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On the spontaneous freezing of the monetary base

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by

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Abstract: The paper explores the question of whether markets under laissez-faire will be able to insulate an economy from bad government money. Some recent proposals favour freezing the monetary base, by abandoning central bank operations. This requires active participation by the monetary authorities, however. On the other hand, the network externality makes a switch from central-bank currency difficult. The paper investigates how the dilemma could be overcome and the monetary base be spontaneously frozen, by a process where commercial banks issue liabilities that are redeemable only into central bank notes issued before a certain date.

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1. Introduction

Can monetary markets under laissez-faire insulate an economy from bad government money? In this essay, the answer is yes. The purpose of this essay is to provide an example of how this could be done, in a process where the monetary base is frozen by the spontaneous activities of the banking sector. The key element behind this development is that some banks start to issue notes and deposits that are redeemable only into central-bank notes that have been issued before a certain date.

The question of whether markets can insulate the economy from bad government money has become relevant because of the increased interest in competitive monetary regimes during the last two decades. A survey of this literature can be found in Selgin & White (1994). Major strands of this literature include the "free banking" literature (Selgin 1988, White 1989, Glasner 1989, Dowd 1993), focusing on systems with a single (commodity) base money and unregulated, competitive supply of bank money; systems with competing (fiat) base monies (Klein 1974, Hayek 1978); and "the new monetary economics" literature (Black 1970, Fama 1980, Cowen and Kroszner 1994), dealing with systems where monetary separation allows various interest-earning media of exchange circulate side by side, being explicitly priced in terms of a medium of account. Although the approaches of this literature differ, they all tend to argue that money is not very much different from other goods and that it is best provided in the market, instead of having the government controlling it in a monopolistic fashion via a central bank. If one accepts the argument that markets may be able to provide a better currency than a central-bank controlled system can, another question emerge: if all legal restrictions on the ability of private agents to compete with the central bank on equal terms are repealed; would then these agents be able to out-compete the central bank and establish an alternative currency? Intuitively this would seem possible. This position has also been defended by the followers of the "legal restrictions theory". According to the legal restrictions theory, there would be no incentives to hold non-interest bearing currency instead of interest-earning assets, unless legal restrictions forces the public to do so (Wallace 1983). The legal restrictions theory has been criticised, however, because it neglects the so called network externality problem. The current medium of exchange is a convention; it forms a co-ordinating equilibrium that will be self-enforcing and thus sustained, although it may be an inefficient one (Wärneryd 1989,1990). Taking the network externality problem seriously, the scope for switching to an efficient currency seems to be quite small, and private markets may therefore fail to establish a better currency. Cowen and Kroszner (1994) have argued, however, that the problem may not be an inescapable one. According to them, the use of a common medium of account makes all assets more liquid and saleable; the network externality is therefore becoming less difficult to overcome and a multitude of assets may serve as media of exchange, circulating in parallel. Although this seems plausible, it does not say how private markets can switch the economy's medium of account and it is probable that it is in this monetary function that a bad money becomes most hurtful to the economy. For these reasons, it has been argued that it is not enough that competition is allowed in the production of base money: in addition, the central bank has to go. For example, Lawrence H. White writes:

> *"Would it then be enough to allow private producers of outside money to compete with the Federal Reserve? Unfortunately, it most likely would not be. It is doubtful that a parallel monetary system could gain much of a foothold even in the absence of legal impediments, because of the natural tendency of money users in a region to converge on a common monetary unit....If competition from alternative currencies would not be enough to neutralize the Federal Reserve's ability to do monetary damage, then the opening of competition must be supplemented by some policy for dealing with the supply of fiat dollars."* (White 1989, p 64)

Proposals that accommodate this argument are the ones proposed by Milton Friedman (1987) and George Selgin (1988). They suggest that the monetary base be frozen once and for all, by the central bank's ceasing with open-market operations entirely. A monetary system could then emerge, with the existing stock of central bank notes being the ultimate means of payment and redeemable commercial-bank notes filling the role of a circulating medium.

However appealing such a proposal might be, there is a catch, namely that those who control the monetary authorities must voluntarily back off and refrain from their powers. As the gains from being in control of the issue of base money are great, both in terms of earning seigniorage and in terms of earning political support by reducing short run unemployment, it is not very probable that such a state of affairs will come about during a reasonable amount of time.

It thus seems that proponents of a monetary system where there is no role for government are faced with a choice between the Scylla of having to rely on the good will of the monetary authorities, and the Charybdis of being stuck with their product. In other words, it is not enough that the government remains passive and do not hinder attempts from private agents to produce an alternative money; they have to take active steps in order for a stable monetary regime to come true. The purpose of this essay is to challenge this contention. In particular, it will focus on the proposals by Friedman and Selgin, and ask: could the monetary base be frozen spontaneously? *What would happen if banks started to issue liabilities that are redeemable, only into central-bank notes that have been issued before a certain year?* The following figure may help to clarify the question:

