling

¹⁴ A ten dollar bill is of course convertible by right into ten one dollar bills. Such conversions are restricted to a tight circle of related assets and, therefore, hardly alter the point.

¹⁵ Fama (1983) pays relatively more attention to currency's comparative advantage in some transactions than Fama (1980). Yet Fama (1983), pp. 18 and 19, still maintains that government issued currency can circulate unbacked (and therefore be 'money' on Fama's narrow definition) largely because of the government's right of taxation and that even a monopoly government currency requires enforcement.

the payments imbalances that arise as I seek to acquire a desired combination of consumption goods and assets. Any real good (gold, steel ingots or units) which is used in transactions becomes monetized. Once a commodity is monetized, its value is largely governed by its monetary uses. In basing the value of fiat money on taxing authority Fama exaggerates the difference between fiat money and commodity money, which is itself valued to a great degree because it is money and not for its non-monetary uses.¹⁶ It ignores, furthermore, the 'autocatalytic' character of any money—it is valuable because it is already valued.¹⁷ 'A mere casual patriotism, or familiarity, or force of habit may be sufficient to prevent a shift to other currencies, even in the absence of legal sanctions, provided that the immediate incentive for such a shift is not too great' (Vickrey, p. 82). Imagine that taxes were abolished or that people were permitted to pay their taxes in gold bars, wheat or some other commodity; there is no reason to suppose that banknotes would suddenly be treated as valueless.

This is not to say that monetary systems are stable under all circumstances.¹⁸ The point is rather that taxes or reserve requirements serve as sporadic policing of the value of fiat money; but that in normal circumstances they are not required for its continuing value any more than the police are required to insure the law-abiding behaviour of the average citizen.¹⁹ The value of fiat money is more fundamentally derived from its settlement services.

But money in Fama's restricted use of the term is not the only source of settlement services. Financial assets can also provide settlement services—in some cases more efficiently than money. Current (checking) accounts at banks are financial assets—ultimately convertible into money—which pro-

¹⁶ Robertson (1948), p. 45, makes this point in a whimsical dialogue between the economist and a paper banknote. The economist begins:

'You are a fine looking fellow, but are you not a little flimsy and anaemic. If you were to give up working as money do you think you could earn a living?'

And the banknote responds:

'...No, of course I should be no more use at house decoration or dentistry or other honest work than ... you would yourself. And it is not only we paper pieces of whom that's true. There is my friend the rupee for instance: ... if you took his lettering off him his carcase would come tumbling down in value. For it isn't his flesh that gives him the value he has got, it's the writing on him.'

¹⁷ Vickrey (1964), p. 76. compare Robertson (1948), p. 46; the banknote speaks of gold coins:

'They think men run after them because they're strong and handsome, and so it was when men were savages. But the chief reason men run after them now is because they're money.'

¹⁸ Charles Goodhart reminds me that history provides examples, such as the Confederate States at the end of the American Civil War, in which the value of money fell rapidly to zero as the expectation of the collapse of the government became nearly certain and imminent.

¹⁹ The point here recalls the debate over whether money is essentially the creature of the state or not: in favor, see Knapp (1924) and Keynes ([1930] 1971), pp. 3–5; opposed see Mises (1981), pp. 83–94; compare Frankel (1977). Legal enforcement of money's status as legal tender itself provides sporadic but inessential support to its value: also see Robertson (1948), pp. 42, 43.

vide access to an accounting (clearing) system. In such a system, the mutually cancelling debt of different financial intermediaries is written-off, so that only the uncleared balances need be settled with a mutually acceptable good of settlement—usually central-bank reserves. The assets of these intermediaries may provide brokerage or bookkeeping or even risk-spreading services; but, more essentially, they provide settlement services.

