Payments Technologies, Financial Innovation, and Laissez-Faire Banking

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The last decade has seen a renaissance of interest in the idea of laissez-faire banking. This is an arrangement whereby the government practices a policy of laissez-faire in relation to the medium of exchange and the banking and financial system.[1] Proponents of this form of banking argue that it would be inherently stable and, accordingly, there would be no need for the type of elaborate regulatory structure which is in place to act as a safety net for current banking arrangements. The systemic health of laissez-faire banking would be assured by a stable payments system, an efficient intermediation of funds, and restraints on the growth of base money.

The laissez-faire banking literature tends to focus on banks issuing traditional notes and coin (the "new monetary economics" [NME] school being an exception) for several reasons. First, this approach seems the most straightforward way of thinking of private substitutes for government-issued paper money. Second, it supplies a useful framework for reexamining history. Third, it avoids the need to speculate about future technological developments. On the other hand, consideration of recent technological developments should not be neglected as they may eventually render paper currency completely unnecessary, thereby offering an alternative path to a depoliticized (or purely private) payments system. We believe that research on

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[1]Lawrence H. White (1993) and George Selgin and White (1994) provide thorough reviews of all aspects of laissez-faire banking.

laissez-faire banking should give greater attention to the potential implications of rapidly improving technology in electronic payment instruments (based on integrated circuit/smart cards and advances in telecommunications) which are being developed by private sector banks. In this paper, we attempt to consider what banking system might emerge from these advances in "electronic money" (and advances in financial markets, in particular securitization). We conclude that those technologies may be enhancing the prospects of laissez-faire banking emerging (endogenously) over time.

As argued later, electronic money, when developed to its full potential, will have clear pecuniary and nonpecuniary advantages over government-issued currency. It is difficult to envisage how notes and coin could undergo a technological advance as payments media that would enable them to compete with electronic money. Accordingly, outside money may suffer a substantial decline or even disappear as a transactions medium in the long run with seigniorage passing to the private sector in the form of a cheaper and more efficient payments system unless these competitive advantages were somehow countered by central banks.[2] It would appear difficult for central banks to compete in providing electronic money. Electronic payments technology is already well-disbursed among private institutions. Accordingly, there would be little public support for a central bank putting in place its own retail electronic payment infrastructure, at great expense to the taxpayer, for charging and recharging cards with an existing private infrastructure already in place. Alternatively, the central bank commandeering the private network would also be likely to prove unpopular with private agents, given its cost to them as both taxpayers and consumers of electronic payment services.[3] Finally, central banks would have to hold retail deposit accounts from which cards' purchasing power would be drawn down, an area in which they have little experience or expertise.

In endeavoring to understand future developments in payments systems and financial markets, the evolutionary approach to the development of money, which has long been propounded by the Austrian school (see Menger [1871] 1981 and von Mises [1912] 1971), would seem best suited. In our view, the movement to a situation where the asset that acts as the medium of account (outside money) is not

[2]The incentive to capture seigniorage should prove sufficient for the private sector to develop electronic money to exploit to the full its pecuniary and nonpecuniary advantages over traditional notes and coin.

[3]A monopolization of a competitive banking system's electronic payments infrastructure could diminish the prospects of interest being paid on electronic money balances and give rise to higher per-item transaction costs than the competitive charge.

itself used as a medium of exchange, even in interbank payments, conforms to this evolutionary approach to money and would seem to be the preferable route to a much more efficient cashless economy. Indeed, it may be preferable to the widely canvassed alternative route to laissez-faire banking that advocates deregulation to end the government's involvement in banking and the payments system for at least two reasons. First, the evolutionary route would not undermine confidence in existing payments media which is a pivotal element in Austrian monetary theory (Cowen and Kroszner 1987). Second, outside money's role as a unit of account is much less likely to be jeopardized as it surely would be by the sudden departure of government-backed currency as a medium of exchange.

