JAMAICA & e–BANKING

Peter W. Jones

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5 Pawsey Place, Kingston 5

(876) 809-6099

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Introduction

In Jamaica there has been some improvement in electronic banking referred to *e- banking* worldwide. We are definitely on the road to this ultimate digital revolution. Especially with products coming out of National Commercial Bank (primarily) and to Bank Of Nova Scotia to a lesser extent.

You can either go online or via telephone and pay a number of bills from the comfort of your living room or bedroom any hour of the day by debit card or by visa card. In other countries especially USA and Europe to facilitate this the digital revolution they have designed a product called a **STORED VISA/MASTERCARD** where any one rich or poor can open an account in any currency and add to the credit card account to the desired credit limit one desires and/or a bank determined maximum for the product. We have in Jamaica a secured credit card where you have to put money forward in a secured account. The former I have described facilitates all while the latter secured credit card limits the greater majority.
In the case of Cable & Wireless I can use my Visa/MasterCard and pay my bill on the phone and get real-time payments credited to my account. If for example my phone is locked off and I can go next-door use my friends phone pay my bill and within 5 minutes my phone is back on. The Introduction by all Banks in Jamaica of the **Stored Visa/MasterCard Card** could be a serious contributing factor to stemming the tide of the digital divide and facilitating the serious onward progress on the road of the digital revolution making Jamaica not another Singapore but a highly competitive Jamaica, a serious player in the Global Village.

In order to get a better grasp of the concept of e banking we explore topics that will enable the reader to have a better understanding of the thinking behind the concept.

What is e banking?

In the past several years, many economists have considered the impact of the digital revolution on the money and banking system, and by extension the macro economy.

Although many of the papers on e-money and e-banking[1] have contained useful insights into these developments, they have also tended to paint an incomplete and even confusing picture. The application of information technology to money and banking raises many interesting questions. But to make further progress in understanding the economic effects, we need to advance in two areas. First, we need to settle on a fundamental set of questions that a theory of electronic money and banking should answer. Second, we must build frameworks that can address the basic questions raised by electronic money and banking.

The most popular terms used in the literature are electronic money, electronic cash, and electronic banking. What do these terms mean exactly? How do they differ? There is a tendency in the literature to assume that the reader knows what the author means by, say, e-money, or to define terms by example rather than by precise description. On the other hand, some authors wish to avoid the impression that their analysis is tied to one specific type of e-money, so they use the term electronic payment media or a similar general term. This leaves the reader wondering what the author has in mind— e-money, e-cash, e banking, some of the above, or even none of the above?

In addition, it is possible that the terms in popular use may not have very precise meanings. When we say we are interested in electronic money, for example, are we really interested in all electronic money? The economic effects we have in mind may only be associated with a certain type of electronic money, or some attribute of electronic money.

ELECTRONIC BANKING, OR E-BANKING, IS THE USE OF ELECTRONIC METHODS TO DELIVER TRADITIONAL BANKING SERVICES USING ANY KIND OF PAYMENT MEDIA.

By “traditional banking services” we mean taking deposits, making loans, and clearing

[1] Connel Fullenkamp and Saleh M. Nsouli1, **Electronic Money and Banking,**2004 International Monetary Fund

payments. The effect of e-banking is to augment or facilitate existing banking and payment mechanisms, primarily by making many transactions cheaper, faster, more secure, and more convenient. In short, e-banking refers to how banking and payment transactions are conducted.

This definition implies that e-banking has been taking place in various forms for decades. Telephone banking, for example, which enables account holders to conduct several kinds of transactions, has been used since the advent of touch-tone dialing. Similarly, automatic teller machines (commonly called ATMs) are a form of retail e-banking in use since the mid-1970s and in nearly universal use since the late 1980s. E-banking, in the form of MICR technology for payment clearing and settling, has been in use even longer than the retail e-banking technologies.

ELECTRONIC MONEY, OR E-MONEY, IS ANY ELECTRONIC PAYMENT MEDIA—ANY MATERIAL, DEVICE, OR SYSTEM THAT CONDUCTS PAYMENT VIA THE TRANSFER OF ELECTROMAGNETICALLY STORED INFORMATION.