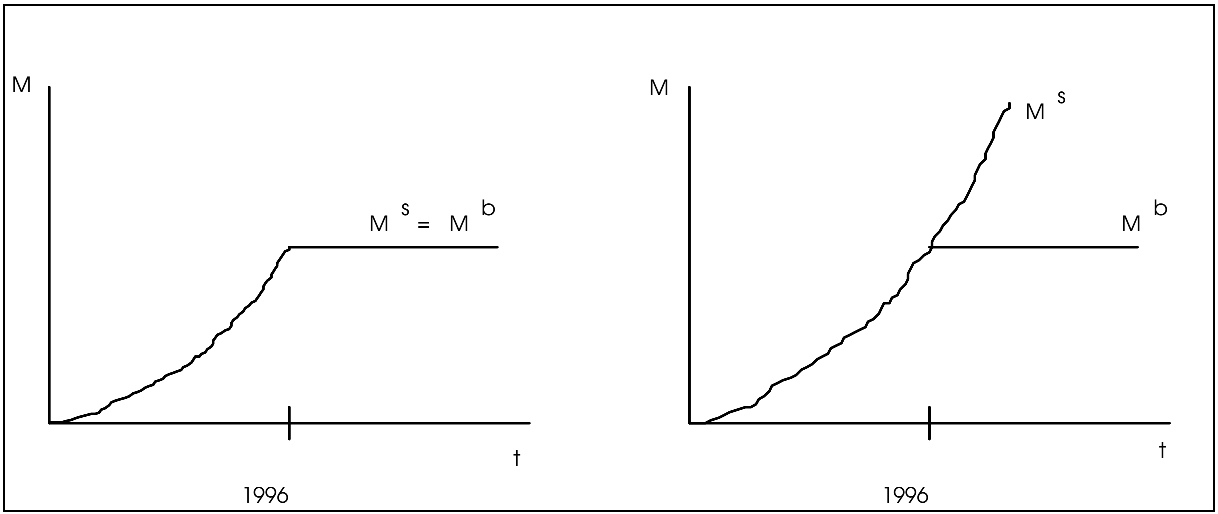

figure 1

In the picture, "M^s" stands for the supply of central-bank notes and "M^b" stands for base money in which commercial-bank money is redeemable. The left diagram pictures the Friedman/Selgin proposal for monetary reform: on a certain date, for example on New Year's Eve of 1996, the central bank will abandon its operations. The money that has been issued up to this date will function as base money and liabilities of commercial banks that are redeemable into central-bank notes, such as notes and deposits, will function as bank-created inside money. The diagram to the right pictures the following proposal: what if banks start to issue liabilities that are redeemable only into central bank notes that have been issued before a certain date? In this situation, the central bank will continue its operations, and the supply of central-bank notes will continue to grow exponentially. The notes that are issued after a certain date will, however, not be part of the base for the commercial-bank liabilities that are working as inside money in the system.

The purpose of this study is to investigate what might happen in such a situation. Can a free-banking system evolve despite the central bank's still operating? And can the monetary base be frozen without the central bank's consent?

The paper proceeds as follows: In section two a scenario will be described of how a situation like the one sketched above might evolve. In section three a more systematic treatment of the issue in the preceding section will be made. Section four discusses what the central bank can do to hinder the transition towards a frozen monetary base. The paper closes with a summary and some concluding remarks.

2. The emergence of commercial-bank money based on a fixed stock of base money.

In this section, a "rational reconstruction" will be attempted of how commercial-bank liabilities based on a fixed stock of base money could evolve. For this sake, let us imagine a "typical" country, which we can call Urbania. In Urbania, there exists a central bank issuing notes called CB-notes. These are the only notes in circulation. They are non-redeemable fiat money and are therefore base money. On the notes, the year of issue is printed, together with a serial number and a portrait of the Ruler. Due to the influence of Urbanian economists, financial markets have been completely deregulated; there is free entry into the banking industry and Urbanian banks are only subject to the laws of commerce that are similar to all kinds of commercial activity, such as laws in case of default and association laws. As a result of these conditions, Urbania has a flourishing banking sector; there exist several commercial banks, offering a wide amount of different kinds of claims on the notes of the central bank, such as bank notes and deposits subject to checks and credit cards. The notes of the commercial banks promise to pay on demand CB-notes equal to the face value of the commercial note. In Urbania there also exist a well-developed clearing system that each day clears the adverse claims that the banks have on each other.

One day an entrepreneurial commercial banker decides that he will start to issue "jubilee-notes", in memory of the centennial of the Day of Independence of the Great Republic of Urbania, in the year 1895. These notes promise to pay on demand at par a central-bank note, with the same denomination and *issued before or in the year 1995*. The notes are called "JB 95ers", and the numbers 95 are clearly written on them. To celebrate the occasion, the customers who take loans in jubilee-notes or deposit their CB-notes in exchange for jubilee-notes receive a small bonus. The bank also decides to issue checkable "jubilee-accounts" that promise to pay on demand CB-notes issued before or in the year 1995. The notes, checks and credit cards of the bank are all designed in the same way and with the number 95 clearly written on them.

The profit motive behind this operation is the same as the motive behind any credit issuing operation. By issuing these kind of liabilities, the banker can, as long as his notes are not cashed, lend out base money and thereby earn interest. Also, by linking its money to the celebration, the bank hopes to attract more customers that are willing to use it.