The Evolutionary Route to Laissez-Faire Banking: Electronic Money and Share Banking

Electronic Money

For large-value transactions, the medium of exchange and store of value roles of government-backed currency have long been dominated by other privately provided transactions instruments such as interest-earning bank deposits subject to check (for example, Negotiable Order of Withdrawal or NOW accounts in the United States). For small-value transactions, which still comprise the vast bulk of all transactions but only a small fraction of their total value, currency is still the dominant transactions medium. Two types of electronically activated payments cards—debit cards and prepaid cards—have been designed to accommodate small-value payments and have recently become commercially available. Debit cards are operated on-line to the holder's bank account. At a point of sale the card is swiped through an electronic funds terminal which activates a signal to the card holder's bank to transfer the specified payment amount from the card holder's bank account to that of the payee. Prepaid cards are cards that have embedded value that can be used to purchase goods and services until the stored value is exhausted. The embedded purchasing power is drawn down at the point of sale by an electronic device that can suitably adjust the information on the card. The amount of stored value remaining on the card can be made visible at any time. While initially popular for single-item purchases, multipurpose prepaid cards are now becoming available and can be used indiscriminately for any small-value purchase. Whereas debit cards are on-line to the holder's bank, prepaid cards are typically an off-line method of payment, the card either being disposed of when the stored purchasing power is spent or alternatively reloaded by insertion in a terminal.

Improvements in card technology would not be particularly valuable without reader technology at points of sale. This service is provided by Electronic Funds Transfer at Point of Sale (EFTPOS) technologies which continue to improve. In particular, recent advances in the communications technology based on fiber-optic cables and digitalization of information hold the promise of an efficient high-speed communications network for the whole economy. The principal benefit for payment systems is that on-line card transactions costs are likely to fall to negligible levels. EFT computer terminals and home-based "dispensing" terminals seem likely to be linked to bank accounts by fiber-optic lines and data transmission to be carried by light through optic fibers. This system is more powerful than transmission by copper wire or by radio frequencies and potentially very cost-efficient, given a recent development that obviates the need to convert light signals into electronic signals and back again every 22 kilometers. In conjunction with payment card developments, it should be possible to effect an immediate deduction of the amount of a purchase from the purchaser's bank account and transfer it to the bank account of the vendor via EFT at a negligible cost.

The advantages of electronic money over a paper-based retail payments system are numerous. For banks, electronic money promises to be very cost efficient in comparison to prevailing paper-based payment systems. A switch from paper to electronic money is likely to cut deep inroads into bank costs, particularly labor costs, of routine processing of currency and paper-based payment instruments. Retailers would not have to carry or handle large physical sums of money, which would also reduce their costs and susceptibility to theft.

Developed to its full potential, consumers will find that electronic money has distinct nonpecuniary and pecuniary advantages over currency. Cards are easier to carry and, since they do not circulate, possibly cleaner; they also offer greater security for the card holder since their embedded value cannot be drawn down manually. Of possibly far greater consequence, however, is the potential pecuniary advantage to card holders of earning interest on their electronic money balances. The logistics of the issuer paying interest on the unspent balances on prepaid cards are simple. When a financial institution issues a card it obtains a float of funds from the purchaser. Since value is drawn down at an electronic terminal it would be straightforward to pay interest on each increment of embedded value in the card up to the time each is spent. The payment of interest on debit cards is even more straightforward, being tantamount to permitting debit cards to be charged against an interest-bearing account held at the issuer's bank. Both the pecuniary and nonpecuniary advantages of electronic

money for consumers and the significant cost savings to banks are likely over time to erode the role of currency in retail payments.[4]

The Stability of Laissez-Faire Banking with Electronic Money

One of the arguments against private banks issuing their own notes and coin, a defining characteristic of most versions of laissez-faire banking, is that they would engage in overissue, possibly leading to hyperinflation. Proponents of laissez-faire banking like White (1984a), Selgin (1988), David Glasner (1989), and Kevin Dowd (1993) would reject this by arguing that if an excess supply of banknotes existed then the amount representing excess real balances would be promptly returned to the issuer. This view is supported, in particular, by Selgin's (1988) evidence that historical unregulated banking systems were characterized by a short issue-redemption lag. Therefore, since issuing banks must stand ready to honor the claims against them, they would be clearly reluctant to engage in overissue (the principle of adverse clearing).

