

The Economics of Community Currencies: a Theoretical Perspective

Pecuniam habens, habet omnem rem quem vult habere.

Menger (1892:250)

Gladstone, speaking in a parliamentary debate on Sir Robert Peel's Bank Act of 1844 and 1845, observed that even love has not turned more men into fools than has meditation upon the nature of money.

Marx (1859:64)

Money does to the economy as love does to people. When there is too much of it, some claim the economy overheats, others that expectations simply adjust. When there is too little of it, economic activity may decline or occasionally even degenerate into more primitive modes, such as barter. In the long run, there may be three responses to economic downturn caused by a shortage of money. Real money balances can be increased by having growth of the nominal money supply exceed the growth of prices. Alternatively, the gap may be filled by inefficient media of exchange or even barter, thus preventing the economy from realising its full potential. Otherwise, an alternative source of money, such as a parallel complementary currency, may alleviate the shortage.

When 'money shortages' are localised, an increase in the national money supply may not alleviate the problem completely or may only achieve this at the cost of general inflation. Additionally, local prices may adjust neither rapidly nor sufficiently to 'equilibrate' the local money supply. As settling for generally inefficient barter or non-monetised exchange is clearly

undesirable, only the complementary currency option remains. Accordingly, this paper argues that, in a *second-best* world, when the national money fails to facilitate all potential¹ exchanges of a sub-set of the economy that has strong economic interconnections, a *complementary* currency can alleviate this problem.

In practice, such economic interconnections tend to be of a socio-geographical nature. The central idea is that their potential *legitimate* economic benefit derives from the failure of the dominant medium of exchange to fully facilitate all potential exchanges. Consequently, they would be utilised chiefly by those economic entities that have some kind of over-capacity. As will become clear from the analysis below, in the context of Industrialised countries these entities can be thought of as ‘communities’ of under- and unemployed people, or alternatively as groups of firms with over-capacity, and in the context of Developing countries as entire regions, cities, or villages. Therefore, these complementary monies can conveniently be termed ‘Community Currencies’.

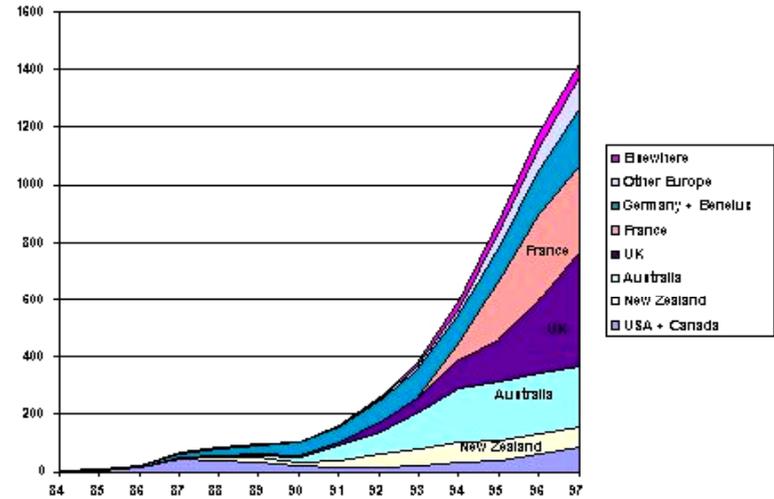
There are, of course, also potential *illegitimate* benefits to the users of Community Currencies. The most commonly cited use being for underground or black economy transactions, thus evading *taxes* and *regulation*. Clearly, utilisation of economic innovations for *illegitimate* purposes may be a problem but the evaluation of such issues is not within the scope of this paper. The purpose of this paper is to determine potential *legitimate* benefits. My working hypothesis in this context is that tax-evasion is not more prevalent with Community Currencies

¹ ‘Potential’ refers not to all possible exchanges but to all those exchanges that would be executed in a Walrasian economy.

than with the national currency, which seems reasonable in light of the findings of the Inland Revenue².

The idea of a community currency is not new and it has been implemented in many different forms. Recently, growth of operational systems has been dramatic as can be seen from Graph I. Their total number exceeded 2500 in 2000 in these countries alone (Lietaer, 2001:159) and there are now over 3000 systems world-wide³. Broadly, there

GRAPH I
Number of Community Currency Systems operational in twelve countries 1984-1997



Source: Lietaer (2001:159)

are three archetypes of community currencies, the *Backed Currency*, the *Fiat Currency*, and the *Mutual Credit System Currency*.

Backed Currencies are directly backed by, and can be exchanged at a fixed fee for, either real goods or legal tender. Some of the earlier *Backed Community Currencies* were instigated by the ideas of the economist Silvio Gesell (1862-1930)⁴, who believed that money had an excess rate of interest. Hence, he argued it should have a carrying cost, a so-called ‘demurrage charge’, in order

² “The Inland Revenue is not aware of any particular problems with Local Exchange Trading Systems and has no plans to evaluate these schemes. Traders who operate within a Local Exchange Trading system are taxable on their trading profits, just like traders who operate outside of such a scheme.” Mr. Jack, answering a written question of Mr. Martyn Jones (Commons Hansard Written Answers text for Tuesday 5 Nov 1996)

³ Lietaer, Financial Times, 24-25/02/2001

⁴ “I believe that the future will learn more from the spirit of Gesell than from that of Marx” Keynes (1936:355). For a summary of Gesell’s work and the technicalities of his stamped money proposals see Keynes (1936:353-358). The following account of stamp scrip is compiled from the following sources: Boyle (1999:125-126), Cohen-Mitchell (2000), Ekins (1986:199-200), Fisher and Fisher (1934:147-168), Greco (1994, Ch. 8), Offe and Heinze (1990:76-78)

to increase the rate of circulation. In this way, more exchanges could be facilitated with the same stock of money, alleviating the problem of local money shortage. Irving Fisher was so enthusiastic of this type of money, which he coined 'stamp scrip', that he wrote an entire book on the subject. Within months of publication, over 300 communities in the U.S. were issuing their own stamp scrip. These systems, however, came to an abrupt end on March 4th 1933 when President Roosevelt advised that the monetary system was in danger and decreed that these scrip systems be wound up.

The scrip currency of the Austrian town of Wörgl serves well to illustrate some of the potential effects of community currencies. During the depression, between 1932 and 1933, the mayor, Michael Unterguggenberger, issued stamp scrip called a "Ticket for Services Rendered." 32,000 of these Tickets were issued, backed by 32,000 Austrian Schillings in the local bank. The employees of the municipality were paid half in Schillings and half in Tickets. The tickets became worthless each month at a set date, unless the owner purchased a revaluation stamp for 1% of the face value.

The shops were reluctant to accept them but knew that the scrip could be exchanged for Austrian Schillings at a fixed fee or, alternatively, used to pay local taxes. Recipients would spend the scrip as soon as possible after receipt in order to avoid having to pay the stamp fee. Within one year, the velocity of circulation of Schillings Tickets was 463⁵. The ordinary Schillings, by contrast, circulated only 21 times over the same period. As Fisher (as cited in Greco, 1994, Ch. 8) describes:

⁵ In contrast to Greco, Lietaer (2001:155) reports that the velocity was 416

“After the scrip was issued not only were current taxes paid (as well as other debts owing to the town), but many arrears of taxes were collected. During the first month alone 4,542 schillings were thus received in arrears. Accordingly, the city not only met its own obligations but, in the second half of 1932, executed new public works to the value of 100,000 schillings.”

That year, unemployment in the town dropped by 25%.

The Austrian Central Bank became nervous when a meeting of 200 mayors of other Austrian towns voted unanimously to adopt Wörgl's system. The Bank ordered Wörgl's town council to cease operating its system, arguing that it would increase inflation⁶. After a long legal battle, the council was forced to comply by the Austrian Supreme Court.