Settlement and convertibility are closely related. A financial asset can be used as a good of settlement because it mimics money's ability to discharge debt. When you deposit my cheque, my part of the transaction is finished; while you are holding a financial asset (ultimately a claim on some ultimate good of conversion), which is the bank's liability not mine. The ability of a financial asset to mimic money's settlement services derives entirely from the fact that holders believe that it is transformable into money through some reliable chain of conversions. Were people to discover that the financial asset was no longer convertible, it would no longer be accepted in place of money.

The actual suspension of convertibility between gold and banknotes in many countries (such as Britain in the First World War and again in the 1930's and the United States in the 1930's) does not qualify this point at all. The banknotes were still accepted in the payment of taxes, could still be used to fulfill reserve requirements, legal judgments and so forth. On our earlier analysis, such banknotes, once they became inconvertible, were no longer financial assets but money—real goods.

Financial assets must be convertible in order to be valued, and, therefore, must be convertible to be used in settling trade imbalances. On the other hand, the need to maintain convertibility restricts the volume of financial assets that may be issued. Some of the goods or assets that a financial asset promises to pay must be on hand for those who desire to convert it or it will not longer be seen as a reliable substitute for money. If convertibility is maintained, however, a financial asset used as a means of settlement can reproduce any effect that money may have on the economy.

The ultimate good of conversion for financial assets used in settlement need not be gold or banknotes, but may just as easily be deposits at the central bank or even Fama's units. Once in this role, however, units have become monetized and are no longer valued only because one needs units to own spaceships but also because they are money. Despite being monetized, units, although real goods, remain abstract rather than concrete; they are money, but not currency. Nonetheless, currency may serve instead of units as the ultimate good of conversion, and so may gold or oil. Even with concrete goods such as gold or oil, which have alternative real uses, inflation is not ruled out because they have become monetized. Inflation of the issue of a fractionally-backed paper banknote convertible into gold, for instance, would depreciate the gold in storage as well as the paper. Only the *actual* insistence of holders on conversion would limit the issue.

We are now in a position to say more precisely what is wrong with the separation theorem. Fama's argument—as set out in detail in Sections II and III above—can be summarized in two related claims. First, it is wrong to add money and financial assets together. Money is a real good which provides real services. Financial assets may provide real services; but, qua financial assets, they are merely (contingent) claims to real goods. Furthermore, financial assets are themselves heterogeneous; so it makes no sense to add dissimilar financial assets together either.

Since money and financial assets really are extremely varied, this point may at first seem persuasive. But the properties of any good are multi-dimensional; and our analysis of the nature of money and financial assets shows that, in the dimension of settlement services, money and some financial assets are homogeneous. Financial assets that belong to clearing systems (e.g., certain bank accounts and central bank reserves) are, for example, convertible into cash on demand and provide settlement services. A debt is just as completely settled when my cheque clears as it would be had I paid in cash. My cheque, of course, has value because it is convertible into cash, even if no one in fact converts it.

One way to see this point is to put it into the context of Walrasian models with a finance constraint (Clower 1967). In such models, agents' purchases in each period are constrained not only by their lifetime budgets but by the cash or cash substitutes they hold at the beginning of each period as well. The simplest version takes the aggregate form

$$p \cdot E \leq M, \quad (1)$$

where p is the price level, E is real expenditure and M is the money held at the beginning of the period. If the constraint is binding and if aggregate expenditure equals aggregate income, then it follows that

$$p = M/E, \quad (2)$$

which is a simple quantity equation.²⁰

The finance constraint aims to capture the need for some medium to settle payments imbalances. Cash is obviously one medium. An individual may borrow cash in order to relax his own finance constraint. Such borrowing merely redistributes cash and, therefore, leaves (1) and (2) unaffected. An individual may also borrow from a bank in the form of a demand deposit. Because banks need cash or reserves only to settle uncleared balances—i.e., they need only a fraction of their deposits—this borrowing is not simply a redistribution of cash and the aggregate constraint must be rewritten

$$p \cdot E \leq M + D, \quad (3)$$

²⁰ This is the simplest model with a finance constraint. More sophisticated versions do not generate such a crude quantity equation, see Kohn (1981, 1984).

where D is deposits, so that (2) becomes

$$p = \frac{M + D}{E}. \quad (4)$$

Contrary to Fama's claim the volume of bank liabilities (deposits) is related to the price level.