We can see two ways in which electronic money could impart even greater stability to laissez-faire banking. They both revolve around one of the basic features of electronic money, namely (subject to some caveats, see below) that it does not circulate. This, as already argued, would enable interest to be paid on electronic money. Competition would force banks to pay interest at the rate that the bank earns on its assets less some small competitively determined margin for the cost of banking services. In order to induce the public to hold more electronic money (prepaid, debit or smart card purchasing power) banks would have to offer higher interest at the margin. But they could not offer a higher rate than that which they could obtain on their assets. This condition would clearly lessen any incentive to overissue. Second, since electronic money does not generally circulate and constitutes an immediate claim on the issuing institution as soon as it is first spent, the mechanism of adverse clearing would operate even

[4]Although currency has declined in importance relative to other monies over time, the amount of currency outside banks continues to rise in absolute terms. The large-value counterparts (direct debits, standing orders, paperless credit transfers, etc.) to small-value retail electronic payment media have been widely available to households and firms for 10 or more years. Cronin (1994: 27–30) finds evidence of a direct replacement of those larger-value instruments for their paper-based counterparts in recent years in four EU countries (France, Denmark, the Netherlands, and Spain), which are relatively advanced in the use of these electronic payment media. In all four countries, there has been both an absolute and relative decline in the volume of cashless paper-based transactions. It is not, therefore, inconceivable that, at the small-value retail level, smart cards and prepaid cards, once they leave their present gestation/pre-saturation stage of development, should begin to reduce the absolute demand for currency as a transaction medium.

more promptly than in a system based on circulating banknotes. Selgin (1988: 148) reports that in Scotland in 1873 the average period of circulation of a bank note was only 10 to 11 days, a delay that is hardly long enough to encourage banks to overissue. The delay is likely to be shorter for electronic money. For commercial transactions effected by debit cards, for instance, there is no issue-redemption lag as electronic money will remain at the issuer's bank account until it is transferred instantaneously on the making of a payment instruction at a point-of-sale. Similarly, interpersonal payment transfers via debit card would also be effected quickly.

With regard to prepaid cards, one would expect electronic money balances drawn down onto such a card at a loading terminal to remain on the person of the withdrawer for the same length of time, ceteris paribus, as paper currency drawn down from an ATM. Once spent, at a point-of-sale, however, electronic technology would ensure that the electronic money claim would be more quickly returned to the originating bank than the relatively cumbersome paper money claim. The relative ease with which claims accumulated by merchants could be downloaded and credited electronically to bank accounts via a terminal located at the site of business, compared with a time-consuming visit to a bank branch by the payee, would be an important feature reinforcing the discipline of adverse clearing. A similar situation would most likely hold for interpersonal payments made by prepaid cards. At the personal level, however, this argument has to be balanced against the fact that electronic money does not depreciate physically (unlike banknotes) and could therefore remain outstanding for longer durations of time, particularly if intercard transfers can be effected smoothly (and it appears that more advanced cards, e.g., National Westminster Bank's *Mondex* Card, possess this feature). Nevertheless, interpersonal transfers effected by prepaid cards are likely to constitute only a small fraction of total electronic payments and, thus, do not strongly detract from our general argument. Electronic money would underpin the stability of a banking system based on private unregulated banks. On the face of it, electronic money would assist in both establishing and maintaining a stable laissez-faire based monetary system.

Share Banking

There is yet another aspect of the shape of banking in the future that, if realized, would also support its inherent stability in the absence of government intervention and which, in conjunction with the electronic payments technology outlined above, could realize a payments system most closely approximated by the NME school.[5] This would

[5]See Black (1970); Fama (1980, 1982); Hall (1981, 1982); and Greenfield and Yeager (1983).

be a rise in share banking (of the mutual fund type). Much attention has been given to the dramatic growth in money market mutual fund shares (see, for example, Edwards 1993 and Hale 1994). David Hale (1994) notes that in the United States, where the trend has been most in evidence, "mutual funds are overtaking banks as the main repositories of household wealth and suppliers of capital to small and medium-sized companies." The U.S. mutual fund industry had an asset total figure of barely 10 percent of bank deposits in the early 1980s but by 1993 that figure had risen to 85 percent. In 1993, 28 percent of U.S. households had membership in a mutual fund, against 6 percent in 1980.

