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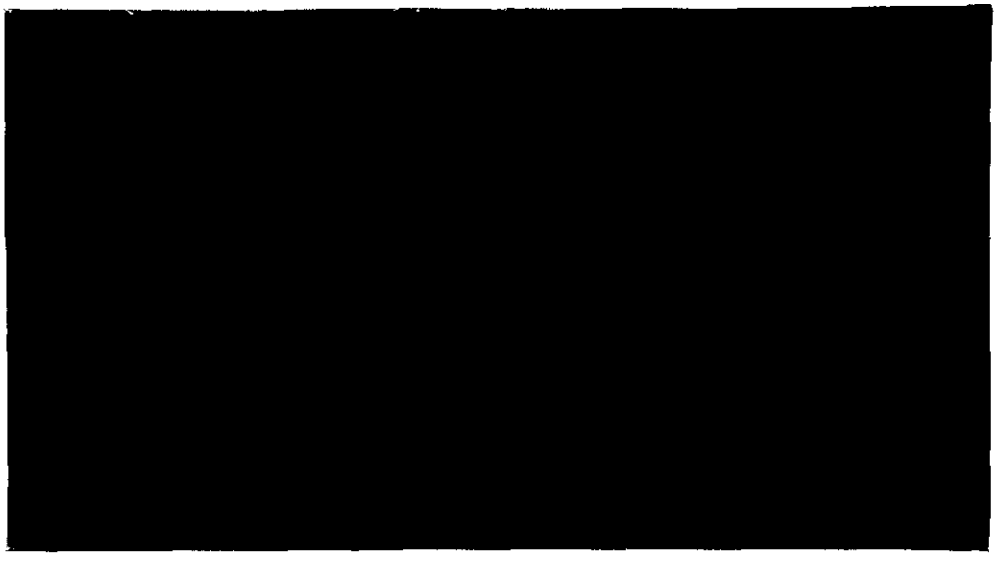

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THE POTENTIAL IMPACT OF INTERNET TRANSACTIONS ON MONETARY POLICY, WITH SPECIAL REFERENCE TO SMALL OPEN ECONOMIES OF THE CARIBBEAN

Lester Henry, Ph.D
Lecturer – Department of Economics
University of the West Indies, St. Augustine

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Lester Henry, Ph.D.

Lecturer, Department of Economics
University of the West Indies, St. Augustine.

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ABSTRACT: The rise the internet as a tool for transacting business has caused some concern among economists and central bankers. The spectacular growth of e-commerce and the new financial innovations developed to accommodate it has led some to believe that there will be a significant undermining of monetary control by central banks. Alternatively, others argue that, because of some critical limitations, the erosion of the power of Central Banks is still a long way off despite the new developments. This paper examines this debate and attempts to draw some conclusions that are relevant for the small open economies of the Caribbean. First, the development of e-commerce and new monetary instruments are outlined.
Second, a literature review of the arguments for and against the erosion "hypothesis" is presented. Third, the implications of each position is examined for small open economies. And finally, a summary and conclusion with recommendations for future research is presented.

1. Introduction

The advent of the Internet and e-commerce has stimulated debate about new forms of payment systems. In recent times, this has taken to form as to whether or not the newly emerging digital cash or e-money can pose a serious threat to national currencies [Berensten (2000), and Good (1997)]. Further, will such e-cash lead to an undermining of the power of central banks to conduct monetary policy? [BIS (1996), Frezza(1996), and, Goodhart (2000)]. In fact, some have even argued that it may lead to the demise of many Central Banks [King,1999]. The conducting of effective monetary policy in small open economies, particularly those in the Caribbean, has traditionally been fairly difficult [Worrell, 1996]. The challenges, therefore, raised by developments with e-money may be quite significantly different for these economies than for the larger economies where monetary policy has generally been effective.