As the bank is one of the most highly renowned and trusted institutions in the country, the public has no problem with depositing their CB-notes in exchange for jubilee-notes. They want to receive the bonus, and they know that they can exchange the notes the next day if they want, for CB-notes. However, the jubilee-notes are rapidly becoming accepted in exchanges, treated as perfect substitutes to CB-notes. Especially shopkeepers find it in their interest to accept the 95ers as payments. The notes are thus becoming used as currency and the public are thereby increasing their willingness to hold the notes. When this happens, the profit opportunities are further increased. The bank can decrease its reserves of CB-notes and thereby increase profits by lending them with interest.

The liabilities of the entrepreneurial banker is now a part of the stock of inside money in the system. Competing banks find it in their interest to accept each others' liabilities and immediately redeem them in cash at the issuing bank. This is done by the normal clearing system. There are several competing issuers of notes and all notes are accepted at par value by the public. Banks hold fractional reserves of CB-notes, enough for the meeting of their obligations at the daily clearings.

The story is thus far very similar to the ones that have been sketched by Selgin and White (1987), Glasner (1989) or Dowd (1993) concerning how a mature monetary system under laissez-faire could be expected to look like. However, there is one great difference. In these stories, the monetary system is based on a commodity standard, such as gold. By contrast, in our story the banking system is based on a fiduciary medium, namely the central bank's notes. What is troublesome with this is that the central bank is still around, eager to use its printing presses. In fact, this system is not very different from an ordinary central bank system. The only difference is that banks grant credit, not only by granting checkable deposits, but by also issuing notes. As the notes issued by the central bank are base money, this is essentially a modern central bank system.

There is, however, one interesting detail that differentiates the system from an ordinary central-bank system: the liabilities issued by the entrepreneurial bank are based on a fraction of the stock of base money. This fraction is fixed, unless the central bank frauds itself by printing the wrong year of issue on their newly created notes. This will, however, not happen in Urbania. The central bankers are honest, and if they should try to print the wrong year of issue, the courts of Urbania would condemn them of fraudulent behaviour.

Anyhow, the idea has not crossed the minds of the monetary authorities; they are fully content with the situation and have not yet realised the danger to their powers that is lurking behind the corner....

The spontaneous freezing of the monetary base

Life is running smoothly in Urbania, and the days pass by pretty much alike. However, there is one great cloud that is casting its shadows, a cloud that will soon upset economic life. The coffers of the Ruler are empty. The people of Urbania is known to be very demanding; they are insisting that the Ruler give them bread and spectacle. In order to increase his popularity, the Ruler has complied with their wishes, which has caused the drain in the State coffers. Nobody in the private sector wants to lend more money to the Ruler; as a last resort he asks the central bank to lend him some. The central banker finds it wise to accommodate the Ruler's request. The central bank starts to lend him CB-notes, with which he can continue the financing of his obligations to the public, thereby keeping them happy. The newly created CB-notes upset the balance between the amount of jubilee-notes and the amount of CB-notes in circulation. Moreover, they cause prices to rise. The public perceives that the jubilee-notes are less frequently passing through their hands. The proportion between jubilee-notes and CB-notes is continuously declining.

As long as the money of the entrepreneur is treated as a perfect substitute to the CB-notes, the entrepreneur will loose money on the inflation. In order to protect himself from it, the entrepreneur has incentives to make the public discriminate between his money and the CB-notes printed after 1995. In other words, he wants the public to perceive that his money is not the same good as CB-notes. That means that he wants the public to perceive that pre-1995 CB-notes are not the same thing as post-1995 CB-notes. How can this be done? In order to promote the perception of a difference, the celebrating bank launches a campaign: PAY WITH 95ERS AND YOU WILL PAY THE PRICES OF 1995. The campaign is heavily launched by different mass media. The bank makes agreement with wide ranging chain stores to help promote the campaign, for example by the bank paying the difference between the difference in price between the year 1995 and the current price. The bank also charge different interest rates for loans taken in post-95 CB-notes and loans taken in 95ers. It claims that loans in 95ers are loans with "real" interest rates, compared to the nominal interest rates of the CB-notes.

With these events, the perception of jubilee-notes and CB-notes as perfect substitutes changes. The 95ers are being identified with the prices of 1995 and CB-notes with actual prices. Shopkeepers find that as long as customers are willing to discriminate, 95ers are much more reliable as a unit of account, which lowers pricing costs. They continue to state different prices after the campaign has been closed. When this happens, the perception of a difference between jubilee- and CB-notes will be strengthened. Soon more and more shopkeepers list different prices for jubilee- and CB-notes. The public actually has a preference for prices stated in terms of 95ers: they are associated with "the prices of 1995" and "price stability". The demand for 95ers increase. The economy becomes jubilee-noteised. The entrepreneurial bank can without loss charge different interest rates for jubilee-notes loans and CB-notes loans. Jubilee-note interest rates are treated as "real" interest rates and CB-note rates as "nominal".

Since jubilee-notes are claims on CB-notes issued before or in the year 1995, the consequence of the discrimination between jubilee-notes and newly created CB-notes is that a pre-1995 CB-note is treated as a different good than a post-1995 CB-note is. Also, the commercial-bank notes that promise to pay any CB-note on demand will be avoided, as they still will be treated as perfect substitutes to CB-notes. When the competitors of the entrepreneur are becoming aware of this development, they start to issue notes and other liabilities in terms of pre-1996 CB-notes.