E-money may be "currency" in that it can be stored in a physical "wallet" like a smart card or token, but it generally exists as account data on some electronic storage device. Credit cards fit under this definition of e-money. Banks already create e-money as part of their normal lending process, when they issue loans by crediting the deposit accounts of the borrowers (or the receiver of the loan proceeds). In fact, paper cheques have become e-money, thanks to truncation.

Electronic currency or electronic cash is an inaccurate name and possibly a contradiction in terms. The term usually refers not to the money itself, but to a portable storage device for e-money that can be carried like cash and used in place of cash. An example is the stored value card[2]. The storage device does not circulate, since the holder of the card retains the device

[2] Santomero, Anthony M., and John J. Seater, 1996, "Alternative Monies and the Demand for Media of Exchange," *Journal of Money, Credit and Banking*, Vol. 28,

after the transaction. A better term is electronic purse. Electronic purses, moreover, are not necessary for an electronic currency replacement. Physical electronic

purses, which can be lost, stolen, or damaged, can be replaced by electronic money systems that use biometric identification, such as thumbprints or retina images, to enable individuals to access their e-money balances remotely.

Electronic Money and Banking

The discussion of electronic money and banking[3] has tended to be driven by with the latest electronic gadgets. Home banking over the Internet and smart cards have been special favorites of authors, for example. While these are certainly interesting tools, and their use may indeed have economic consequences, the focus on the gadgets has obscured a more important question: what are the truly innovative features of electronic money and banking? What is different about these new products and services that may lead to macroeconomic effects? Having a set of precise terms to describe electronic money and banking instruments and services is essential to answering these questions.

In the case of electronic banking, the innovation is the increased speed and convenience, and decreased cost, of monitoring one's banking assets and making transactions with them. The sudden interest in e-banking has come about because the application of the Internet to e-banking represents an order-of-magnitude increase in the speed and convenience of making banking transactions, including bill payment. This is an evolutionary innovation of considerable magnitude. For example, before the arrival of Internet banking, most people had to drive to their bank branch or to an ATM to make simple transfers between accounts. Although telephone banking was possible, the procedure, such as keying in a long string of account numbers, proved too cumbersome to ever become the preferred method of e-banking. This suggests that the appropriate term to

[3] Miller, Roger LeRoy, and David D. VanHoose, 1993, *Modern Money and Banking,* 3rd ed. (New York: McGraw-Hill).

use when thinking about the effects of the most recent innovation in ebanking is Internet e-banking.

Turning to the innovation in electronic money, we first consider the electronic purse. While devices such as stored value cards will certainly be a great convenience for their users, their true innovation is in offering a new way to temporarily store and transport purchasing power. Electronic purses may be more convenient to carry on one's person, they may be more secure (but may not be, depending on the exact form of the purse), and they generally solve the "exact change" problem. They will probably affect the demand for currency, and they may have a noticeable effect on the overall demand for money because of the increased convenience. But in itself this does not seem to be a dramatic innovation, which is not terribly surprising once we redefined the sexy term "e-cash" properly as the far more mundane "e-purse."

Given that e-money already exists to fill the electronic purses, what is innovative about it? As in the case of e-banking, the arrival of the Internet has brought about a new possibility for an existing technology. In particular, the Internet makes possible the reemergence of private money, in electronic form. A further definition is thus in order.

Private e-money is electronic money that originates from a private, nonbank firm.

In order to be truly private, e-money must originate outside the government and outside the banking system, because money creation inside the banking system is regulated by the central bank and other government agencies. For clarity and convenience, we refer to e-money that originates in the banking system as government money, since it is under the regulation of the central bank. Government money is the sum of government e-money and fiat currency.

All of the new e-money that has been created on the Internet to date is actually government e-money. As an illustration, consider the services provided by PayPal (www.paypal.com)[4]. This service enables the user to send a payment to anyone with a PayPal account or an email address.