This paper examines the potential impact of e-money on the relative ability of central banks to conduct monetary policy. Section 2 briefly outlines the background of the issue, with respect to, the growth of the Internet, e-commerce, and e-money. Section 3 examines the debate over the consequences, for central banks and monetary policy, of the widespread use of e-money. The possible impact of e-money on Caribbean open economies is discussed in Section 4. Finally, a brief summary with some recommendations is presented in Section 5.

2. Growth of the Internet, e-commerce and e-Money

The last decade or so has seen a remarkable rise in the spread and use of the Internet. The correspondent rise in e-commerce has also been phenomenal. For example, worldwide the number of Internet users is

expected to reach 1 billion by 2005[1]. The volume is e-commerce is expected to rise to US$4.6 trillion according to the Boston Consulting Group's estimate [Table 1]. This high estimate is cited since, generally, the growth of e-commerce and the use of the Internet have tended to surpass even the most liberal projections.

Table 1: Various estimates of world-wide e-commerce (billions $)

	1999	2003	Average annual growth
e-Marketer	98.4	1244	89
IDC	111.4	1317	85
ActivMedia	95	1324	93
Forrester Low	70	1800	125
Forrester High	170	3200	108
Boston Consulting Group	1000	4600	46

Source: OECD[1999].

This dramatic increase in trade over the Internet has fueled efforts to come up with alternative payments systems, particularly that using e-money. Electronic money or digital cash takes on a number forms. For example, the smart card, also known as the electronic purse, is a plastic card with an embedded microprocessor that can be loaded with a monetary value [Berentsen,1998]. The main advantages of e-money are "no bulk, perfect divisibility, and delivery versus payment" [Jordan and Stevens, 1996]. Some notable efforts at e-money are listed in Table 2.

The DigiCash and CyberCash experiments failed because they "did not do anything people could not already do with credit cards, so few wanted to use them"[Coyle,2000]. There were the obvious problems of security,

[1] NUA internet surveys

anonymity, transferability, and lack of uniqueness with these systems[2]. It is, therefore, argued that properties required for e-money to be widely accepted must be: security, unique convenience, inheritance of merits from cash (Nakayama et. al, 1997).

Table 2: Types of e-money

CyberCash	Mondex
CyBank	Netbill Project
CheckFree	USC's NetCash
DigiCash	NetCheque
eCoin.net	Sandia's e-cash system
CitiBank's EMS	Oakington System
FirstVirtual	
Millicent	

Source: The Information Economy, http://www.sims.berkeley.edu/resources/infoecon/, and other websites.

This has not dampened, however, the efforts to come up with a smarter form of e-money. The Mondex Smart Card has achieved a fair amount of success, and the comparatively new Oakington system claims to have remedied all the problems associated with previous efforts. The Millicent System aims specifically at micro-commerce and works on a "pay per click" basis.

3. The Internet, The Demand for Money, Monetary Policy, and e-Money's Impact on Central Banks

Impact on the Demand for Money

The impact of the Internet on the demand for money has also caused some amount of concern. The existence of Internet banking may seem so attractive, particularly for purchases made over the Internet that the demand for cash may fall drastically. Using the familiar Baumol-Tobin model, the demand for money (MD) emerges as:

[2] Nakayama et al [1997] outlined a scheme in which all these problems can be surmounted

$$MD = f(\mathbf{Y}^{+}, \mathbf{B}^{+}, \mathbf{R}^{-})$$

Where **Y** is an income measure, or spending, **B** reflects technological innovations that reduce transactions costs, and **R** represents the interest rate [see Barro, (1990) or Marquis, (1996)]. Both Y and R are positively related to MD while the impact of R is negative. Technological innovations may, perhaps, reduce transactions costs zero. This results in an increase in the number of trips to the "bank", and thus, a reduction in the demand for money. The number of trips to the bank will increase in the sense that will every time a purchase it made the customer dips into their account. As Grigg [1996,p.10] points out: "the Baumol-Tobin model predicts zero cash from the bank".