As the process continues, fewer are willing to hold newly created CB-notes. In consequence, the central bank has to create even more new CB-notes, in order to earn seignorage. When this happens, the flight into jubilee-money is further increased. The process reinforces itself; now the central bank must print even more notes, which will lead to more flight into 95ers, and so on. In the end, newly created CB-notes will not be treated as money. When this happens, a new monetary regime has been established: the stock of base money is frozen for good and on this base a stable banking system is operating.

3. The argument refined

We have seen how the monetary base could be frozen spontaneously, despite the fact that the central bank did not suspend its operations. Apparently, society was able to sneak out of the inefficient equilibrium where the monetary base consisted of the total stock of central-bank notes. In this section, let us try to investigate in a more systematic way the mechanisms that were at work when this happened.

If we recapitulate the nature of the problem at hand, we have a situation where it is difficult to move from a state where a currency that is perceived as being less efficient is being used, to a state where a more efficient currency comes into play. Why should a frozen monetary base be a more efficient outside money than one that is being controlled by the central bank? Obviously, the distinctive feature compared to an ordinary central bank currency is that the former is thought to be less fluctuating in quantity. If the quantity is not perfectly time invariant, it is at least non-increasing. Although there is probably some slight decrease in its quantity due to wear and tear, it does not seem outrageous to say that the quantity of a frozen monetary base can be more stable over time than the quantity of a money that is subject to the will of a central bank is. Let us therefore treat the quantity of a frozen monetary base as being fixed. The efficiency of a time invariant currency may be attributed to the lowering of costs such as pricing and evaluation costs and lesser risk of making wrong decisions due to false signals when using the price system.[1] A fixed medium will also dominate a medium that is increasing in quantity over time as a a store of value.

If time invariance is a desirable property of money, it is obviously possible to establish an efficient currency if it is possible to define a fixed subset of the currency that is currently being used. This is the case if, for example, each individual element of the currency

[1] For the costs of inflation and price level uncertainty, see Leijonhufvud 1981, 1984.

is marked in a chronological order when produced with a serial number, or if the elements of the currency is marked in such a way that it is possible to make subsets according to finite time intervals, for example by marking the year of production on the individual notes. A third option would be to discriminate between notes according to the different secretaries, chairmen et cetera, whose signatures appear on the notes[2].

Obviously, since in our case it is printed on the notes of the central bank both a serial number and the year of issue, the possibility of establishing a fixed subset of the current money as efficient base money is possible. This transition will not occur automatically, however. First, there is the problem of defining subsets: by which criteria should they be defined? How should the elements of the subset be marked, so that they can be distinguished from the other elements of the current money with low cost of verification? Second, since it is possible to define a very large number of subsets, there is the question: which subset should be used as base money? We have here a co-ordination problem that resembles the question of deciding which good should be used as a medium of exchange in a barter economy.

Third, there is the network externality problem. Even if there exists an alternative medium that is more efficient, the switching to it will not easily occur. If we start from a situation were everybody is willing to accept a certain medium of exchange A, it will not be in the interest of an agent to accept some other medium B, since nobody else will accept it in exchange. In order for the medium B to have a chance of becoming established, the expected utility of accepting it must be at least as large as the expected utility of accepting medium A. For this to happen, a certain proportion of the population must be prepared to use it in exchange. In other words, it is necessary to establish a "critical mass" of medium users if the switch is to occur (Wärneryd 1989,1990).

In order to investigate how the network externality may be overcome, it could be useful to look at the various functions of money, and how they come into play in different

[2]The last option was given to me by Jonas Frycklund.

stages of the process. For this purpose, it seems fruitful to adopt the approach of Cowen and Kroszner (1994), and allow for monetary separation: different goods may serve as medium of account and medium of exchange respectively. According to Cowen and Kroszner, monetary separation into different goods has been the rule rather than the exception. The crucial property of a good serving as a medium of account is that it is familiar. The decisive quality of a good serving as a medium of exchange is that it has "supreme saleability", or that it is more easily traded than other goods.

When monetary functions are separated into different goods, there are two distinct network externalities at work. Corresponding to a medium of exchange is a medium of exchange network externality. This externality is the more familiar one that was described above: it pays off to accept in exchange the good that everybody else is willing to accept in exchange. Then there is a medium of account externality. In the words of Cowen and Kroszner, a medium of account can be thought of as a "language", by which different agents are communicating subjective valuations to one another. As with all other languages, it is individually rational for an agent to speak the same language as everyone else does. Thus, for a seller, it is rational to state prices in terms of a certain medium of account, if all the buyers are in the habit of valuing things in terms of this medium. Likewise, it makes sense for a buyer to value things in terms of the medium of account in which prices are stated.

When monetary functions are united into one good, the separate externalities seem to reinforce themselves: A medium of exchange will have a tendency to be used as the medium of account because of its familiarity. This relation lies behind the Mengerian explanation of the evolution of money, where the most commonly accepted medium of exchange becomes used as the medium of account (Menger 1892). Likewise, it is natural to accept the medium of account as a medium of exchange: increased familiarity of a good often makes it more saleable. The unification of monetary functions thus seems to enlarge the network externality problem. The effect is somewhat analogous to the effect of certain types of glue, that are constituted by two substances. If these are kept apart, the fix of each individual substance is weak. If combined, however, the result is a fix that is very hard to break.