Unfortunately, these initiatives never had the chance to be tested in practice over a longer period. Moreover, whether the source of its success is to be found in its community aspects, demurrage charge, or other factors is not easily determined. Offe and Heinze (1992:78) assert that: “all in all, then, the Wörgl experiment was an emergency measure that was successful in the short term, but its success almost certainly owed virtually nothing to its inbuilt characteristic of constant depreciation.” They claim that the payment of tax arrears was more due to the high exchange fee and the limited usability of the currency than its demurrage charge. Moreover, the ‘miracle of Wörgl’ had the favourable side effect of attracting tourism. Alternatively, its success could be attributed to the fact that the money circulated locally, thus facilitating potential local

⁶ The contention of the Austrian Central Bank, that currency competition drives the market value of money to zero is countered by Klein (1974:429). He argues that this argument confuses the price of monetary services with the exchange value of a unit of nominal money (as did Pesek), or by the implicit assumption that these monies will be indistinguishable (Friedman), or more generally that they be fixed in exchange rate independently of the rate of issue of controlling institutions (Klein, 1974:431). Neither applies to the community currencies described here. Note that New Zealand's Central Bank currently endorses community currencies as a means of keeping inflation in check Lietaer, 2001:215-220)

exchanges that were not facilitated by the national money. The process by which this may occur is discussed in section two.

More recently, extensive barter-networks have developed in the former Soviet-Union, including money surrogate systems, which are collectively grouped as *veksels* (Gustafson, 1999:23-24, Commander and Seabright, 2000:363-364). In Russia close to 25% of the economy operates on 'virtual exchange systems' powered by various forms of *veksels*. These systems are comprised of complex connections between local firms and between people. Here, 'IOUs' and even stocks of local companies function as the medium of exchange. Apparently, even taxes can increasingly be paid in *veksels*. The *veksels* system can be seen as a hybrid between a *Backed Currency*, backed by goods and shares, and a *Mutual Credit System Currency*, consisting of IOU-networks.

The *Fiat Community Currency* is neither backed by real goods, nor by labour and thus similar to legal tender. Among economists one of the most famous private *Fiat Community Currency* initiatives is the Capitol-hill baby-sitting co-op, which has been discussed in many of Paul Krugman's articles (following Sweeney and Sweeney, 1977). The simplicity of the system serves well to illustrate the problems with the 'money supply' under fixed prices. In this case, the institutional rigidities caused an inappropriate supply of scrip and fixed prices, which were constitutionally set at one unit of scrip for half an hour of baby-sitting. This first caused a recession with excess supply of baby-sitters because people had insufficient scrip and subsequently, as the supply of scrip was increased, inflationary pressure with excess demand of baby-sitters.

Another well-known *Fiat Community Currency* that fixes its prices in terms of labour time is the Ithaca-hours system. Ithaca hours is one of the few community currencies that actually

circulates in the form of bills. In 1999, 5,700 hours representing \$57,000 circulated, generating about \$60,000 in trade per month. The currency is printed on the local printing press, and validated and issued by the founder-manager Paul Grover.

The most prevalent⁷ community currency system is the Local Exchange and Trading System (LETS), which operates as a *Mutual Credit System Currency*. Mutual credit systems (MCS) are a completely different means of issuing money. The idea of mutual banking originates with the 19th century French social-anarchist Proudhon. The system operates as a pure accounting system of exchange (Black 1970, Fama 1980, White 1984) without an initial stock of cash. All members open an account with a central administration unit⁸, which records transfers in ‘units’ between these accounts. Members facilitate transactions by running down balances or going into debt, thus ‘creating’ money according to transaction need. In a well-administered system, all accounts sum to zero.

LETS was first implemented in the late 1970s in Courtenay, a town of 50.000 inhabitants in the Comox Valley on Vancouver Island, Canada. The main trigger appears to have been a severe (local) depression, after the two primary employers, the US air force and the timber industry, laid off most of their employees. Consequently, the able and mobile emigrated and the rest remained on public assistance. As the initiator was a practitioner of remedial exercises, demand for his services fell sharply, which gave him an incentive in organising an alternative system of exchange. In this context, an added benefit of a LETS is that:

⁷ According to www.transaction.net/money

⁸ Note that this in fact makes tax-evasion much harder than with fiat-cash as the central administration records each transaction and this information is surrendered to the tax-authorities upon request.

It offers both the unemployed and everybody else the opportunity of transforming their labour power or working time (even small, unevenly distributed amounts of the latter) into 'purchasing power' *without* the necessity of either working for an employing firm or of possessing capital, which is a *sine qua non* of earning a living by self-employment.

(Offe and Heinze, 1992:95).

Within two years the system had some 600 members and more than the equivalent of 500.000 dollars in turnover. As many transactions involve payment in both LETS and national currency, so as to reflect the mix of local and imported 'product' content, an estimated additional two million of national dollar turnover was generated (Offe and Heinze, 1992:92).

Since then, the LETS has spread around the world. To give an idea of its scale: in Argentina, the LETS based 'Arbole' and 'Creditos notes are now accepted in 500 systems nationwide, with a joint issuance of US\$1,400,000 equivalent with a further US\$200,000 being locally issued (DeMeulenaere, 1999). Similarly, in Australia, in 1998 there were 250 community based LETS systems in operation. Also, corporate barter, in separate but similar barter exchange systems, grew from 3,500 firms and AUD60 million in 1993 to over 12,000 firms and AUD350 million (Liesch and Birch, 1999). In the UK there were over 450 LETS in 1999, with 'over 100 LETS being funded by City Councils through the Single Regeneration Budget, as part of anti-poverty strategies' (Lietaer, 2001:164). Williams (1995:330) finds that in 1995 on average UK LETS had a membership of 85.6 and a turnover of £6,006 (Sterling equivalent), that is £70.16 per member. In 1995 combined UK LETS membership of 350 systems stood at around 30,000 and annual

turnover at £2.1 million (Williams, 1995:330). A ‘back of envelope calculation’ suggests that current turnover would be in the region of £6.5 million⁹ in the UK.

Although LETS is probably the most common community currency system, it is only on the fringe of the economic map and can hardly be seen as economically relevant in turnover terms. Similar conclusions could be drawn on the basis of products and services traded. LETS is primarily concerned with services and a few goods in the domestic sphere. Pacione (1997:1195) finds that in the West Glasgow LETS trade centres around service categories such as “building and decorating”, “Care”, “Health and Personal”, “Office and Computing”. Whereas, services and goods in “Arts and crafts”, “Household and Clothing” and “Tuition” are proportionally offered much more in the offerings publications than traded. Nevertheless, LETS does illustrate how the MCS can be founded and managed entirely within the private sector.

These examples portray the wide variety of features of Community Currencies that have been implemented and will be drawn upon to illustrate the analysis in this paper. Moreover, they show how complementary currencies can coexist with the national currency and that people are willing to use them in transactions despite the existence of the national currency. Nevertheless, perhaps with the exception of *veksels*, none of the examples described above provides an adequate foundation for economic theorising about the merits and demerits of community currencies. In the case of stamp scrip, the experiments were simply too short-lived to attach any definite conclusions to their apparent success. Labour time based currencies, such as Ithaca Hours and baby-sitting co-ops, incorporate an economic ideology, namely equal pay for equal time but

⁹ This is a crude extrapolation based on figures in Williams (1995:330). It assumes 100 new systems since 1995, with an average life-time of 2.5 years and turnover of £6,000, and 350 continuing systems, with a lifetime in excess of 5 years and an average turnover of £16,500.

unequal type of work. This is likely to affect the composition and structure of exchange, and the acceptability, and circulation of the currency, such that findings based on experiences with these systems do not readily apply to currencies that do not directly fix a set of relative prices.

Finally, LETS systems do not provide an appropriate foundation for economic theorising either. The rapidly growing body of research on LETS has shown that the participants are not on average similar to '*homo economicus*' (Williams 1996, Pacione 1998, Gran 1998, Caldwell 1999, North 1999). The economic theory that is employed below is meant to provide insights into the functioning of community currencies in an economy consisting of people reflecting the total population. Consequently, it would be a fallacy to base such an economic theory on research into LETS. This is the result of LETS being a heterotopia (North, 1999) utilised by economists, anti-capitalists, environmentalists and other pressure groups as a vehicle to achieve their goals. Consequently, the membership of LETS does not correspond even closely to the average population and transactions are often not economically but ideologically motivated. Therefore, the approach adopted in this paper is purely theoretical, such that it does not utilise existing empirical research as a foundation.