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[4] Prinz, Aloys, 1999, "Money in the Real and the Virtual World: E-Money, C-Money, and the Demand for CB-Money," *Netnomics*, Vol. 1,

The payments are made in U.S. dollars or in one of the other currencies that PayPal chooses to deal in. While PayPal makes payments using e-money, the e-money is not private. PayPal works through the banking system, because any payment that moves through PayPal must enter and exit PayPal's system either though an electronic bank transfer or through a credit card payment, which is also an electronic bank transfer. Thus, PayPal is conducting e-banking (payment) services using government e-money, not private e-money. PayPal is certainly a useful convenience to millions of users, but its innovation is in extending the existing credit-card system to a new set of users.

The distinction of interest is between government e-money and private e-money. Truly private e-money must be distinct from, and a substitute for, government money. When the existing literature refers to e-money, it is generally referring to private e-money, not government e-money. Central banks have already demonstrated that they can maintain monetary control and achieve their policy goals in a world with government e-money. Indeed, most monetary policy is conducted through open-market operations, which use e-money. Whether central banks can continue to achieve their policy goals in a world with private e-money is the unanswered question.

How e-banking will affect the economy

After several experiments with Internet-only banks, the banking industry has settled on a mixed model of physical branches combined with Internet banking[5].

There is a question about what effect, if any, does the increased use of electronic banking have on an economy. In particular, does increased e-banking affect the central bank's ability to control the money supply or to adjust the short-run levels of output and employment? This depends on what electronic banking is, and what is innovative about it.

Now we consider the impact of the innovation in Internet e-banking. The main innovation in electronic banking is a dramatic reduction in the cost of banking transactions.

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[5] Tanaka, Tatsuo, 1996, "Possible Economic Consequences of Digital Cash," *First Monday,*Vol. 1, No. 2,

money is held for transaction purposes but has a cost in terms of forgone interest on other assets.

Users of money would like to economize on money holdings by making frequent transactions to sell interest-bearing nonmoney assets, but these transactions are costly. The costlier the transactions, the fewer times they are made and the more money will be demanded at any time.

The reduction in the average cost of transactions, due to the adoption of Internet e-banking, will enable users of money to further economize on holding cash balances.

A further consequence of the reduction in transaction costs is that users of Internet e-banking will have greater access to interest-bearing assets, including ones offered by mutual fund companies and brokers. Before Internet banking, it was costly for a household to shift funds out of a bond fund or an equity position and into a transaction account at a bank. This effectively limited the opportunity cost of holding money, since these assets were not realistically available for storing idle cash balances. The reduction in transaction costs has increased the range of assets available and therefore increased the opportunity cost of holding money. We should therefore expect to see a greater interest sensitivity of money demand as Internet-based e banking becomes widespread.

e Money Vs. Other Forms Of Money

In Economics and Banking there is a law, Gresham's Law, which in summary states that bad money drives out good—cheap money drives out expensive money, where the definitions of cheap and expensive depend on several factors, including the prices of different monies in terms of goods and the cost of using each type of money. Will electronic money drive out other forms of money, such as currency? In order to answer this

question, we need to get into the details about how an e-money provider will function, and how e-money will be used. We also need to ask, Under what conditions will electronic money, and its providers, survive and flourish? The answers depend on how the electronic money is defined, what its innovative properties are, and the role that the main providers of existing money—the banks—are playing in the model.

The innovation behind Internet e-banking was relatively simple and easy to integrate into existing macro models, we were able to derive the macro consequences from e-banking in a single step. Determining the consequences of the innovation in e-money, on the other hand, requires a two-step process. First, we need to set up a model of a private e-money system[6]. Then we need to integrate the model of private e-money into the model of the money market and by extension the macroeconomy.

Gresham's Law gives us one way to think about the likely characteristics of private e-money: it won't be demanded at all if it is very costly to use. But money has three functions, and all three must be considered. For example, the store of value function of money implies a portfolio-theoretic approach to money. Money is an asset, and private e-money can have a return that differs from the returns on currency and on government e-money. This return can offset some of the costs of using private e-money, making it attractive even if it is more costly to use, and riskier, than government e-money. A good way to construct a model of private e-money is to think about how it would fulfill the three functions of money: unit of account, medium of exchange, and store of value.