How is it possible to overcome the network externality problem? Taking the network externality problem seriously, there seem to be little way out, unless the deterioration of the value of the money in terms of other goods is very speedy. Cowen and Kroszner, however, have sketched scenarios where the problem is not an inescapable one. In the world of Cowen and Kroszner, the use of a common medium of account makes all assets more liquid and saleable; all goods are priced and it is easy to get information about the relative values of different goods. This lowers the network externality problem: people are more ready to accept other things than money in exchange if they know prices for which they can sell them. Because of this, assets that are superior in storing value by giving pecuniary returns will be used as media of exchange.

Such forces can not be at work here, however, since our situation is one where one fiat currency is being replaced with another fiat currency, an asset that give no pecuniary returns. Since the new base money is fixed in quantity, it has a potential for storing value better than the incumbent money, once it has been generally accepted. Since a fiat currency has value only because of the network externality, this cannot, however, be a driving force in the initial stage of the process; there is still some critical mass of users needed in order to start the transition towards the establishment of the new money. Once the critical mass needed is in place, the superior value storing capacity of a fixed base money can reinforce the process and make for a speedier transition to the new equilibrium.

A switch from a fiat currency to another thus seems extremely unlikely, since there is no outside value-storing properties that can "break the spell": the new currency cannot be used as a medium of account because it is not used as a medium of exchange. On the other hand, it cannot serve as a medium of exchange because it is not used as a medium of account. There is an element of "Catch 22" in this situation.

In our special case, however, there is another way out. The crucial element that makes a change possible is that the "new" money is a fixed subset of the incumbent money. Since the notes of the central bank are being individually marked with serial numbers and year of issue, it is possible to discriminate between them and define fixed subsets. Since the "new" money is a defined subset of the established money, it is apparent that it will immediately be accepted as a medium of exchange; people do not care whether it is a 1995-note or a 1996-note that they get, as long as it is a note. In other words, the medium of exchange externality never imposes a problem and the new currency can be immediately used as a medium of exchange circulating in parallel with and as a perfect substitute to the incumbent medium of exchange. In fact, people are not yet aware of that they are using a "new" currency.

Once the new currency is being accepted as a medium of exchange, this fact will help it become a medium of account through a Mengerian process, so the medium of account network externality will be considerably less difficult to overcome. It cannot disappear completely, however, so there is still some critical mass needed in order for a switch to occur. The cost of pricing and the habit of valuing things in terms of the incumbent medium of account is still prevalent.

In our special case, however, even the pure medium of account externality is severely weakened, due to the fact that the new currency can be seen as a subset of the incumbent one, also in its capacity as a medium of account. The new medium of account is an "old version" of the incumbent medium: it is equivalent to the incumbent medium of account as it looked in 1995. Because of this, there are already prices in terms of the new medium of account available, and people are accustomed to calculate in terms of it. This fact significantly lowers the force of the network externality. If it is small enough, we could have a situation where there are incentives for one agent to bear the costs of establishing the necessary critical mass.

It is by now apparent that the problem at hand is quite different from what is normally expected to be the case when a transition from one type of base money to another is to occur. Normally, the problem is how one should make the public accept and switch to something that is perceived as being different from what is currently in use. In our case it is the other way around: the task is to make the public perceive as different things that are perceived as being similar, and to discriminate between these things. In both cases, there are network externalities at work. In the former, there is an "acceptance externality", in the latter one could speak of a "perception externality"; it makes sense for an agent to treat as different two things only if everyone else perceives that there is a difference between them. According to this analysis, it could be argued that externalities of this latter type are more easily overcome than the traditional acceptance externality. Whether this is a general feature or a special case is an open question: it is probable that in our case the medium of account function of the new currency is easier established due to the fact that the public is already familiar with it. The task, in such a case, is more of the character of merely refreshing the memory of the public: "Remember when the medium of account was used; was it not better in those days?" In other words, the unique character of the new medium of account being a chronological antecedent to the current medium may help to weaken the strength of the perception externality.

Another distinctive feature is the way the network externality problem was being made less severe by a kind of piecemeal appropriation of the monetary functions by the new currency. First, it was made a medium of exchange. This was done at virtually no cost. Once the new currency was generally accepted in exchanges, it could be turned into a medium of account. In this way, by gradually bending and picking open the lock of the incumbent currency, the new currency was able to become established. The following table may help to illustrate the sequence of events:

Table 1

stage	t_0	t_1	t_2	t_3	t_4
Med. of Ac.	CB	CB	CB/JB	JB	JB
Med. of Ex.	CB	CB/JB	CB/JB	CB/JB	JB

The force that drives the transition is the entrepreneur and his striving for profits. At the initial stage, at t_0, he defines a fixed subset of the incumbent currency. Moreover, he makes the subset clearly recognisable and distinctive from the other elements of the incumbent currency, and makes the public aware of the specialty with this particular subset.

It is as if the entrepreneur "paints" the elements of the subset in flashy colours, so that the public immediately can recognise them and at no cost discriminate between them and other elements of the incumbent currency. This is done, because the entrepreneur thinks that it is in his interest that a fixed subset of the incumbent currency is being identified with his own money. The problem of defining subsets and choosing between multiple equilibria is done in an independent and unintended fashion; the entrepreneur acts as an independent "coordination device".