The widespread use of e-money will further diminish the demand for money once accepted as an alternative to cash. Jordan and Stevens[1996] envisage a time when "the velocity of central bank money might approach infinity—that is, that there will be no appreciable domestic demand for central bank currency". They further argue that "it seems quite likely that electronic moneys could supplant currency in a considerable portion of legal, retail transactions" [Jordan and Stevens,1996,p.4]. Berensten[2000] also argues that the only threat of e-money comes from it ability to replace cash.

On the other hand, others like Dwyer [2000] and Feedman[2000], emphasize that due to the problems of security, and anonymity, e-money will only be useful for making "micropayments" up to a maximum of between $5 and $10. It seems quite premature, however, to rule out the possibility that the implementation problems of e-money will not be surmounted in the near future. After all, the U.S. government has recently decreed that e-signatures are valid for legal claims. This gives

some indication that the level of confidence in the amount of security attainable in Cyberspace is quite high. Also, the U.S. has just lifted the ban on the export of advanced encryption programs to the OECD and several other countries.

Impact on Monetary Policy

The advent of e-money may "lead to shifts in the velocity of money which might temporarily reduce the usefulness of monetary aggregates"[BIS, 1996, p.7]. As argued above, modern financial innovations tend to result in diminished average money holdings by individuals. E-money and e-banking will continue to exacerbate this trend. Nevertheless, Berentsen [2000] argues that e-money is like any other form of inside money and, therefore, should have no immediate impact on monetary policy[3]. Also, Tanaka [1996] argues that the most important aspect of e-money is it's ability be borderless. He stresses that: "transnationality is a critically important characteristic of digital cash [Tanaka, 1996, p.2]. He contends that once e-money only circulates within a domestic economy then it remains just another payment system.

An area of general agreement is that e-money will result in a loss of seigniorage revenue for governments [Ely (1996), and BIS(1996). The replacement of central bank notes by e-money as a means of payment will "lead to a corresponding decline in central bank asset holdings and the interest earned on these assets that constitutes seigniorage revenue"[BIS, 1996, p.7]. The loss of revenue from seigniorage may be crucial, particularly for countries with large budget deficits[4].

[3] Berentsen [1998] notes that "Inside money gives the bearer a legal claim against its issuer; outside money entails no such claim". Central bank notes are, therefore, outside money while travelers checks would be an example of inside money.

Impact on Central Banks

Furthermore, technological innovations may also have a significant upon or may even threaten the existence of central banks [see king,1999]. A major proponent of the view that central banks could become redundant, King, has argued that "if financial intermediaries could settle with each other in real time, then the role of central banks in providing finality of settlement would disappear"[see Goodhart, 2000, p.29]. King suggests that central banks may be at the peak of their powers at present but are due to experience a serious decline in importance in the years ahead. He argues that the successful implementation a system of private settlements could result in "no unique role for base money, and, hence, the central bank monopoly of base money issue would have no value"[King,1999,p.49]. And he further surmises that: "the successors to Bill Gates would have put the successors to Alan Greenspan out of business".

King [1999, p.42] also raises the issue as to whether "monetary policy is impotent when short-term interest rates remains zero". He argues that the persistence of low, or zero, interest rates are a distinct possibility due to cost reductions brought about by technology[5]. If monetary policy becomes completely ineffective, as is the case with the "liquidity trap", then central banks lose one of the main reasons for their existence. King cites the recent experience of Japan where interest rates were near zero for an extended period beginning in 1999 as evidence of this possibility.

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[4] The BIS presents estimates of the potential loss of seigniorage revenue for several OECD countries if Smart Cards are used for payments under $25 and $100.

[5] See the Goldman Sachs, Global Economics Paper, by Brookes and Wahhaj [2000] for a discussion of the possible impact of technology on inflation and growth

E-money can also "affect central banks in such areas as banking supervision, supervision of the payment system, and the stability of the entire financial system" [Berensten, 2000,p.3]. If commercial entities begin to make e-money loans from their deposits then they create money based on the usual operations of fractional reserve banking. The existence of this new cyber money supply will then pose some interesting challenges for central banks.