We begin with the unit of account function of money. Since government money already exists, the providers of private e-money have a simple choice: adopt the same denomination as government money, or introduce a different denomination. Adopting a different denomination from government money seems to have little or no benefit under normal circumstances. Under conditions of high or hyperinflation, however, a private e-money may signal a commitment to stable value by choosing a denomination that differs from that used by government money. This is an interesting possibility that we leave for future research. But outside of this case, adopting a new denomination would only impose an unnecessary cost on those who transact in the private e-money, since they would have to constantly convert the value of their private e-money holdings to their value in government money in order to compare their value to everything else.

Even if this is simply an annoyance, it is sufficient to rule out the use of private e-money under

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[6] Miller, Roger LeRoy, and David D. VanHoose, 1993, *Modern Money and Banking,* 3rd ed. (New York: McGraw-Hill).

normal circumstances. Therefore, we propose that private e-money will adopt the same denomination as government money in order to avoid unit-of-account costs—that is, it will exchange at par with government money.

Given our conclusion regarding the denomination of private e-money, the medium of exchange function of money focuses attention on transaction costs. Both government and private e-money incur transaction costs. The costs are basically those associated with clearing and settlement, though some additional security and storage costs related to currency are also involved. We ignore currency, since the demand for it is accommodated by the central bank, and because it is extremely unlikely that private physical currency will appear on a large scale owing to existing laws. Shy and Tarkka (2002) present a very nice framework for thinking about transaction costs and their effect on the payment media used. In particular, the authors' concept of a "transactions space" is a good way to think about how transaction costs may affect the use of private e-money.

Basically, a transaction space exists for a particular medium of exchange if it is the cheapest medium to use for both the payer and the payee. In terms of transaction costs, it is difficult to say whether private e-money or government e-money will be cheaper for payers or payees. An entirely possible, if not likely, outcome is that the marginal transaction costs for clearing and settling electronic payments will be about the same for both government and private e-monies.

Therefore, private e-money could occupy the same transaction space as government e-money. Settling paper transactions, of course, will remain far more expensive.

Although private e-money is probably similar to government e-money in terms of its average transaction costs, it must still overcome an initial cost in terms of wary consumers. A reasonable presumption would be that private e-money will not displace government e-money (for transactions purposes) without a compelling reason. There may exist, however, a niche for private e-money in facilitating transactions that are currently impossible or extremely costly to conduct using government money. For example, direct person-to-person payments over long distances are extremely costly using wire services such as Western Union or bank wire transfer.

An Internet service such as PayPal is less costly in terms of fees, but the payments can only be passed along to somebody else in the PayPal system at a correspondingly low cost. There is a substantial delay (currently four business days) if one wants to transfer a PayPal payment out of the system and into a bank. A private e-money provider who enables a user to remit payments quickly and cheaply to any third party, and who can guarantee acceptance by the third party, should be able to find willing users for its money. This offers a possible route through which private e-money can find at least initial acceptance for transactions, and from there further "invade" the transaction space occupied by government e-money. Further reason to hold the money can then be found in the way that private e-money fulfills the remaining function of money.

The store of value function of money is an important though often overlooked factor determining the use of e-money. There is nothing preventing money from having a positive return, and indeed much of the money held by households is in interest-bearing checking deposits such as NOW accounts. Therefore, it is reasonable to assume that private e-money will also pay some positive return. As an asset, money has a return that is randomly distributed. The characteristics of this return distribution will determine the share of the household portfolio that is allocated to the particular asset. Rather than specifying arbitrary return distributions for private e-money and government e-money, it is sufficient for our purposes to note the following ideas. First, the expected return on e-money can include compensation for transaction costs. Second, to the extent that the return on private e-money and the return on government e-money are less than perfectly positively correlated, there will be gains to diversifying one's portfolio between private e-money and government e-money. Finally, the main risks in private e-money are the absence of deposit insurance and the absence of a lender of last resort, which would both tend to increase the riskiness of the distribution.