Finance-constrained models may or may not be satisfactory models of the economy. The point here is not essentially about the algebra of such models. Rather it is that, because money and some sorts of financial assets share the ability to settle payments imbalances, it is appropriate to aggregate them. If money affects prices, so do these financial assets.

Fama argues that since deposits are heterogeneous and different in kind from currency, different deposits should not be added together and certainly not added to currency. We were all taught, of course, not to add apples and oranges; but it can be perfectly correct to add pieces of fruit even if some are apples and others oranges. Deposits and currency can be properly added together when the question is to what degree they relax the finance constraint—i.e., to what degree they settle payments imbalances—which is properly measured by their nominal value and, hence, is related to the price level.

Fama's second claim is that the Modigliani–Miller theorem implies that the supply and demand for real goods, including money and real services incidentally associated with financial assets, determines relative prices independently of the volume and composition of financial assets. This claim has been partly answered already: since money and some financial assets are homogeneous providers of settlement services, they must both be related to prices in the same way.

The application of the Modigliani–Miller theorem assumes that the real services associated with financial assets can somehow be treated as separable from the financial assets themselves. Our analysis shows, however, that settlement services are the principal real service provided by financial assets in accounting or clearing systems. Settlement services arise from the ability of financial assets to mimic money in discharging debts that inevitably accompany exchange. This ability itself exists only because financial assets are reliably convertible into money. The nominal value of financial assets used in accounting or clearing systems is, then, an exact measure of their nominal value as means of settlement because it is an exact measure of the money into which they are convertible. Their real value depends, just as money's does, on the prices of all the real goods in the economy.

In order to see this, consider a case close to practical experience in light of the assumptions needed to prove the Modigliani–Miller theorem. The fourth assumption was that firms' investment decisions are made independently of how the investment is financed and according to fixed rules. Fama

would like to think of banks as unit trusts or mutual funds with a transactions service attached—much like money market mutual funds.²¹ If such banks wish to earn more money from their transactions business, they of course must invest in more computers, clerks, telephones and so forth; but, in order to attract the use of their real services, they must also choose portfolios that attract additional business. Banks and money market mutual funds understand this well as their heavy advertising of funds and accounts differentiated by the nature of their asset portfolios attests. The present value of such firms—even if they are merely brokers profiting by management fees and cheque charges—is not unrelated to the portfolios they choose. This violates the fourth assumption needed to prove the Modigliani–Miller theorem. Any agents' real decisions affected by the bank's present value will also be affected by the volume and composition of its portfolio. Relative prices, including the relative price of money, are not then independent of finance.

VI. Summary

The policy conclusions of Fama's well-known attempt to apply modern theories of finance to monetary theory are (as noted in the Introduction) that control of the price level should focus on the monetary base and that banks and related financial intermediaries stand in no more need of government regulation than any other industries. Such strong conclusions, however, follow only from the use of an overly strained analogy between a pure Walrasian barter economy and a projection of our own economy into a future in which computerized transactions replace cash. Our argument sought to show that a financial system without an ultimate good of conversion is incoherent. This is because in a non-Walrasian world people have preferences not only over final consumption, but also over which assets are used to settle temporary payments imbalances. But even if our argument were wrong and some practical system could be conceived which did not require such an ultimate good of conversion, the actual financial system does in fact contain one—money in the form of cash or central bank reserves. Any system that possesses such a good, whether or not it is itself used directly in transactions, becomes monetized. And in any monetized economy the volume and composition of financial assets, especially those used in transactions, will be related to prices in equilibrium. Fama's separation theorem is false.

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²¹ Goodhart (1986) argues that it is possible and desirable for such unit trusts or mutual funds to replace traditional banks. Our argument so far is that such a system still requires an ultimate good of conversion and that money remains well, but narrowly, defined in it.

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