Experiences with community currencies in the past and present illustrate how they can potentially succeed in reviving the local economy. Section two analyses how a community currency system may achieve this. The analytic framework employed to examine the theoretical potential of community currencies utilises the ways in which money releases well-known constraints on exchange of goods. Because of the distribution and nature of money, these constraints may not be completely released. In this context, I will illustrate how inter-regional trade may influence the distribution of money. The potentially sub-optimal distribution of money

due to inter-regional trade patterns can cause a reduction in exchange of mainly non-tradables.

This section argues that a *complementary* community currency can (partially) alleviate this problem without distorting incentives or requiring fiscal transfers.

This static argument, however, is insufficient to support the thesis. Clearly, it is necessary that people would be willing to use a complementary currency in the light of these findings. This requires that they can trust the currency to persist over time. That is, it must be dynamically robust, such that it will not immediately collapse due to fluctuations in the local economy.

Section three argues that both these conditions hold, given that the system and its money supply are ‘well-managed’.

Section four analyses how the money supply may be managed in a community currency system. A sizeable body of literature on monetary systems with centrally supplied money, such as *Backed Currencies and Fiat Currencies* already exists¹⁰. Moreover, from the arguments in section two and three pertaining to problems of effectiveness and central supply of money, the *Mutual Credit System* arises as an elegant solution several of the problems that arise with centrally supplied physically circulating money. Therefore, section four analyses how the MCS, as an alternative to centrally supplied money, can endogenously manage the money supply. In particular, it analyses how the main obstacle to an efficient endogenous supply of money, namely erosion of system credibility, can be overcome. That is, it argues that the MCS can be robust to a membership reflecting the general population, in light of the ‘commons problem’ arising from members’ ability to run up excessive debt within the system. Within this ‘Common Property Resource’ framework, a system stability theory is developed based on the institutional features of MCSs and economic theory of social norms.

¹⁰ See Hayek (1976a and 1976b) and Klein (1974) for the seminal works on centrally supplied parallel currencies.

Section 2

How money facilitates exchange:

But that every economic unit in a nation should be ready to exchange his goods for little metal disks apparently useless as such, or for documents representing the latter, is a procedure so opposed to the ordinary course of things, that we cannot well wonder if even a distinguished thinker like Savigny finds it downright ‘mysterious.’

Menger (1892:239)

In this paper, money is evaluated in terms of how it facilitates transactions by releasing the constraints on complete and efficient decentralised exchange. The question is whether the national money does so optimally and thus yields a complete and efficient execution of all excess demands and supplies. It is argued that this is not necessarily the case. Subsequently, the problems arising from this shortcoming and their potential solutions are analysed.

The constraints on exchange can be summarised as follows:

- I. Double coincidence of wants (Jevons, 1875:3, Kyotaki and Wright 1989)
- II. Synchronisation of receipts and payments (Adam Smith, 1776:Book I, Ch. IV)
- III. Transaction costs: search, information, contracts, set-up costs etc. (Brunner and Meltzer, 1971:786)

Money alleviates these constraints in several ways, notably through its properties:

1. Medium of exchange
2. Store of value
3. Informational (and physical) properties: unit of account, standard of deferred payment, ease of transfer etc.

The medium of exchange function relaxes the double coincidence of wants constraint by allowing a decentralised exchange pattern, which may yield full execution of excess demands and supplies, as shown by Ostroy and Starr (1974:1097):

The role of money as a medium of exchange consists in allowing full execution to be achieved in one round by a decentralised rule, whereas, in the absence of money, full execution requires more time, or a centralised rule, or sufficient quantities of non-money commodities.

Moreover, jointly with the 'store of value' function it releases the synchronisation constraint.

Finally, the properties of money aid in reducing transaction and information costs of exchange.

For instance, the value of money is approximated easily as compared to more complex or quality dependent products, which may be used as a medium of exchange in a barter economy.

Additionally, when there is one unit of account, the number of exchange ratios that must be known to each transactor in an N-good economy is reduced from $N(N-1)/2$ to N (Brunner and Meltzer, 1971:787). For the analysis that follows, money is loosely defined as anything that is commonly used to facilitate exchange. Concretely, this may include bank balances and lines of credit.

In order to obtain their finding, that money optimally facilitates all potential exchanges, Ostroy and Starr (1974:1109) make the following key-assumption:

Suppose there is a commodity, m , such that the value of each trader's endowment of it is at least as large as the value of his desired purchases of commodities other than m .

That is, each agent must hold enough money to finance all planned purchases. This is a very strong assumption, which clearly does not hold in the real economy, as illustrated by the fact that the velocity of money commonly exceeds unity¹¹. The reason that money cannot be distributed such that all agents have sufficient balances to facilitate all their planned exchanges is that the value of money depends on the restriction of its quantity relative to demand (Fama, 1980:50-56, Greenfield and Yeager, 1983:303). As discussed below, the distribution and redistribution of money therefore have real consequences¹². Thus, it is argued that decentralised exchange may not yield full execution of potential trades.

¹¹ Technically, this argument does not strictly hold. Ostroy and Starr do not explicitly define time, whereas the velocity of circulation is defined over one year. Nevertheless, it is common knowledge that liquidity constraints and cash-flow problems are real.

¹² See Zhou (1998) and Berentsen (2000) show this in a random-matching model of exchange. They illustrate how different distributions of a fixed money stock can yield different levels of exchange and consumption. The intuition of their model is that at high money balances the marginal utility of holding additional cash for transaction purposes does not compensate for the marginal disutility of transacting and producing. Hence, the individual does not transact at some threshold value for money balances. This creates a non-producing and a cash-less population, who cannot transact despite opportunities. This, depending on the *distribution* of money holdings, yields different levels of exchange for the same aggregate money stock.

How inter-regional trade affects the distribution of money:

“The mercantilists were the originals of “the fear of goods” and the scarcity of money as causes of unemployment which the classical were to denounce two centuries later as an absurdity.”

(Keynes, 1936:346)

These days, neo-classical economists, using the powerful ‘gains of trade’ argument, readily dismiss the arguments of mercantilists as being simply nationalistic and flawed. Whereas the import substitution arguments of the mercantilists are quite effectively countered by the gains of trade argument, this is not the case with their arguments based on monetary effects. Keynes (1936:348-349) captures the essence of the problem:

For in an economy subject to money contracts and customs more or less fixed over an appreciable period of time, where the quantity of the domestic circulation and the domestic rate of interest are primarily determined by the balance of payments, as they were in Great Britain before the war, there is no orthodox means open to the authorities for countering unemployment at home except by struggling for an export surplus and an import of the monetary metal at the expense of their neighbours. Never in history was there a method devised of such efficacy for setting each country’s advantage at variance with its neighbours’ as the international gold (or, formerly, silver) standard. For it made domestic prosperity directly dependent on a competitive pursuit of markets and a competitive appetite for the precious metals.

As a consequence of the international gold standard, or the general use of an internationally acceptable full commodity backed currency, it is not domestic monetary policy but net exports that determine the monetary balances in the economy. It is easy to see how under a sustained balance of payments deficit the domestic supply of money (gold) is exchanged for foreign goods, and thus is drained from the economy.

But if the arguments against the gold standard were correct, then why should a similar argument not apply against a common currency system in a multi-regional country?

Under the gold standard depression in one country would be transmitted, through the foreign-trade multiplier, to foreign countries. Similarly, under a common currency, depression in one region would be transmitted to other regions for precisely the same reasons. Interregional balance-of-payments problems are invisible, so to speak, precisely because there is no escape from the self-adjusting effects of interregional money flows. It is true, of course, that interregional liquidity can always be supplied by the national central bank, whereas the gold standard and even the gold-exchange standard were hampered, on occasion, by periodic scarcities of internationally liquid assets; but the basic argument against the gold standard was essentially distinct from the liquidity problem.

(Mundell, 1961:660)

The problem is of course that the central bank may not be willing to provide interregional liquidity if this may increase overall inflation. Moreover, a central bank cannot target money

specifically to a particular region. Thus, inter-regional trade redistributes money in a similar way that international trade redistributed gold under the gold standard.

Capital flows could in theory compensate for these adverse re-distributions of money. However, in the light of capital rationing and market failure in credit markets (Stiglitz and Weiss, 1981) and the more general problem of debt-accumulation this is unlikely to do the trick when money is flowing out of a deprived region or from a group of unemployed people.