The picture of private e-money that emerges from considering the three functions of money is a private e-money that takes the form of an interest-bearing checking account. The promised return on the balances held in the private e-money account will be higher than the return on a government e-money account, primarily to compensate for the increased risk of failure of the

private provider, relative to a government-regulated provider of e-money. The return on private e-money may also compensate for any increased transaction or unit of account costs relative to government e-money, but these costs are likely to be small. A private e-money system, however, may initially gain users by performing certain transactions that are currently expensive if conducted using government money.

Now that we have established the conditions under which people would actually use private e-money, we need to seriously consider whether any private institution would want to provide it under these conditions. That is, can a private e-money provider offer interest-bearing checking accounts and still turn a profit? A private e-money provider actually combines three different revenue-generating institutions in a single firm: central bank, clearing and settlement system, and portfolio manager. Each function provides a source of revenue. The central bank function provides direct seigniorage, in which the money provider purchases goods and services by crediting the accounts of individuals and businesses, creating money in the process. The clearing and settlement system provides fee revenue from clearing and settling the transactions made in the private e-money. The final source of revenue comes from managing a portfolio of assets purchased with the private e-money deposits.

Of the three sources of revenue, direct seigniorage is likely to be quite small. There is simply a limit to the amount of in-kind revenues that an e-money provider needs. The revenues from clearing and settling fees could be significant, but the provider may have little flexibility in setting them. If the transaction fees are too high, relative to government e-money, the private provider will have to pay higher interest on deposits or face a rapid decline in demand for private e-money. The major source of revenue, it would appear, would be the same for a private e-money provider as for a bank: the returns from the asset portfolio.

The private e-money provider must be careful in its choice of assets, however. If it lends directly to its customers, then it is in the position of taking deposits and making loans—that is, it is a bank and therefore subject to all the government banking regulations. This would bring its e-money under the regulation of the government, so the e-money would cease to be private. The private e-money provider must therefore operate like a mutual fund, purchasing securities on the primary and secondary markets. This raises the further problem of whether

the holders of securities would accept the private e-money as payment, especially at the inception of the private e-money system.

The different revenue-generating functions of a private e-money provider give an indication of the type of institution that could evolve into a private e-money provider. As Friedman (1999) points out, the key step in creating private e-money is the settling of payments on the books of the private firm rather than on the books of the central bank. Thus, a clearing house or credit card system is a natural candidate to become a private e-money provider. A mutual fund, insurance firm, or another large asset manager could potentially add e-money creation, clearing, and settlement to its services, since it already has expertise in managing deposits and assets and a large base of potential e-money users. Friedman also suggests that a very large provider of some good or service, such as a transportation authority, that accepts e-money, could also potentially create, clear, and settle payments on its own books.

But again a note of caution is in order. It is highly unlikely that a potential e-money provider can suddenly introduce a private e-money that is completely independent of the banking system. In order to establish its reputation, a private e-money provider will have to promise to redeem private e-money liabilities in government money. This means that the private e-money provider will have to maintain deposit accounts at banks. Banks will probably regard a private e-money provider as a competitor for deposits and may refuse to do business with a private e-money provider. This limits the likelihood that a private e-money provider will be a clearing house or a credit card system. Visa, for example, is actually a member-owned association, where the membership includes banks. And a private firm that uses bank loans to finance its activities will probably not want to undertake a venture that will certainly jeopardize this source of funding, regardless of the profitability of the private e-money venture. This leaves the mutual fund company as the most likely introducer of private e-money.

The private e-money function of any provider is likely to mimic the operation of a bank of issue, the last large-scale private money provider, which operated under the gold standard. The private e-money issuer will maintain a reserve of government money (and government-money denominated assets), and promise to redeem all private e-money deposits in

government money on demand if the depositor wishes. If the private e-money provider proves its soundness and reliability, it may reduce its government-money reserves to a smaller and smaller fraction of the stock of private e-money claims that it has issued. In the extreme case, the private e-money provider can reduce its reserves of government money to a trivial fraction of its private e-money liabilities.