Eugene Fama (1985) and Joseph Stiglitz (1985) argue that what is unique about traditional banks is their access to private information about the creditworthiness of potential borrowers and their ability to act prudently on the basis of that information. This defining characteristic has been seriously questioned by the ability of nonbank investors to avail of the considerable fall in the cost of collecting information about potential borrowers in recent years, which may help to explain the rise of securitization and mutual funds as institutions of alternative intermediation (Cummings 1987). In conjunction with the improved risk-return performance that is associated with share bank savings (e.g., money market mutual funds) relative to par-value bank deposits, the rise of share banking can be more clearly understood.

The appeal of share banking may be further enhanced if Glasner's (1989) contention is correct. He points to two conditions that are necessary for bank runs to arise. They are that depositors be entitled to a fixed nominal claim on demand and that there be a loss of confidence in the solvency of the bank. The value of securitized assets held by mutual funds on behalf of their investors is marked to market continuously. This reduces any inclination to start a run on these banks since to do so would reduce confidence in the value of the bank's assets which would be reflected immediately in their market value. Selgin and White (1994: 1728) state the case clearly and convincingly:

> There is no point running on a mutual fund because there is no greater expected payoff from closing one's account ahead of others. Any fall in the value of a mutual fund's assets is shared immediately by all account holders. A large enough fall in the value of an ordinary bank's assets, by contrast, brings the value of the assets below the (unchanged) value of debt claims, in which case depositors who close their accounts first may get a greater payoff than those who close their accounts last.

Bank runs can therefore be obviated by backing transactions media by equity claims (the money market mutual fund model) rather than

by debt claims (the traditional banking model). It should, however, be pointed out that Selgin and White (ibid.: 1729) put forward two reasons as to why demandable debt exchange media would survive under laissez-faire banking. The first is that equity claims would have fluctuating value so they would "be inconvenient to use as currency." This is an acceptable argument but would be undermined were transactions to be settled electronically rather than by currency because the fluctuating value of equity claims would not be an inconvenience in making payments electronically where payment involves bookkeeping debit and credit entries rather than physical exchange of media. The second reason they put forward for demandable debt surviving is that "it beneficially constrains banks to act in the interest of shareholders, precisely because claim holders have the option of forcing liquidation."

How the New Payments Technology and Securitization Could Realize the NME Vision

The NME school of laissez-faire banking envisages transactions being effected without the use of tangible money. Trade would be executed by the instantaneous debiting and crediting of liquid wealth accounts (McCallum [1985] terms this an accounting system of exchange). Together, the developments in retail payment instruments and financial innovation discussed above seem capable of bringing about a situation where it will be possible to replace money with productive liquid assets as transactions and settlement media. In this accounting exchange system, transactions are effected by means of signals to an electronic accounting network resulting in appropriate credits and debits to the wealth accounts of buyers and sellers. All wealth accounts in this accounting exchange framework are highly divisible. Ownership of securitized claims is transferred to settle transactions. Settlement is as close to instantaneous as makes no material difference, i.e., all retail payments are settled in real time, in which case there is no need for a wholesale interbank clearing system. Interest is earned on claims up to the moment that each is spent on the purchase of a good or service. The purchaser then forfeits ownership of an amount of assets equal to the nominal value of the purchase. Once ownership is electronically transferred to the vendor, the recipient immediately starts to earn interest on the transferred amount at market rates.

In such an accounting exchange framework there is no need to hold a temporary abode of non-interest bearing purchasing power, i.e., money. This is best understood in the context of the standard Keynesian micro-foundations of the demand for money (Baumol 1952,

Tobin 1956). Baumol's representative individual determines his optimal demand for money, M, as a function of a number of variables related through the well-known "square root rule," $M/P = (1/2)\sqrt{2bT/R}$. The aspect of this money demand function which is of interest to us is the "brokerage fee," b. This is the fixed cost of exchanging bonds for cash in order to be able to purchase goods and services. With the growing sophistication in the electronic transfer of funds, brokerage fees, widely defined to include the opportunity cost of leisure time forgone, are undoubtedly falling and at a dramatic rate. Should brokerage costs fall to a negligible level then no money will be held. The advances in retail payments efficiency along with the growth in securitization, already mentioned, may effect a transition to such a state of the world where the current ubiquitous monetary exchange system would be replaced by an accounting system of exchange.