There is, however, one peculiarity that may seem somewhat strange. Why would the entrepreneur want to commit himself to pay back CB-notes printed before a certain year; why not just promise to pay back any CB-note? Obviously, there are costs associated with discriminating between CB-notes: costs of collecting and keeping notes apart from each other and costs of seeing to it that the customers get the right kind of notes. Above all, there are the above mentioned costs due to inflation; the value of the entrepreneur's money will loose value at the same rate as the inflation. He cannot compensate this by issuing more liabilities; then his reserves will vanish.

One could come up with several explanations why the entrepreneur might be willing to take this extra cost. He could think that by linking his liabilities to the year of issue the public would connect his liabilities with the Centennial of the Independence of the Republic. He thinks that there is a big market for patriotism, and this is a way of getting a share of it. He may expect a low inflation rate, so his expected costs of inflation are correspondingly low. Or maybe he is a great fan of the Republic himself, and the thought of having jubilee-notes circulating is something that makes him feel so good that he is willing to pay for it. In any case, the motives of the entrepreneur to make the commitment to notes issued before a certain year are not that important. The entrepreneur can be seen as a "mutant" that suddenly does something irregular. The important question is whether this "mutant" action is sufficient to set the process of freezing the monetary base in motion.

At the same time as the entrepreneur defines a fixed subset of the incumbent medium of exchange, he also pays the cost of establishing the critical mass of people that are willing to accept the new currency needed for it to become a generally accepted medium of exchange. This cost is quite small, if the entrepreneur has a good reputation. The cost for establishing the critical mass is the "bonus" that the entrepreneur offers to the customers that are willing to accept his notes when taking loans. He has to pay this bonus until his notes become accepted in exchange. In the figure, this happens at stage t_1.

As soon as the notes of the entrepreneur have been accepted as a medium of exchange, the entrepreneur has incentives to make the public discriminate between his notes and the central bank’s notes. We have here a situation that resembles the ones exposed by Klein (1974) and Hayek (1978), where several issuers compete with different kinds of currency. The entrepreneur will increase his market share of the money demand if he can make the public believe that there is a fundamental difference between his money and ordinary CB-notes, and that his money is superior. These incentives are further increased by the inflationary policy of the central bank, which will make the notes of the entrepreneur a continuously smaller part of the total money stock. As prices rise, the real value of his profits decline. This development will continue as long as the public treats the notes of the central bank as perfect substitutes to the liabilities of the entrepreneur. For these reasons, the entrepreneur has incentives to make people discriminate between pre- and post- 1995 CB-notes. When he tries to establish the perception of a difference, he also simultaneously tries to establish a fixed subset of the stock of CB-notes as the commonly accepted unit of account. In order to succeed, he once again has to pay for the establishment of the critical mass needed for the switch to occur. The cost is the cost for throwing the campaign in mass media, paying different interest rates and supporting prices in the figures of the year 1995. This cost is probably much larger than the cost for establishing the 95ers as a medium of exchange. It is probable that it is the size of this cost that determines whether the freezing of the monetary base will be successful or not. For this reason it seems necessary that we investigate in more detail the nature of the incentive scheme that the entrepreneur faces.

When the entrepreneur tries to promote a difference between the 95ers and the newly created CB-notes, he also establishes the difference between pre- and post-1996 CB-notes and make the former an independent base money as part of the new medium of account. Once he has succeeded with this task, others can join and use the new outside money as a base for their own liabilities. We have here spillover effects that are beneficial to others but which the entrepreneur will be in no position to reap benefits from. He cannot copyright the use of the new medium of account and he has no other monopoly powers on the use of the fixed monetary base. Indeed, the absence of any monopoly powers on the use of and production of the base money is one of the reasons why one might expect it to be preferred by the consumers, as this condition will make the money stable and difficult to manipulate. The entrepreneur cannot hope to gain monopoly profits, at least not in the long run. At most, he can gain entrepreneurial profits, as he is the first to exploit the profit opportunities that are open to those who satisfies the public's demand for a stable currency. As soon as his success becomes noticed by his competitors, they will start to issue their own liabilities, denominated in terms of pre-1996 CB-notes. The 95ers will probably be the preferred medium of exchange for a while, since the others will have to make their own liabilities accepted by the public. The question then is: will this entrepreneurial profit be enough to make the establishment of the critical mass worthwhile?

If the gains are not enough to make it profitable for one independent agent to promote a switch of base money, then it may be profitable for a group of banks to perform the task. In such a case, we have a situation where the outcome in large part depends on the ability of the agents involved to collude on a certain behaviour. As is well known, collusive behaviour is inherently difficult to sustain, because of the gains that can be explored by a defective behaviour. In our case, however, it is reasonable to suspect that these problems are limited. Following the scenario that has been sketched in section 2, the promotion of the new medium of account seems to consist of two kinds of activities. One part consists of advertising in favour of the use of the money of the banks that participates in the promotion of the new currency. Another part consists of supporting the perception of a difference between old and new CB-notes, by giving a benefit to those who pay with the money of the advertising banks. The first part can easily be agreed upon and paid for in advance. Then there are costs for making people pay with the liabilities of the particular brands of the individual banks. These costs can probably fall more directly on the individual banks, so that each bank is subsidising the use of his own liabilities. It seems quite risky in such a situation for a bank to defect, by not giving the bonus to those who uses the instruments of that particular bank. The reputation effects of such a behaviour would probably be quite substantial and would probably be enough to deter banks from deviating. There are in other words no unequivocal gains from deviating from the concerted path by an individual bank, once a group of banks have agreed upon a joint campaign. The throwing of a joint campaign acts as a co-ordination device; it changes the situation from a prisoners dilemma-like situation to one with characteristics more resembling those of a co-ordination game.