Consequently, if there is a reduction in the availability of a widely accepted medium of exchange in a region, this can result in increased search, information, and transaction costs for the proportion of transactions that can no longer be facilitated by money. This would cause a reduction in the total amount of goods and services exchanged.

How Community Currencies alleviate the effects of a sub-optimal distribution of money:

“You know what we call them now? Said Marty, waving an hour vaguely in the air.

“The Untraveller’s Cheque. Because you have to use them here. You can’t take them with you”

(Boyle, 1999:116)

The potential *legitimate* benefit of Community Currencies, lies in their ability to increase the levels of exchange. It is straightforward to construct a case where a convenient medium of exchange, such as the national currency, is drained from the local economy due to a trade deficit with the rest of the national economy. As there is a currency union, there is no exchange rate to depreciate, just as under the gold standard. Additionally, prices are unlikely to vary greatly over

small geographical areas, and similarly, wages are unlikely to respond significantly to this imbalance, especially when minimum wage regulation is present. This leaves the adjustment to migration, which may be an option for the economically well-off and mobile but often is not for the economically weak.

This means that purchasing power leaves the community in exchange for goods. In the end, insufficient liquid purchasing power may be left to facilitate the exchange of a proportion of otherwise viable transactions in the region. Simply providing credit may not help to alleviate this, as money will continue to flow out in exchange for inter-regional imports. The key is to induce those with over-capacity, such as the fully and partially unemployed, to exchange this over-capacity with each other. Normal money cannot perform this function optimally because earnings can be spent on goods that are not produced by those with over-capacity.

To increase the levels of exchange, more money can be brought into local circulation, or the 'efficiency' with which money facilitates exchange can be increased. For instance, cash releases the synchronisation constraint only asymmetrically. That is, cash aids those that earn first and spend later but not vice versa. Thus, a medium of exchange that can release this constraint symmetrically, such as an MCS, would in this dimension be more efficient than cash in facilitating exchange. Similarly, stamp scrip, by motivating faster circulation, could also yield higher levels of exchange for the same stock of money.

Before a case, where an inter-regional drain of money causes money shortages, can be constructed, the characteristics of a 'region', defined in terms relevant to monetary analysis, must be defined. The optimum currency area literature provides a good starting point for such considerations. Tavlas (1993:666-667) suggests what characteristics potential members of a

optimal currency area might have: similarity of inflation rates, factor mobility, open economy, high degree of commodity diversification, price and wage flexibility, high degree of goods market integration, fiscal integration, and the political will to integrate the regions.

In case of local money shortages, labour mobility defines is the major determinant of a non-tradable, hence defines 'the region'. The essence of the argument is that inter-regional trade redistributes money. Consequently, the concept of a region becomes meaningful for analysing how local money shortages affect the regional economy once there are economic entities that cannot obtain 'sufficient' money by selling their goods outside the region. Instead, they must only be able to sell inside the region, that is, their goods must be non-tradables.

This yields regions of city size or social groups in geographical proximity. The lack of labour mobility can be readily explained in terms of the degree of uncertainty about the future and the size of the adjustment costs. That is, the more uncertain the environment, the less the willingness of 'national economic agents to undertake adjustment that may ex-post be regretted' (Bertola, 1989:95, as cited in Tavlas 1993:677). The most significant and most uncertain adjustment cost in this context is changing domicile. Suppose that labour is immobile if it involves moving. Then labour becomes a 'non-tradable' when travel-costs exceed the profit associated with supplying the labour. For low-paid or part-time jobs, associated with those with over-capacity suffering from the lack of money, i.e. the unemployed, the geographical range within which they can profitably supply work is likely to be small because travel costs constitute a larger percentage of wages. Therefore, in the context of money shortages causing excess-capacity, immobility of labour makes the concept of a non-tradable most widely applicable to regions of the size of a city or perhaps slightly larger in developing countries.

Now we can turn to developing a simple model to illustrate how a redistribution of money through regional trade can lower the levels of exchange and how this problem can be alleviated by a community currency. The first assumption is that there is neither price and wage flexibility, nor factor mobility, and that net fiscal transfers equal zero. On the trade side, we assume all trades are quid pro quo (i.e. no IOUs) and that goods are perishable (i.e. goods, such as services, cannot be stored). Moreover, the economy is a pure money economy, that is: “Money buys goods and goods buy money: but goods do not buy goods” (Clower, 1967:208) but, in line with the imperfect capital assumption, money earned by the surplus region does not immediately return to the deficit region via a banking system. Finally, transactions, production and consumption are assumed to be instantaneous affairs¹³.

Based on these assumptions, a highly simplified and restricted numerical example is presented to illustrate the idea that inter-regional money drain can inhibit intra-regional trade in (mainly) non-tradables. For illustrative purposes the distribution of endowments and implicit utility functions (homothetic) are simplified to show the principles behind the argument. All goods exchange one for one (single price equilibrium). Complications, such as allowing all agents to consume all goods, including imports, and allowing for more complex utility functions, would not change the qualitative nature of the findings. The analysis focuses on the economy of the region with a trade deficit,

Let there be region A and B, where A_i denotes agent i in region A, and good types X_A, X_B represent exportables of region A and B respectively, and Y non-tradables of region A. Let C_t , the endowment matrix at time t , denote the agents A_i in the rows and their endowments in the

¹³ Relaxing this assumption allows us to explain the working of stamp scrip within the model in terms of facilitating exchanges more rapidly than ‘normal’ money. For simplicity and illustrative purposes, this temporal aspect of exchange is ignored.

columns, column 1 denoting X_B (imports of region A), column 2 denoting X_A (exports of region A), and subsequent columns denoting non-tradables. Let D , the money expenditure matrix, denote the agents A_i in the rows and the fraction of money personal money balances spent on each good per period t in the columns, and Z denote excess demands (positive) and supplies (negative), starting with X_B . And let M_t be the money balances matrix for agents A_i , where t denotes the iteration of trade (i.e. all trades that can be executed at that instant given demands, supplies and money balances).

$$\begin{array}{c|ccccc} & X_B & X_A & Y_1 & Y_2 & Y_3 \\ \hline C_0 = A_1 & 0 & 2 & 0 & 0 & 0 \\ A_2 & 0 & 0 & 4 & 0 & 0 \\ A_3 & 0 & 0 & 0 & 2 & 0 \\ A_4 & 0 & 0 & 0 & 0 & 2 \end{array} \quad \begin{array}{c|ccccc} & X_B & X_A & Y_1 & Y_2 & Y_3 \\ \hline D = A_1 & 0 & 0 & 1 & 0 & 0 \\ A_2 & 0.5 & 0 & 0 & 0.5 & 0 \\ A_3 & 0 & 0 & 0 & 0 & 1 \\ A_4 & 0 & 0 & 1 & 0 & 0 \end{array} \quad M_0 = \begin{array}{cccc} A_1 & A_2 & A_3 & A_4 \\ \hline 0 & 0 & 0 & 0 \end{array}$$

Clearly, no intra-regional trade takes place in A until A_1 has traded both X_A for money¹⁴. Subsequently, MD (dot product) is the effective demand at this stage in the economy for each good, which at this specific endowment is fully supplied to yield:

$$\begin{array}{c|ccccc} & X_B & X_A & Y_1 & Y_2 & Y_3 \\ \hline Z_2 = A_1 & 0 & 0 & 0 & 0 & 0 \\ A_2 & 1 & 0 & -2 & 1 & 0 \\ A_3 & 0 & 0 & 0 & -2 & 0 \\ A_4 & 0 & 0 & 0 & 0 & -2 \end{array} \quad \begin{array}{c|ccccc} & X_B & X_A & Y_1 & Y_2 & Y_3 \\ \hline C_2 = A_1 & 0 & 0 & 2 & 0 & 0 \\ A_2 & 0 & 0 & 2 & 0 & 0 \\ A_3 & 0 & 0 & 0 & 2 & 0 \\ A_4 & 0 & 0 & 0 & 0 & 2 \end{array} \quad M_2 = \begin{array}{cccc} A_1 & A_2 & A_3 & A_4 \\ \hline 0 & 2 & 0 & 0 \end{array}$$

At this point, money continues to flow through the local non-tradables market until it has either completely flowed out through purchases of imports or the holder cannot exchange it for the desired good because the endowment of that good has been fully exchanged. In this example, throughout each cycle agent 2 leaks 50% of money balances to region B by importing, which