The Evolutionary Route to a Separation of the Unit of Account and Media of Exchange

Any transition from the current monetary exchange system to an accounting system of exchange is likely to be a slow piecemeal process. NME theorists argue that a new unit of account based on some quantity of a commodity or bundle of commodities would be required in a cashless economy based on an accounting system of exchange. We believe that if an accounting system of exchange were to emerge slowly over time with electronic exchange of securitized claims coming to replace fiat money as settlement media, the unit of account function of the fiat dollar need not be jeopardized. Fiat money would no longer be a preferred medium of exchange so demand for it in that capacity would no longer exist. Fiat notes and coin, however, have long been a collector's item among numismatists, irrespective of whether the particular notes and coin continue to be used in settling transactions. As fiat notes and coin become increasingly rare among the public, it is, accordingly, likely that because certain fiat note and coin issues remain popular among collectors they will continue to have positive value relative to other goods even as demand for them as media of exchange disappears. So long as fiat notes and coin have a determinate and positive value (be that as a medium of exchange or, as is more likely to be the case in the future, as an asset) relative to other assets, the role of the fiat dollar as a unit of account need not be jeopardized. If there is no demand for money as an asset in the accounting system of exchange, then the adoption of a commodity-based unit of account such as the ANCAP of Robert Hall (1981) would need to be considered.

The demise of currency as a transactions medium, therefore, need not jeopardize its role as a unit of account so long as there is some alternative demand for it as an asset. It is, accordingly, difficult to agree with the viewpoint of those who would argue that the disappearance of outside money as a circulating transactions medium would render the price level anchorless and subject to "aimless drift" (Gurley and Shaw 1960: 253–56) or have consequences for the macroeconomy more generally that were "drastic" (Wallace 1986: 206).

The modern free-banking school argues that a continued demand for fiat money as a bank reserve medium employed in interbank transactions would sustain the unit of account function of such money. There are sources of reduced demand for central bank money at the wholesale interbank level which are related to improvements in payments technologies and indeed mirror what is happening at the retail level. Real time gross settlement (RTGS) systems have already been introduced in some countries and their introduction in European Union countries is due to be completed in 1996. A priori, a movement from net to gross settlement, would require banks, ceteris paribus, to hold a once-off increase in reserve balances. That would certainly be the case if the type of RTGS chosen were *pure* gross settlement. RTGSs, however, when fully operational, have considerable potential to economize on the use of central bank money by increasing its velocity of circulation.

The experience of the Swiss Interbank Clearing (SIC) system, one of the first RTGS systems, is instructive in this respect. The SIC was introduced in 1987. It directly replaced a net settlement system in January of that year. A change of liquidity regulations in January 1988 in Switzerland made the holding of reserves by banks voluntary. Within three months, SIC participants had reduced their cumulative reserve holdings from 7.5 to 2.6 billion Swiss francs and the turnover ratio of daily payment values to reserves had increased from 12 to 54 on an average day (Folkerts-Landau 1990: 15). Although it could be argued that this sharp decline in reserve holdings was due to private banks adjusting their reserve balances to the level of unconstrained working balances that would have existed if reserve requirements had not been in place to begin with, Vital (1994: 8) reports that the level of reserve balances has continued to fall. By 1994, reserve balances held by SIC participants were of the magnitude of 2 billion Swiss francs while the value of payments per day continued to rise steadily, yielding a daily turnover ratio of 64 in January 1994.