The problems discussed above are general to all types of cases where a switch of medium of account is to occur. There seems to be an unpleasant catch in these kinds of situations; a catch that one do not encounter when a switch of medium of exchange is in question. For a switch of medium of account to occur, someone should have an incentive to establish the critical mass needed. Yet, if the costs of doing so are substantial, this is difficult, unless someone can be sure of exploiting the advantages that comes from using the new medium, for example by having monopoly powers on the production of it. On the other hand; if someone has monopoly powers, then the medium in question will not probably be preferred by the public. One of the main arguments in this essay is that because of the special peculiarities of the new medium of account in this essay, the problem is less severe than it is in other cases. This is due to two facts: first, the new medium of account is an "old version" of the incumbent medium of account. People are already familiar with it; this lowers the strength of the network externality. That means that the cost of establishing the critical mass is lower. Second, the new medium of account is already circulating as a medium of exchange, something that makes it familiar to the public. that the new medium of account is circulating as a medium of exchange is due to it being a fixed subset of the incumbent medium of exchange; the low cost of establishing a medium of exchange thus indirectly lowers the cost of establishing a new medium of account.

At stage t_2 the entrepreneur succeeds in establishing 95ers as a medium of account. At this stage we have multiple media of account and media of exchange circulating in parallel with each other. Prices are stated both in terms of CB-notes and 95ers. Some people prefer calculating in terms of CB-notes, while others value things in terms of 95ers. However, the central bank fights an uneven battle, with its inferior product. The greater stability of 95ers make them the preferred medium of account. At stage t_3 they have taken over the medium of account function completely and all prices are stated in terms of them. The CB-notes are still circulating as a medium of exchange, however, although they are traded at a discount. This stage is in line with some of the scenarios envisioned by Cowen and Kroszner, where multiple media of exchange circulate in parallel with each other, being explicitly priced in terms of a medium of account (of course, the price of the 95er is equal to its face value).

The situation of multiple media of exchange circulating in parallel can not be a long-lasting one in our situation. The CB-notes are increasingly dominated as stores of value, as inflation increases. In addition, it is natural to trade with the medium of account. Thus, at stage t_4 monetary functions are once again united into one good and the JB-notes are the sole notes in circulation. At this stage, the transition from the inefficient equilibrium to the efficient is completed and the monetary base has been frozen for good.

4. The central bank strikes back.

So far the arguments have been furthered under the assumption that the central bank continued as if nothing had happened and did not try to interfere in order to prevent the development towards a frozen monetary base. It does not seem realistic, however, that they would sit and idly watch by how their powers wither away, without trying to prevent it. What can the central bank do? We are still assuming laissez-faire, so measures such as legal tender laws or other measures in order to promote government currency, that rest on the coercive powers of the state, are ruled out.

When investigating the powers of the central bank to thwart the scheme, it seems important to distinguish between a situation where the perception of a difference between old and new CB-notes has been established (stage t_2 in table 1), and one where they are still treated as belonging to the same set of base money (stage t_1). Starting with the former situation, it seems that the central bank in such a case can do very little. If the central bank should promise to convert old notes for new ones at par, it would be in a position that is no different from any other agent's. It would in such a state be subject to the principle of adverse clearings; the central bank would have to hold reserves of old CB-notes and if it over-expanded its issue of new notes this reserve would vanish. In such a situation, the central bank is effectively abdicating from the position as a producer of base money and is confining itself to the more humble task of competing in the provision of inside money. The circle can then be said to be closed; the central bank has returned to the position from which it once originated. If such a state would come about, then old CB-notes and 95ers will trade at par with newly created CB-notes, contrary to the suggestions in the preceding section.

Instead of once again becoming a producer of inside money, the central bank could try to continue competing in the production of base money, by not promising convertibility. It would then have to contract its issue of new notes in order to make its currency more attractive as a unit of account. In order for this measure to have effect, it is important that the process has not gone that far, that the set of old CB-notes, together with their inside money correspondents, is the sole medium of account in the economy. Then the central bank would have to impose the cost of establishing the critical mass that is needed. If the new notes are still used as a medium of account, the chances are better. We would then have a situation that is resembling the Hayekian/Kleinian scenarios with competing currencies circulating in parallel. What would be the preferred medium of account? The central bank competes against a medium that is being fixed in quantity. That implies that the prices will fall approximately with the same rate as the productivity in the economy rises. We have assumed that this medium is preferred to an inflationary medium. What if the central bank promise that its medium should give "price stability", by promising to peg the issue of notes to the value of some basket of commodities? It is frequently assumed in economic debate that a monetary policy aiming at price stability is the preferred ideal that consumers favour. This is just an assumption, however, and there is no actual proof that consumers favour a money that gives price stability according to some index, to a money whose quantity is fixed and whose value appreciates approximately with the rate of productivity. It would therefore be quite interesting if a situation as the one above would occur; for the first time, consumers would be able to give their verdict on what the best monetary rule is.