¹⁴ It is assumed that supply of X_B is perfectly elastic and the stock of money of region B sufficient to accommodate its import demand, much like the small country versus world assumption.

means that in each subsequent cycle there is less money left to be used for local trade. If all money is permitted to leak out of the local economy, that is the cycle continues until there is no more money to trade (which in this particular example coincides with the full exchange of endowments) effective final demand and endowments will be:

$$\begin{array}{c|ccccc} & X_B & X_A & Y_1 & Y_2 & Y_3 \\ \hline Z_n = A_1 & 0 & 0 & 0 & 0 & 0 \\ A_2 & 0 & 0 & 0 & 0 & 0 \\ A_3 & 0 & 0 & 0 & 0 & 0 \\ A_4 & 0 & 0 & 0 & 0 & 0 \end{array} \quad \begin{array}{c|ccccc} & X_B & X_A & Y_1 & Y_2 & Y_3 \\ \hline C_n = A_1 & 0 & 0 & 2 & 0 & 0 \\ A_2 & 2 & 0 & 0 & 2 & 0 \\ A_3 & 0 & 0 & 0 & 0 & 2 \\ A_4 & 0 & 0 & 2 & 0 & 0 \end{array} \quad M_n = \frac{A_1}{0} \frac{A_2}{0} \frac{A_3}{0} \frac{A_4}{0}$$

Suppose that the terms of trade worsen by 50%, due to an exogenous price change, such that one X_B now costs $2X_A$ in money terms. Clearly, the income of agent 1 is halved, causing half as much money to enter the local economy, hence the final distribution is¹⁵:

$$\begin{array}{c|ccccc} & X_B & X_A & Y_1 & Y_2 & Y_3 \\ \hline Z_n = A_1 & 0 & 0 & 0 & 0 & 0 \\ A_2 & 0 & 0 & -2 & 0 & 0 \\ A_3 & 0 & 0 & 0 & -1 & 0 \\ A_4 & 0 & 0 & 1 & 0 & -1 \end{array} \quad \begin{array}{c|ccccc} & X_B & X_A & Y_1 & Y_2 & Y_3 \\ \hline C_{n+\epsilon} = A_1 & 0 & 0 & 1 & 0 & 0 \\ A_2 & 1 & 0 & 0 & 1 & 0 \\ A_3 & 0 & 0 & 0 & 0 & 1 \\ A_4 & 0 & 0 & 1 & 0 & 0 \end{array} \quad M_n = \frac{A_1}{0} \frac{A_2}{0} \frac{A_3}{0} \frac{A_4}{0}$$

Clearly, this is a sub-optimal outcome, as agents 2, 3, and 4 are stuck with unwanted goods (excess supplies) that perish (after time interval ϵ). This situation can be interpreted as though they are partially unemployed, such that some labour time is not utilised. That is, agents 2, 3, and 4 would have preferred to continue trading but were prevented from doing so because of a lacking medium of exchange.

This drain of money out of region A is analogous to the liquidity problems that might occur in a nation with a fixed exchange rate. For instance, given a balance of payments deficit,

¹⁵ Technically, a gift-exchange economy would be the welfare maximising solution to the problem.

the exchange rate would tend to depreciate, forcing the central bank to buy the national currency with its foreign reserves, hence reducing the money supply (De Grauwe 1997:93). However, there are two important differences. Firstly, in the national case, if the money supply is too far out of line with the optimum, the country can devalue the exchange rate. Secondly, there are national focal points in prices, such as a minimum wage, marginal tax-rates, institutional wage bargaining arrangements, price transparency and other socio-economic factors, and other institutional factors hampering inter-regional wage and price flexibility (e.g. taxation). Therefore, prices are more likely to adjust to imbalances between nations than between regions of one nation.

The problem could be alleviated in several ways. In this example, in principle enough money enters the economy to facilitate complete exchange of all local goods. However, the problem is that people start spending money on imports immediately after receipt, rather than first exhausting local exchange possibilities. It can easily be shown that if agent 3 spends all money on non-tradables initially, then full exchange can be achieved. Essentially, this is a co-ordination problem that increases in complexity as the number of goods and agents increases. If agents have the guarantee that others will act likewise, they may be willing to forego spending their money on imports immediately. Rather than trying to solve this co-ordination problem directly, there are several options for governments to alleviate it, namely introducing some form of trade protection, fiscal transfers, or a localised medium of exchange.

The problem with an income based approach, such as fiscal transfers, is that it has to be repeated in each subsequent period and all agents (including those of other regions) bear the cost of reducing the unemployment indirectly caused by the terms of trade deterioration. The alternative of trade-protection is difficult within national borders. Moreover, it distorts the exchange process yielding inefficiency, and reduces consumption of imports.

Instead, a Community Currency (CC) could be issued, which can be saved for the next period and can only be used locally. In this case, the local money can only facilitate intra-regional exchange, whereas the national money (N) may facilitate both inter-regional and intra-regional exchange. Suppose that one unit of local currency is issued to A_2 , this yields final distribution C_n' :

$$\begin{array}{c}
 Z_n = \\
 \begin{array}{c} A_1 \\ A_2 \\ A_3 \\ A_4 \end{array}
 \end{array}
 \left| \begin{array}{ccccc} X_B & X_A & Y_1 & Y_2 & Y_3 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array} \right.
 \quad
 \begin{array}{c}
 C_n' = \\
 \begin{array}{c} A_1 \\ A_2 \\ A_3 \\ A_4 \end{array}
 \end{array}
 \left| \begin{array}{ccccc} X_B & X_A & Y_1 & Y_2 & Y_3 \\ 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & 0 & 2 \\ 0 & 0 & 2 & 0 & 0 \end{array} \right.
 \quad
 \begin{array}{c}
 M_n = \\
 \begin{array}{c} N \\ CC \end{array}
 \end{array}
 \left| \begin{array}{cccc} A_1 & A_2 & A_3 & A_4 \\ 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{array} \right.$$

Clearly, this is strictly better than both the non-interventionist and the alternative interventionist outcomes. In fact, this is the only intervention that definitely increases the total amount exchanged and does not appear to hamper efficiency. This, however, results from the oversimplified nature of the example. For instance, suppose that both A_2 and A_3 were importing, with national money still entering the local economy via A_1 . Then, the introduction of a community currency may allow A_2 to use all national money for imports because the community currency is available for exchanging non-tradables. In this case, the community currency has the perverse effect of depriving A_3 from the ability to import despite increased exchange levels. However, as discussed in section three, there must be some exchange rate at which agents could exchange their community currency earnings for national currency. Given purchasing power parity, unchanged utility functions and that the total amount exchanged has increased, as shown above, the exchange rate must be such that A_3 can attain consumption of imports at-, and consumption of non-tradables in excess of-, the non-intervention level. Therefore, even in a more complex exchange system, the outcome is strictly better than the non-interventionist outcome.

Nevertheless, it is important not to lose sight of the potential scale of these currencies.

Offe and Heinze (1992:199) capture the essence:

Furthermore we must stress from the outset the supplementary, compensatory role of a *'parallel economy'* the system is designed to play in the sphere of the domestic environment, to avoid loading it with unrealistic expectations and consequent disappointments. The objective is not to achieve near self-sufficiency of supply, but to strengthen the structure of self-help capability, in the full realisation that the vast majority of goods and services will continue to be provided by and from the formal economy with its medium of money.

The ideas in this section are broadly consistent with research on the *veksel* systems in the former Soviet-Union. There, *veksel* and barter exchange is strongly linked to a reported *shortage of liquidity* of firms. Moreover, these firms trade within established networks but are isolated from wider markets (Commander and Seabright, 2000:363-364). There is a clear parallel to unemployed people being isolated from the broader labour market but able to trade within their local network.

To conclude, a sub-optimal distribution of money, arising from inter-regional money flows, causes imperfect relaxation of the double coincidence of wants constraint on exchange. Consequently, not all excess demands and supplies can be executed. This problem may be alleviated by a community currency that either circulates only locally, such as Ithaca Hours, or enhances the efficiency of the outstanding stock of money, such as stamp scrip. Ideally, the community currency could do both, and alleviate the synchronisation constraint at the same time. Section four analyses how an MCS, such as LETS, may achieve this. Nevertheless, these findings

arise from a static framework, in which interaction of national and local currencies, and fluctuations of the economy, and money supply issues were either ignored or assumed away.