It would seem implausible that, six years after the removal of reserve requirements, banks would still be adjusting their reserves downwards to the level that would have existed in January 1988 if statutory reserve

requirements had never been in place. If the process of adjustment was still occurring in 1994 then this suggests that SIC member banks have been very slow to adapt reserve holdings to their optimum level. An alternative explanation of the secular decline in Swiss banks' reserve holdings is that those banks quickly adjusted their reserves holdings to an optimum level following the January 1988 deregulation, but that the optimum level of reserves has been falling in the intervening years due to the greater efficiency in the use of central bank money arising from the employment of RTGS. This latter explanation seems the more plausible to us. The Swiss chose to adopt a RTGS that operated on a queued basis, i.e., where payments are processed on a first-in first-out basis. This feature allowed banks to have lower holdings of reserves than they would need under pure RTGS. Furthermore, efficiency improvements continue to be achieved under RTGS that allow a lower amount of reserves to be held in order to make the same, or indeed a greater (as has transpired in the SIC), value of interbank payments in a day. The SIC, for instance, has recently encouraged less urgent payments to be settled at the less busy earlier part of the day by charging lower transaction fees at that time than later in the day. The consequence has been a greater smoothing in the flow of payments being made and, with less payments being made at the end of the day, a lower amount of reserves being required to settle total daily payment flows.

The actual experience of this comparatively new and increasingly popular wholesale payments technology, RTGS, therefore, points to the possibility that the demand for fiat money as reserves could decline as a proportion of interbank transactions. Indeed, the more likely scenario, as the Swiss experience shows, is that the absolute nominal value of reserves may fall even in the situation where the value of wholesale transactions continues to grow in the long run. Furthermore, if one considers that it may, in time, be feasible for debtor banks to start transferring liquid "productive" assets (which, unlike reserves, earn market rates of interest for their holder) to creditor banks to settle interbank debts, then the need to mediate interbank transactions with central bank money may be obviated. On the basis of bilateral agreements between banks, electronic messaging could be used to transfer the ownership of an amount of a mutually agreed marked-to-market asset equivalent to the interbank obligation without any need necessarily arising to redeem the underlying asset itself. We therefore do not see interbank demand as necessarily providing a long-term source of demand for central bank money.

Monetary Equilibrium and Disequilibrium

Many economists trace the main causes of historical business cycles to money market disequilibria. An increase in the demand for money to hold, or hoarding, exacerbates the coordination problems in economies with decentralized decisionmaking. This is because money withheld as an abode of purchasing power constitutes potential purchasing power in general. A substitution away from expenditure or savings (which are actual demands for specific goods and assets, respectively) in favor of money to hoard diminishes the number of useful signals sent out by households to firms as to what to produce now and how much to invest for future production. The result is a coordination failure, a failure of production and expenditure plans to mesh in the aggregate leading to a downturn in economic activity.

In an accounting system of exchange of the type outlined above, with a viable unit of account, real time gross settlement and liquid securitized wealth, those types of coordination problems are much less likely to arise. This is because all wealth, being liquid and perfectly divisible, would be capable of acting as transactions media. Furthermore, the total volume of those transactions media would be in infinitely elastic supply relative to the volume required for actual trades in any small finite period. In such a situation, the coordination difficulties that may arise in monetary economies could not arise because there would be no need to withdraw income from the income-expenditure stream in order to accumulate balances of general purchasing power. If the monetary disequilibrium account is correct, then cyclical fluctuations in output and employment arising from monetary disequilibria would disappear in a pure accounting system of exchange.

Indeed it may not be too panglossian to predict that an economy based on a pure accounting system of exchange would be more stable and less inflation prone than one based on a monetary system of exchange. And, if the types of asset price bubbles seen in the 1980s are driven predominantly by excess money growth as monetarists would argue, then, by corollary, large asset price collapses would not occur in a pure accounting system of exchange. If large swings in asset values were thereby obviated, the stability of a banking system of the mutual-fund type, which we envisage being the basis of free banking in the future, would be further underpinned.

Skepticism on White's Objections to the Viability of Cashless Payment Systems

Lawrence H. White (1984b) has questioned the likelihood of the spontaneous emergence of a competitive cashless payments system

from the current ubiquitous monetary system of exchange. He identifies three conditions that would be necessary for this transition to occur: (1) the disappearance of redeemable inside money; (2) the disappearance of outside money; and (3) the redefinition of the unit of account in terms of a numeraire other than outside money.