Those who argue that e-money will not erode the power of Central banks emphasize the ability of the banks control short-term interest rates. For example, Woodford [2000], building on Goodhart[2000], theorizes that as long as the Central Bank can maintain control over interest rates via the manipulation returns on borrowed reserves and at the discount window then e-money poses no threat. Woodford argues that the ability of central banks to conduct monetary policy does not depend on individual's willingness to hold base money. There could be a total replacement of central banks notes, for that matter, and policy can still be effective. This is certain, in the cases such as the U.S. where there are reserve requirements and the demand for money remains somewhat elastic. In countries without reserve requirements the dynamics will be different but the end result will be the same. Woodford [2000, p.9] concludes that "while advances in information technology may well require changes in the way monetary policy is implemented in countries like the United States, the ability of central banks to control inflation will not be undermined".

What all of the above authors have failed deal with is the question as to how do ordinary citizens earn e-money. Until one is willing and able to work for e-money, its threat to government issued currency use will continue to be limited. If the only way to get and use e-money is by first

depositing normal cash into an account then government issues note will never be seriously threatened. Given the continued expected growth of e-commerce it is quite possible to envision a period when an employee may be willing to accept at least part of their salary in digital cash, a form of IOU. With the increasing concentration of businesses via mergers and acquisitions, conglomerates may be able to issue e-money to employees that they, in turn, will use to purchase products from other divisions of the company. The strength of the world's major multinationals is, in some cases, more powerful than governments.

4. The Potential Impact in the Caribbean

The potential for e-money in the Caribbean

Contrary to assertions of the BIS that "in many emerging market economies the infrastructure needed to operate cashless retail payments systems, especially nationwide ones, is likely to be costly set up and operate" [BIS, 1996, p.4]", e-money may be actually more useful and cost effective in a developing country context. It could be argued that in economies that are not highly monetarized it maybe advantageous to implement digital money in the form of smart cards rather than continue to back an unstable or virtually worthless currency. This may allow for some catching up, or perhaps "leapfrogging", of more advanced economies.

Good [1997, p.65] quotes a member of Smart Card Forum[6] as declaring that: "developing nations are using smart cards to leapfrog the need to build telecommunications infrastructure". Good also cites a wide variety of experiments taking place in developing countries with Smart Cards. For example, South Africa has been "experimenting with stored value

cards for six years and has developed a standard for a sophisticated product that reduces vulnerability to fraud, violent crime, and compensates for a lack of telecommunications infrastructure"[Good,1997,p.65]. There is no reason to believe that the Caribbean cannot benefit from similar schemes.

A credible private entity offering a form of e-money may not be a far-fetched alternative to a currency that carries little confidence. Consumers in the Caribbean are already using forms of e-money such as: debit cards, prepaid cellular phone cards, and photocopying cards.

Furthermore, given the size of the Central Bank's liabilities in relation to currency in circulation, a significant use of digital cash could have a marked impact on the money supply. As Table 3 indicates, in Guyana and, Trinidad and Tobago, currency in circulation as a percent of GDP and overall central bank liabilities is fairly small. Notes and coins are only .1 of a percent of central bank liabilities for Guyana and 2.4 percent for Trinidad and Tobago. The figures for Barbados are larger and look closer to that which exists in the OECD countries. The U.S. information is included to highlight the significant difference between developed and developing countries. A moderate adoption, therefore, of e-money will have a much larger impact in the latter.

Table 3:

	Currency in Circulation				
Country	Period	as a percentage of GDP	As a percentage of Central Bank Liabilities	As a percentage of Deposits	Memo item; Deposits as a percentage of GDP
T&T	Jan-97	2.4	10.4	9.4	26.1
Guyana	1997	0.10	0.10	0.2	65.8

[6] Smart Card Forum was set up in 1993 by "Citicorp, BellCore, and the U.S. treasury financial management services division to accelerate the widespread acceptance of smart cards that support multiple applications in North America" [Good, 1997, p. 40].