Section 3

Why people would hold both the national and the complementary currency:

Money is better than poverty, if only for financial reasons

Woody Allen¹⁶

Despite the case for community currencies presented above, it would not be hard to find a sceptic, who would question people's willingness to hold and use several currencies simultaneously. There are various costs associated with an increase in the number of media of exchange. For example, when there are two units of account, efficiency benefits are reduced because people have to know twice as many prices, which increases transaction and information costs. Moreover, there are costs associated with posting several prices (menu-costs) and with risk inherent in exchange rate fluctuations between the currencies. As money is subject to an externality, such that wide acceptability depends (paradoxically) on wide acceptability, the community currency would be subject to higher transaction costs because it is less widely used (Tullock, 1975:491-492). Additionally, network effects and switching costs may prevent a second medium of exchange from becoming generally accepted (Dowd and Greenaway, 1993). Of course, a major determinant of whether a currency will be accepted in general exchange is whether the government accepts it for payment in taxation, recognising that taxation is generally of the order of 40% of total transaction value.

Hayek (1976a and 1976b) does not seem worried about such problems with the acceptance of several competing currencies¹⁷. His views on the matter appear to be broadly

¹⁶ As cited in Boyle (1999:213)

supported by the Swiss experience with currency competition between 1826 and 1850. This system provided a stable monetary standard where “the Swiss used specie from neighbouring countries along with a multitude of debased cantonal and local currencies” (Weber, 1988:460). Moreover, even today in most border towns two or more currencies are readily accepted as a means of payment by businesses and people alike. Similarly, consumers appear to be quite willing to participate in several discount and savings schemes, such as air-miles[®] and customer loyalty-cards in super-markets, and make purchases in terms of these units. With advances in digital money transfer and administration technology, transaction costs of using several currencies will diminish further in the future.

On a theoretical level, even within the standard monetary general equilibrium models (Kyotaki and Wright 1989, Brunner and Meltzer 1971:802) people do not *necessarily* converge to a single (government issued) medium of exchange. Moreover, whereas costs of having several currencies may be substantial, the cost of not fully executing excess supply and demand can be much higher for sub-sets of the population. The comparison is analogous to one between the efficiency of a market and its existence, that is, between dead-weight-loss triangles and much larger sub-optimal production boxes¹⁸. As argued by Fisher and Fisher (1934:155), once a community currency is accepted by some local businesses, others will follow suit in order not to ‘miss-out’ on the additional business it provides. The numerical example above illustrates that accepting local money means extra business. Therefore, if it allows agents to exchange their over-capacity, they are likely to hold and use the community currency.

¹⁷ “To the great mass of wage- and salary-earners the chief interest will probably be that they can make their daily purchases in the currency in which they are paid, and that they find prices everywhere indicated in the currency they use. Shopkeepers on the other hand, so long as they know they can instantaneously exchange any currency at a known rate of exchange against any other, would be only too willing to accept any currency at an appropriate price.”

(Hayek, 1976b:56)

¹⁸ Note the parallel with the Harberger triangles vs. Okun’s gap controversy

The relation between the national and community currency:

Suppose that, in line with the analysis thus far, there is a region with a cash-shortage, which implemented a community currency that *did* get accepted by those that could exchange their over-capacity with it. The question is whether, in a dynamic world, the system would be robust to inflows of national currency (analogous to an improvement in the terms of trade in the example in section two), such that it does not suddenly collapse once conditions improve. This question cannot be answered without first considering the relationship between the community and national currencies.

The most direct relationship is a *Backed Community Currency*, which is backed by national money, such as in Wörgl. Alternatively, there could be a fixed exchange rate with the national currency. However, this is only feasible if the community currency is issued in exchange for goods and services by an issuer, who has sufficient national money balances to exchange the full value of outstanding community currency. An example of this may be a currency issued by an institution with large dealings in both currencies, such as a (local) government with a tax-base. Considering that the point of issuing the community currency was a local shortage of national currency in the first place, this operation is only sensible when replacing national money with a more efficient money, such as the local stamp scrip in Wörgl.

The problem with a backed local currency is that it may circulate outside the region, eroding its function of solving the 'import co-ordination problem'. Conversely, a fixed exchange rate does not seem feasible for a community currency that is not directly or implicitly backed. That is, assuming all goods exchanged for community currency would also be exchanged for

national currency, the community currency would have to trade at a discount. There is however, no guarantee that this discount would be fixed as the relative supply of community currency compared to national currency changes. Consequently, the institution exchanging at a fixed rate would be faced with excess selling or buying of national currency and make losses at the hands of arbitrage. Additionally, Klein (1974:443) argues that “the crucial information cost reducing characteristic of monetary arrangements is the *predictability* of exchange rate changes” and of price changes, rather than their stability. “There is therefore no theoretical reason to expect even constant exchange rates between competing monies to be an optimal solution.” Thus, a fixed exchange rate is only sensible when the community currency is directly backed by the national currency¹⁹.

Alternatively, the exchange rate can be flexible and actively determined through sufficient amounts of currency being exchanged on a regular basis. In this case, there may be an additional benefit to community currencies, namely the introduction of collective wage flexibility. That is, the community vs. national currency exchange rate will depreciate until those earning the community currency are no longer willing to supply it at the going exchange rate. Consequently, the effective wage paid in terms of national currency may be lower, thus flexibility may be higher, than would have been the case in the absence of the community currency. In this way, a depreciation of the community currency allows co-ordinated collective wage-cuts for the unemployed. The point is analogous to that of Keynes, when he argues that workers are unwilling to accept nominal (perceived as relative) wage cuts but are less hostile to wage reductions through inflation because they are uniform.

¹⁹ As noted by Tullock (1975:495), habits yield significant transaction costs savings. If the levels of explicit and implicit transactions between the currencies are low, it is possible that habits, custom, and ideology support a fixed exchange rate as long as fluctuations are relatively minor. This is practically the case in LETS, many of which ‘fix’ the exchange-rate ideologically at unity. See also Ellickson (1991) on ‘order without law’. Section 4 analyses the role of social customs in more detail

In this context, the analysis of a community currency with a flexible exchange rate is similar to that of regional currency of an optimal currency area (Mundell, 1961, Tavlas, 1993). However, the *essential* difference is that with such a regional currency the whole region bears the costs of reducing unemployment through depreciation, whereas with a community currency these costs are collectively born by the unemployed themselves. Hence, with a community currency the unemployed are better off than with just a national currency but worse off than with a regional currency as envisaged by Mundell.

This function of community currencies is consistent with research on the reasons for the existence of Russian *veksels*. This research finds that *veksels* serve also to allow implicit price cuts below the ‘excessive prices resulting from regulation and customary mark-up pricing’ (Gustafson 1999:23-24) and as a means of price discrimination, that is, a way to keep prices high for liquid firms whilst continuing trade with illiquid firms (Commander and Seabright, 2000:364). Similarly, Neale et al. (1992:341) find that, for corporate barter systems, both conserving scarce foreign exchange and concealed price flexibility, to circumvent cartel agreements or discount to particular customers, are important motivations for participating in such systems.

Summarising, a fixed exchange rate relationship is compatible with a *Backed Community Currency* but not likely to be sustainable for a *Fiat Community Currency* or MCS. Moreover, flexible exchange rates allow those trading in the community currency, that is, those with over-capacity, to introduce collective price and wage flexibility and to price-discriminate.

The interaction between the national and community currency:

Having analysed the exchange rate relationships, it is now possible to examine the effects of changes in the regional availability of national currency. Suppose, for example, that after the

terms of trade have worsened (as in section 2) and a community currency has been brought into circulation, the terms of trade improve again to their original level. This increases the supply of national money in the region, such that there is sufficient national money to facilitate all exchanges. The question is whether the community currency system would collapse.

Suppose that the currency is backed, that is, the nominal exchange rate is fixed. In this case, the real exchange rate can either be flexible as shopkeepers adjust their prices to reflect the relative valuation of the currency, or it can be fixed. The latter can only occur if the (local) government legislates that prices must be equal in both currencies. Alternatively, in case of small value discrepancies between the national and community currencies, social custom or habit could support the fixed real exchange rate.