If we assume that the government aims at price stability for some basket of goods, and the consumers prefer its money, a switch of monetary regime will apparently not occur. Can we still make the claim put forth in the introduction, that markets under laissez-faire will be able to insulate the economy from bad government money? In my view, the claim is still valid. The issue was to insulate the economy from bad government money. In the current situation, the economy is not isolated from government money; the market has "tamed it", however, and made it "good". What will happen to the note issuing commercial banks, that discriminates between old and new CB-notes? It seems reasonable to suspect that this activity will be doomed and we will be back to square one; the central bank is the only player on the outside-money field and can in principle act as it pleases a monopolist. It is probable, however, that its resent experiences has shown that it is vulnerable; the central bank would realise that in order to keep competitors out it would have to keep its issue in line with what the consumers prefer. In other words, the threat of having entrants into the base money industry will secure a competitive solution to the production of base money.

What if the perception of a difference between new and old CB-notes has not yet taken off? We are in other words, in terms of table 1, still in stage t_1. In such a situation, it appears that the abilities of the central bank to act in its own favour are greater. For example, it could replace the old notes with new ones as soon as it gets hold them. This would shrink the base for the entrepreneurial bank's money and force it to contract its issue of liabilities. The question is how the central bank would be able to receive old notes. In the current system, where the central bank holds the reserves of the commercial banks, there are possibilities to perform such an operation. It is not so sure what would happen in a situation of laissez-faire, however. Also, the banks that issue liabilities redeemable into old CB-notes will have incentives to keep the central bank from getting its hands on the old notes. In addition, they have stronger incentives to try to make the medium of account switch as fast as possible, if they discover that the central bank is trying to keep the old notes out of the economy. What if the government would try to get their hands on the old notes, by actively campaigning for it and maybe promising to economically reward those who turn in their old notes in exchange for new ones? We have to remember, that we are living in a world of laissez-faire, so the government cannot simply order the public and the commercial banks to hand over their old notes, such as is customary in contemporary societies. If people should voluntarily go to the trouble of exchanging their notes, they would have to be given incentives to do it. There is the risk, from the central bank's point of view, that if these incentives should be given, the perception of a difference between old and new notes will be strengthened. If every old note is paid with a new note plus a small epsilon, the central bank itself will not treat their own notes as perfect substitutes to old notes and the notes of the commercial banks. It will even trade its own notes at a discount, thus giving legitimacy to the claims of its adversaries that the notes of the central bank are inferior. Moreover, there is a cost from performing the whole operation, similar to the cost that the commercial banks have to incur by discriminating between notes. In all, the outcome of the central bank's taking action at stage t_1 apparently seems much more difficult to predict.

5. Summary and conclusions

Let us summarise the main characteristics of the process exposed:

1) The network externality problem is weakened and overcome by a process where the various monetary functions are being appropriated in a piecemeal fashion by the new currency. This method lowers the network externality problem, because the externalities are easier to deal with separately, than when they all have to be overcome at the same time. As the new medium of exchange is a fixed subset of the incumbent medium, the medium of

exchange externality does not practically exist. As the new medium of account is an "old version" of the incumbent medium, the medium of account externality is also smaller than it would otherwise be.

2) The process is driven by entrepreneurial striving for profit. The critical masses that are needed in order for a switch of medium to occur can be established because it is in the interest of an entrepreneur to establish them. The entrepreneur also defines a fixed subset of the incumbent currency and makes it easily distinguishable from the other elements of the incumbent currency. The entrepreneur may perform these activities without intending to define a new base money or establishing a new monetary regime. The narrow-minded looking after his own interest is sufficient to make it happen anyway.

3) The character of the problem is not, as is usually the case, to make acceptable something that is perceived as being different: the problem here is rather to make people treat differently what is perceived as being similar. It is as if the new currency is secretly sneaked into the incumbent one without anyone paying attention to it. Once it is in place, the masks are teared off and the face of the new currency is revealed. Because of its superior characteristics, it is capable of taking over.

How realistic is the proposed scenario? And why is it that banks in the real world do not start to issue these kind of contracts and start the process? One could think of several answers. First, there could exist legal restrictions, hindering the issue of notes. Second, bankers may not think that it is in their interest to issue liabilities based on a certain year, as discussed above. Third, the cost of establishing the critical mass for the medium of account switch may be prohibitive. Fourth, it may be the case that nobody has yet thought of doing it.

Whether there are legal restrictions or not is an empirical question; it is somewhat irrelevant to the argument in the essay, as it was based on the assumption that there were no such restrictions present. The second and third answers are in my view the serious threats to the main argument of the essay, that a spontaneous freezing of the monetary base is possible. If the fourth answer is the correct one, the policy implications should be clear: The Market should immediately start to act in the proposed direction. In any case, I hope that the essay has provided some arguments for challenging the contention that it is necessary to discharge with the central bank in order to obtain monetary stability. Given that all restrictions on banking activity and restrictions on the use of alternative monies are repealed, the spontaneous forces of the market may be enough to make a stable monetary regime come true and the prospects of having stable money need not be too far away.

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