In the end, it is unlikely that private e-money will drive out government money, for several reasons. First, households and businesses will be willing to hold both government money and private e-money in their portfolios. Second, the establishment of a private e-money system will likely depend on the use of government money as a reserve by the private e-money provider.

And since private e-money providers cannot engage in direct lending, government money will persist through the banking system, as long as there is demand for bank loans.

On the other hand, it is unclear whether private e-money can be introduced successfully and can flourish. Not only is it unclear whether there are sufficient profits to attract potential private e-money providers, but the type of firm that would be willing and able to provide private e-money also appears to be limited. For now, we assume that sufficient profits and an able provider will arise, so that we can solve the remaining puzzles. But in reality, the requirements for the existence of private e-money appear difficult to meet.

Regulators and e-money

What should be done about private e-money? Is it a useful innovation, a nuisance akin to spam email, or an attack on the monetary system that must be prevented by some kind of firewall or antivirus software? Clearly, since private e-money (to the extent that it exists) will be part of the payment system, the central bank must be concerned about the emergence and uses of private e-money and the dangers that a private e-money system poses.

Fundamentally, there are two possible threats from private e-money. The first one constitutes —will private e-money destroy the central bank's ability to manipulate the money supply or to affect output and interest rates in the short run? The monetary authority will have to pull harder on the policy levers, but they will still have an effect. But it may be argued that our model assumes that the private e-money providers will be well behaved, even in the absence of government regulation. We have not considered, for example, that a private e-money provider could become reckless in its issuance of private e-money, which could lead to inflation or to financial panic. The historical experience with unregulated financial institutions, however, indicates that this is a naïve assumption.

The latter consequence is the real danger of private e-money. Private e-money could pose a huge systemic risk if left unregulated. Over issuance of private e-money could lead to a classic run on the private provider, or it could introduce gridlock into the payment system if private e-money payments are suddenly refused. Such problems will surely spill over into the banking system and other financial markets, given the various linkages between private e-money, government money, and the bond market that we modeled in this paper. A financial panic precipitated by private e-money would place the central bank in a difficult position. On one hand, such a panic would effectively and more or less permanently eliminate private e-money, but at a potentially huge cost to the government money system and to the real economy. On the other hand, if the central bank were to use its power as lender of last resort, the action may unintentionally bail out the private e-money provider and create a moral hazard problem.

The goal of regulation should be to reduce or eliminate the systemic risk from private e-money. One strategy is to prevent private e-money from appearing in the first place. An

outright ban on private e-money is possible, but as in the case of state bank notes, perhaps a more successful strategy would involve taxing the issuance or use of private e-money at a rate that makes it unprofitable or unattractive. But should private e-money be eliminated? As mentioned above, private e-money must find a niche in order to be adopted by households and firms. It must fulfill the functions of money in a way that is better, faster, or cheaper than government money. If private e-money providers find a way to do this, it would represent a valuable innovation in the payment system that would probably have to be mimicked by the government e-money system. Private e-money could provide a force for payment system innovation and improvement that is largely missing from many economies, most notably the United States, which is still mired in billions of paper cheques. If private e-money can be managed to gain the benefits of increased competition and payment innovation without an unacceptable increase in systemic risk, then private e-money does have a useful role to play in the economy.

The question of regulation then becomes whether it is possible to manage private e-money providers to limit systemic risk. One possibility is simply to impose regulation on them as on any other financial institution. Private e-money providers are essentially modern banks of issue, so one possibility is to create a special regulatory category for such an institution and to modify the banking regulations to accommodate them. Such regulations would include capital adequacy, and the Basel standards could easily be extended to these banks of issue. Issuance of private e-money can likewise be regulated by the imposition of CAMELS-like ratings and standards for private e-money providers.

One potent tool for regulating private e-money providers, which has a precedent in history, is to force them to redeem their private e-money for government money in large quantities, on a regular basis. This technique was used by the First and Second Banks of the United States in the early 19th century as a way to regulate the issuance of private bank notes. The Bank of the United States would accumulate claims against state banks, in the form of their notes, and present them to the issuing banks for redemption in specie. According to contemporary observers, this regulation was fairly successful at keeping state bank note issuance in check. Such a practice could work well for modern regulators of e-banks, and it would obviate a

policy advocated by some authors. In particular, Goodhart (2000) has advocated that the government only accept government money as payment in order to maintain demand for government money and hence to maintain monetary control. But if the central bank were to redeem private e-money payments for government money on behalf of the finance ministry, this would accomplish the purpose just as well. In fact, it would be a better practice, because it involves the central bank directly in monitoring and disciplining the private e-money issuers.