If the real exchange rate is fixed Gresham's law applies. Thus, the overvalued currency will drive out the other currency, independent of their relative 'use-values'. In practice, stamp scrip initiatives require the community currency to be overvalued, as they would not work unless they drove out the national currency (Fisher and Fisher, 1934). For the national currency, this means that it leaks faster and is hoarded for longer periods, reducing its velocity of circulation.

The alternative, a flexible real exchange rate is analogous to the flexible nominal exchange rate case. In this case, Gresham's law does not apply. In fact, the opposite will occur; namely, that 'good' money will drive out 'bad' money. As Hayek (1976b) points out, under flexible exchange rates parallel currencies will *compete* and the currency with the lowest user costs and greatest stability, that is, yielding the highest value stream of monetary services (Klein, 1974), would be preferred by transactors.

There is no *a priori* reason to expect the national money to perform better than the community currency. Potential benefits of using community currencies may be lower inflation,

the ability to price-discriminate, or implicit provision of credit or market matching services as in the Mutual Credit System (see section 4). The national money may have lower transaction costs, more credibility, hence lower volatility, and (by definition) facilitates a wider variety of transactions.

Clearly, the community currency could never drive out the national currency entirely because it is needed for imports. Nevertheless, it may be more attractive to use for a sub-set of transactions, notably those between people with over-capacity. Additionally, in practice unemployment remains present even throughout a boom. This, in combination with the currency competition argument, suggests that a well-managed community currency system is likely to be robust to normal fluctuations in the regional economy.

Nevertheless, as unemployment falls and more people earn wages in national currency, presumably the volume of transactions facilitated by the community currency would decrease. Consequently, the community currency supply would have to shrink to prevent too much money chasing too few goods causing inflation, as in the Capitol-hill baby-sitting co-op example. According to Fisher's quantity theory of money, as transactions volumes fall, either the velocity of circulation of the community currency, or its real money supply has to fall. Achieving this through inflation means that the real exchange rate regime is (implicitly) flexible, thus potentially violating local government regulation or social norms. Moreover, inflation is bad for credibility, which is a particularly sensitive issue with small (private) community currencies.

In the case of stamp scrip, the velocity of circulation could be reduced by reducing the stamp tax. The alternative is an ability to manage the money supply, which can be problematic when concerning small centrally supplied currencies. For instance, the Ithaca hours money supply growth is mainly managed through loans and gifts in local currency to local charities. By keeping

a tight money supply, inflation has so far been warded off. However, within this set-up it is difficult, if not impossible, to reduce the stock of money, leaving the system open to inflationary pressure in the future. This is reported to have happened to Maritime Hours, circulating in Nova Scotia, Canada (Boyle, 1999:128). Contrary to a *Fiat Community Currency*, a *Backed Community Currency* could unwind without major damage as people could exchange it at a fixed fee for its backing. Alternatively, a *Mutual Credit System*, such as LETS, (discussed further in section 4) mostly avoids central money supply issues through the individual issue of units, which cancel out as debts are repaid.

The analysis in this section suggests that transaction-volumes in local currency terms move in a counter-cyclical fashion. Stodder (1998) confirms this for corporate barter systems, based on time-series data (1974-1995) from the International Reciprocal Trade Association. The regression coefficients of barter-trade volumes on wholesale inventories, GDP and capacity utilisation are all significant and as expected (positive, negative, and negative respectively). Moreover, Stodder cites research confirming the counter-cyclical nature of LETS systems in the UK, Australia, Poland, and Switzerland. This evidence should, of course, be evaluated with the caveats on LETS as a foundation for economic theorising in mind.

Concluding, despite the fact that there are significant costs associated with working in two or more currencies simultaneously, this does not necessarily prevent people from holding more than one currency. Considering the benefits associated with accepting both currencies in terms of the extra business or the ability to market excess labour or even as a means of price-discrimination, it seems likely that those unable to exchange their labour time or excess capacity will be willing to accept a well managed *complementary* community currency. Moreover, once

implemented, such a is robust to fluctuations of the regional economy, given sufficient system credibility and a capacity to manage the money supply. In this case, a boom merely reduces trade volumes rather than causing the system to collapse.

Section 4

Mutual Credit Systems and the Endogenous Supply of Money:

The use of money necessarily involves strategic elements and certain aspects of social custom.

Kyotaki and Wright (1989:928)

Thus far, I have discussed what a community currency can be, why it may be useful and whether it would be accepted and withstand fluctuations in the regional economy. As argued in the previous section, the real money supply of the community currency must be responsive to fluctuations and the system must be 'well-managed' to ensure credibility. The relatively small scale of community currencies permits novel solutions to money supply problems. In each section, the MCS has been identified as a promising alternative to a system with a centralised supply of money. As identified above, the MCS potentially addresses the issues of the distribution of money, the asymmetric release of the synchronisation constraint, the effectiveness of the medium of exchange in facilitating transactions, and money supply fluctuations directly. Considering that centrally supplied money systems have been analysed at length in the economics literature, whereas the MCS has received little attention, this particular system is analysed in detail here.

The individual mode of supplying money in the MCS potentially allows a more flexible and decentralised adjustment to shocks and changes in the economy. However, the question is whether the system can deal with the problems arising from opportunistic individual money supply. The ensuing question is how the flexibility of the individual money supply is affected by

solutions to this problem. Finally, the question of optimal MCS size is addressed in relation to its stability.

The most widely implemented MCS is the Local Exchange and Trading System (LETS). Although there appear to be many variations to the theme of LETS, the majority seem to operate according to the principles set out by Michael Linton: “A LETS system is a self-regulating economic network which allows its members to issue and manage their own money supply within a bounded system” (in Ekins, 1986:200). In order for this to work, each member, including new members, has an account on which they can draw to finance transactions. As each transaction has to be booked on the individual account, transaction costs are higher than with cash. In industrialised countries modern communication and administration devices are rapidly reducing these costs, whereas in developing countries hybrid systems, such as the Argentinean Arbole, which include cash elements have emerged.

To facilitate mutual monitoring and allow members to check the viability of the system there is no banking secrecy. Therefore, the administration publishes the balance and turnover details of the members regularly. Moreover, before a transaction takes place the supplier has the possibility of checking the balance and turnover of the purchaser as a proxy for creditworthiness. Generally, no interest is charged on negative or positive balances.

Finally, LETS are not only (alternative) bankers, but also market-matchers of demand and supply. This function generally operates through a regular publication advertising what people have to offer or would like to buy. This publication might be supplemented by ‘community building events’, such as a bazaar where members promote their products and services. In economic terms a LETS thus performs three main functions, namely the provision of *transaction*

management, credit, and 'market-matching' of supply and demand. Jointly, these allow LETS currency units to function as a medium of exchange.

The value of the community currency ultimately depends on the credibility of the system. Credibility can be affected by endogenous and exogenous factors. The available supply of goods and services within the system, relative to the outstanding community currency supply and potential future increases in this money supply, for a given price-level, endogenously determines system credibility.

Exogenous factors, such as the inter-regional terms of trade, supply of national money and its inflation rate, 'animal spirits' and levels of confidence in the national or world economy may also affect credibility. The analysis of section three suggests that a system, which can manage the money supply accurately, would be robust to moderate fluctuations in these variables.

Despite the possibilities for mutual monitoring, MCSs appear susceptible to opportunism of members, who could run up debts and subsequently refuse to repay. This is exactly what happened in the Australian Baytown LETS, which collapsed with a positive final aggregate balance of 2100 green dollars, as a consequence of several debtor departures (Jackson, 1997). In fact, this situation is analogous to the 'commons problem' (Hardin, 1968). That is, overgrazing of the commons is logically equivalent to over-supplying units, resulting in reduced system credibility. That is, as the value of the community currency relies on credibility, the Common Property Resource (CPR) can be defined as the credibility of the system.

The problem with preserving credibility by preventing over-supply of units is that the debtor captures the full benefit of defaulting on debt, whilst bearing only a small part of the cost in terms of an increased probability of system collapse. Similarly, the creditor only suffers a small part of the risk of default of the debtor but captures the full benefit of the transaction, hence has

little motivation to prevent the trading partner from over-issuing. The essence is that both those that are most prone to ‘over-issuing’ and those that can most easily monitor such cases benefit from over-exploiting the CPR.