Barbados	1995	6.3	0.342	9.9	63.7
U.S.	1994	5.2.	84.1	44.7	11.6

Source: Various Central Banks publications and BIS[1996]

Implications for seigniorage

As admitted by Goodhart[2000], even if e-money does not threaten the power of central banks, it will reduce the amount of seigniorage that governments are able to extract. This may not be crucial, however, as seigniorage revenues have tended to be fairly small in recent times. Table 4 indicates some estimates of seigniorage[7] for three Caribbean territories. As is clear, is small and represents only a minor percentage of GDP.

Table 4: Seigniorage Revenue in Selected Caribbean Countries (millions of local dollars)

	Period	Seigniorage	Seigniorage/GDP
Trinidad /Tobago	1997	115.778	0.003
Guyana	1997	13.782	0.000
Barbados	1995	21.822	0.005

Source: author's calculations

Internationally traded e-money, originating from the U.S., could also hasten the process of dollarization. Caribbean residents will have an additional incentive to abandon their local currency. Furthermore, King(1999) argues that with increasing financial liberalization, governments are not as enthusiastic about national currencies, therefore, "the creation of currency boards, or even complete currency substitution" may see a reduction in the number of Central banks worldwide. This is certainly a possibility in the Caribbean where a

[7] Following the BIS[1996], seigniorage is roughly estimated by taking the amount of currency in circulation times the long term interest rate on government t-bills.

number of suggestions have already been made that switching to a wholesale adoption of the U.S. dollar will bring major benefits, despite the loss of sovereignty.

Even if there is not complete dollarization, the work of regional central banks can be made complicated since e-money could place pressure on exchange rates and lead to financial crises [see Tanaka, 1996.] Once e-money is borderless, a foreign exchange market in Cyberspace will emerge. This will allow ordinary citizens, for the first time, to directly deal on the FX market, opening the possibility of speculative attacks on both cyber and regular currencies.

The ability to transfer money via the Internet at almost zero cost must also be appealing to many in the Caribbean. The region receives a fair amount of remittances from the U.S., Canada and England as is well known. The fees paid for such transfers can be quite high. If a much cheaper and reliable alternative appears via the Internet then this could lead to great benefits for the Caribbean.

5. Summary and Conclusion

The general belief in the literature is that e-money will not pose a serious threat to monetary policy. The fear raised by King [1999] that central banks will become obsolete is taken as being exaggerated by Freedman[2000], Goodhart[2000], and Woodford[2000]. The implementation problems are expected to plague the widespread use of e-money for a long time to come. Furthermore, it is argued, that as long as the central banks maintain their ability to influence short-term interest rates monetary policy will continue to be relevant.

The control of interest rates and inflation by central banks in the region has always been tentative. As Worrell[1996] noted, there tends to be interest rate inertia, that is, changes in the money supply results in little or no change in interest rates faced by the public. Monetary policy, in the cases of Guyana, Jamaica, and Trinidad and Tobago, has primarily been geared toward exchange rate stabilization in recent times. The potential of a U.S. based e-money system making inroads into the region will no doubt exacerbate this challenge.

It is crucial, therefore, that policy makers take serious note of this possibility. Also, the potential benefits of Smart Cards over credit and debit cards needs to be studied more carefully. This is so, especially given the experiments taking place in South Africa. It should be stressed that Smart Cards allow both payment and settlement of a transaction. This could be quite appealing in the context a weak technological infrastructure. The opportunity to leapfrog to a more advanced payment system should not be dismissed as mere pipe dreaming. After all, the dramatic transformation of the world within only the last five years should provide ample evidence to the possible[8].

[8] The Internet, debit cards, cell phones and Cable TV have all become common household items in the region today from almost nowhere a few years ago.

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