White argues that the first of these conditions is unlikely to happen since par value deposits, being claims on debt, are superior as media of exchange to mutual fund shares, which are equity-type claims. Unlike the latter, contractual guarantees of the purchasing power of deposits can be given in advance. Another reason offered by White as to why (demand) deposits are likely to survive, even under unregulated competition, is that the payments system they provide is less costly. The second condition will not hold either, he argues, so long as manual transfer of currency remains the least costly method for executing certain transactions. On the third point, White cannot see the unit of account being divorced from the medium of exchange.

White (ibid.: 707) is correct in asserting that the "historical fact is that deposit banking did not naturally grow up on an equity basis." The cost of gathering information central to valuing bank assets on an ongoing basis would have been excessively high in the past. Accordingly, equity-type banking was not a realistic option. Now, however, developments in information technology are making the operation of continuous marking to market of even small savings claims efficient. Consequently, a "natural" blockage to share banking is being increasingly eroded. This fact is supported by the greater mediation of savings into equity-type claims: for instance, as already cited, in the U.S. mutual funds are now equal to about 85 percent of U.S. bank deposits against barely 10 percent in the early 1980s.

Although the capital value of the typical investor's share in a mutual fund is variable, this scarcely presents a problem. The asset diversification which mutual funds are capable of achieving is much greater than that achievable by traditional banking. This feature enables idiosyncratic risk to be diversified away. As a result, the maximum variability in an individual's shareholding, which itself replicates the composition of the fund's overall portfolio, is reduced to a low level. Furthermore, all wealth in the economy can, in theory, be securitized to form liquid wealth accounts. The flow demand for those wealth accounts to perform the role of transactions media for the flow supply of goods and services in any small interval of time (a day, say) would be extremely low relative to their stock supply. Therefore, there would scarcely ever be any question of an individual finding that his liquid wealth account would be inadequate to cover daily expenditures despite its being continually marked to market.

White (ibid.: 710) believes that exchange in a cashless world would burden wealthholders with "relatively high transactions costs in unloading payments property." Using any asset other than money (fiat or commodity money) burdens someone with paying the significant bid-ask spread involved in exchanging that asset, a cost that does not arise in exchanges undertaken in money. We have argued earlier that the cost of using an electronic exchange network based on optic fibers and smart cards may soon be far lower than that pertaining to current monetary exchange systems. That saving could include bid-ask spreads on assets being reduced to negligible levels. If so, White's argument would be undermined. Already effectively redundant for large-value transactions, currency would no longer even remain the least costly method for settling small-value transactions.

As argued previously, the demise of outside currency as a transactions medium need not jeopardize the continued role of the fiat dollar as a unit of account. Even as of now, given that currency constitutes only 1 percent of transactions media in the United States and this is predominantly held by households, there must be vast areas of business activity which operate smoothly without ever coming into contact with the medium of exchange which incorporates the unit of account (i.e., currency). For those transactions there is effective separation of their medium of exchange (exclusively inside money) from the unit of account. As retail electronic payments vehicles are diffused throughout the economy and as payments habits evolve, those activities where there is effective separation of the medium of exchange and the unit of account will grow still further and will probably ultimately dominate.

Conclusion

If the emerging electronic payments media of prepaid, debit and smart cards were to be issued exclusively by purely private market concerns and if they were to succeed in replacing currency, then inside money would completely replace outside money and laissez-faire banking could emerge spontaneously from the technology. Those electronic means of payment combined with the ongoing process of financial innovation, which is making wealth increasingly liquid, could eventually result in an efficient and stable laissez-faire banking system.

It is possible to visualize an endpoint to the process of payment, financial, and institutional innovation in which neither outside nor redeemable inside money is any longer held for settling transactions and all payments are carried out via transfer of productive liquid assets; trades are executed by instantaneously crediting and debiting wealth accounts; buyers' creditworthiness is verified by instantaneous

electronic access to their wealth accounts and transactions are settled with finality and virtually instantaneously at the moment of trade. The disappearance of fiat money as a transactions medium would be unlikely to impede its role as a unit of account because there would still be a demand for fiat notes and coin as assets. Finally, the accounting system of exchange would be superior to a monetary exchange system in coordinating economic activity.

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