One question that remains with regard to regulation is whether e-money is governable in the long run. That is, if a government bans the provision of private e-money, or allows it under conditions that prospective providers find unacceptable, renegade providers may attempt to establish an illegal private e-money system, say in an offshore server. Given our analysis, it seems that e-money is governable in the long run, even though monetary policy as practiced over the past 50 years may lose its effectiveness. What we have shown is that e-money is tied intimately to e-banking, and banks are still delicate institutions that depend on trust and reputation as much as convenience and price of services. Renegade e-money providers will lack trust, reputation, and convenience, because they will have to remain completely separate from the official money and payment system. Therefore, they are not likely to survive.

The above point actually raises a possible outcome from regulation. We have argued that private e-money providers will be like banks in that they are highly leveraged institutions that operate on small margins and are therefore quite sensitive to changes in their cost structure. Thus, as with other financial institutions, it will remain surprisingly easy to regulate them out of existence by imposing costs on them. In addition, competition from government money providers—banks—is likely to be intense as they fight to protect their franchise over money creation. It is quite probable that the establishment of minimum capital standards, combined with the costs of entry into a market with a strong incumbent firm, will be sufficient to prevent private e-money providers from arising, even though they would be perfectly legal.

Conclusions

1) we have provided clear and inclusive definitions of e-banking and e-money. These definitions remind us that both e-banking and e-money have existed for quite a while, which forces us to find the truly new innovations in each area. We argued that the innovation in e-banking is the adoption of Internet e-banking, and that the innovation in e-money is the creation of private e-money. These innovations are the sources of the most significant effects, including potential problems, from e-banking and e-money.
2) The adoption of Internet e-banking has an important implication for monetary policy: monetary policy will become less effective as money holdings become increasingly interest sensitive, because of Internet e-banking. The impact of this change has been incremental, since the widespread adoption of Internet e-banking is likely to take place over many years. Nonetheless, the cumulative effect may be quite large and may significantly reduce the effectiveness of monetary policy as currently practiced. There is also a benefit to this process in the form of expansionary pressures in the economy that raise economic activity while allowing interest rates to remain low.
3) Private e-money provides socially useful services, it should not be quashed by government regulation. But private e-money providers will also be financial institutions—ones that will come to play a key role in the payment system. Thus, regulation of these institutions is essential. One strategy would be to redefine what a bank is, based on the role an institution plays in the payment system. This would make it impossible to operate as an e-money provider without being a bank, since clearing payments is intrinsic to operating a private e-money system. The effect of this change in definition would be to eliminate all private e-money by bringing it under the monetary control activities of central banks, effectively converting it to government e-money.

   On the other hand, private e-money providers do not need to be banks (as currently defined) or to be regulated exactly like commercial banks. They do need to be prevented from overissuing money that would lead to default and payment system gridlock. This can be done through appropriate capital requirements and CAMELS-like ratings created specifically for modern banks of e-issue. In addition, private e-money

providers can be required to redeem their e-money for government e-money at par and can enforce convertibility by "presenting" massive quantities of private e-money for redemption on a regular basis. The central bank can regulate safety and soundness of banks of issue and participate in market discipline. By simply establishing standards for safe and sound operation, however, there is a good chance that regulation will render private e-money provision unprofitable.

Of all the possibilities we consider in this paper, the most likely scenario appears to be that e-banking will give the economy a repeated, mild stimulus while gradually weakening the effectiveness of monetary policy. Internet e-banking is a reality that is gaining momentum.

On the other hand, it remains to be seen whether sound, safe, and profitable private e-money providers can thrive outside the imagination of economists. Nonetheless, regulators should be prepared for this possibility.