The combination of this problem with the LETS directive that people are free to ‘go into commitment’, that is debt, without a formal obligation to repay, appears to be one of the major fears of prospective members. The question is, however, to what extent are these fears based on an oversimplified analysis of the process of unit issue in its institutional context.

“By referring to natural settings as “tragedies of the commons,” “collective-action problems,” “prisoner’s dilemmas,” “open-access resources,” or even “common property resources,” the observer frequently wishes to invoke an image of helpless individuals caught in an inexorable process of destroying their own resources.”

(Ostrom, 1990:8)

“What makes these models so interesting and so powerful is that they capture important aspects of many different problems that occur in diverse settings in all parts of the world. What makes these models so dangerous – when they are used metaphorically as the foundation for policy – is that the constraints that are assumed to be fixed for the purpose of analysis are taken on faith as being fixed in empirical settings, unless external authorities change them.”

(Ostrom, 1990:6-7)

The point is, that members of MCSs are not necessarily confined to the analytically simplistic case where they can neither collectively prevent each other from over-issuing, nor alter this constraint through institutional supply.

Institutional adaptations to alleviate the commons problem:

Having thus defined and analysed the CPR and its main determining internal factors, we can now proceed with an evaluation of the extend to which the MCS is institutionally equipped to deal with the commons problem. Ostrom (1990) has analysed what institutional characteristics equip a system to successfully manage their CPR. This analysis led to the formulation of *eight design principles* (1990:91), which characterise robust CPR institutions. In order to determine whether the MCS can overcome the commons problem its (potential) institutional properties are evaluated against these eight design principles.

1. *Clearly defined boundaries,*

These determine who is allowed to ‘withdraw’ resources from the CPR and the boundaries of the CPR itself. In case of the MCS these boundaries are perfectly defined in terms of system membership. Only members, i.e. those who supply, can issue units within the system.

2. *Congruence between appropriation rules and provision rules.*

“Provision problems concern the effects of various ways of assigning responsibility for building, restoring, or maintaining the resource system over time, as well as the well-being of the appropriators. Appropriation problems are concerned with the allocation of the flow. Provision

problems are concerned with the stock. Appropriation problems are time-independent; provision problems are time-dependent” (Ostrom, 1990:47).

In terms of the MCS, this means that appropriation rules are concerned with dividing the optimum potential ‘withdrawal’, i.e. issue of units, consistent with optimal credibility. Provision rules are concerned with the maintenance of the system, in terms of preserving credibility. These could regulate issues such as acceptability of units by members, required supply of work into the system, and the means of collecting resources for maintenance of the system.

Currently, in most LETS systems, resources for maintenance are gathered on a *pro rata* and annual lump sum fee basis. Withdrawal rates are either proportional to the membership, such that each member has an equal credit limit, or not constrained, in which case there are no explicit credit limits. These appropriation rules are not necessarily consistent with the provision rules because members are allowed to ‘appropriate’ up to their credit limit, which may be in excess of their expected supply of work into the system. Moreover, the rules may not maximise system credibility. Consequently, it serves to analyse theoretically the nature of rules optimally suited to maximise credibility subject to full exchange. The central question is how such rules affect the flexibility of individual money supply.

In practice, optimal rules will differ substantially across systems. However, they must conform to the following principles in order to guarantee the minimum amount of credibility consistent with rationality. As a provision principle, ultimately the overall value of outstanding units must not exceed the present value of implicitly committed work-supply to the system. Consequently, a consistent appropriation rule would be that individuals may not supply units exceeding the present value of the services they implicitly commit to the system in the future. This could be achieved through credit limits.

In fact, there is a trade-off between credibility and the speed and efficiency at which excess demands and supplies are executed. That is, a lower level of outstanding units relative to the implicit future work-supply means a lower potential proportion of over-issued, that is illegitimate, units, hence higher credibility. However, as the money supply, that is the level of outstanding units, is reduced, it becomes more computationally and time-complex²⁰ to achieve full and efficient exchange. This trade-off will yield different rules across systems, consistent with different valuations of risk and time.

However, the general principle would be to set a rule that sets the 'optimal' aggregate and individual money supply subject to the principles above and full execution of excess demands and supply. Ostroy and Starr (1974) in effect have shown that the limit case, where each agent is able to issue units up to the value of their excess supply to the system, is consistent with full execution of excess demands and supplies. Hence, setting the potential individual money-supply subject to the minimum sufficient credibility and full execution constraints will give at least one (corner) solution, namely the maximum money supply or level of debt. Given a non-infinite discount rate, there can be smaller aggregate levels of debt, achieving full execution within a positive time period. Assuming risk or loss-aversity, such a smaller level of debt can be a welfare improvement as compared to the maximum level of debt.

Additionally, the central administration authority can periodically make adjustments to the system if structural imbalances arise. For example, if the money is hoarded a demurrage charge can easily instituted in the form of a negative interest rate. Conversely, if people have difficulty spending their money a positive interest, which increases the inter-temporal pay-off of working now, can be instituted. Finally, if outstanding units are in danger of exceeding the

²⁰ See Stodder (1995:15) and Norman (1987) for a discussion on these concepts

implicit labour supply, system stability can be improved by putting a negative interest rate on both positive and negative balances, such that outstanding debt tends to zero.

Clearly, due to imposing congruent appropriation and provision rules, the money supply cannot perfectly elastic. This probes the question of what the difference is between centrally supplied money and the MCS. Firstly, the MCS still (partially) resolves the synchronisation constraint symmetrically. Moreover, the central authority of the MCS merely sets the potential money supply in terms of credit limits. Individuals still decide to issue units in response to transaction needs, thus endogenously determining the money supply in response to changes in economic conditions, subject to the constraints of their credit limits. Consequently, damage due to predictive failure by the central authority is reduced. Moreover, the concept inherent in stamp scrip, the demurrage charge, can easily be implemented in the MCS.

Summarising, congruent appropriation and provision rules can be set within the MCS. Such congruence does neither eliminate the flexibility of the MCS with respect to fluctuations, nor prevent complete exchange from being achieved, unless such complete exchange is traded off against risk.

3. *Collective-choice arrangements*

These allow those subject to operational rules to change them. This also allows CPR institutions to adjust the rules to local conditions. Given the local and social nature of the MCS, such arrangements should not be difficult to implement. However, the ideological impetus of LETS and the potentially inflexible nature of computer software for administration may constrain operational rule changes in practice.

4. *Monitoring* and 5. *Graduated Sanctions*

In robust CPR institutions appropriation and provision rules are effectively monitored and such monitoring is accompanied by graduated sanctions for opportunists. These provide a flexible punishment mechanism, preventing the high cost of rigidly applying harsh sanctions for different or first time offences (Ostrom, 1990:186). Within the MCS monitoring is essential when there are no credit limits, or to ensure that they are set at appropriate levels for individuals, or that they are not exceeded by writing uncovered cheques.

There are several ways to argue that, despite non-recoverable costs to the punisher, which create a second-order free rider problem, monitoring and punishment will take place. These approaches either presume some self-interest based strategy or argue that people's behaviour is characterised by reciprocity (Fehr and Gächter, 2000) to yield this result.

The self-interest based approach can be illustrated by the strategy of 'quasi-voluntary compliance' (Ostrom, 1990:94-95). Here, people are willing to comply with the rules as long as they perceive that the collective objective is achieved and they perceive that others also comply, which means they wish to avoid being 'suckers'. Such contingent behaviour has been widely perceived as an alternative to coercion in order to achieve co-operative behaviour. That is, the "private benefit of monitoring in settings in which information is costly is that one obtains the information necessary to adopt a contingent strategy" (Ostrom, 1990:97). In the context of the MCS, this means that members would like to avoid being the last one to find out that system credibility has dropped below the some threshold, which would trigger collapse and cause them to suffer proportionately more than others. To prevent this situation, people are willing to 'invest' in private information by monitoring. Gradual sanctioning could include reputational repercussions, reduced credit limits, fines, or even eviction from the system. Akerlof (1984)

shows in a general equilibrium model that it is possible for social customs that are costly to the individual to persist if a stable fraction of the population believes in them and punishes opportunists through for instance reputational repercussions.

The reciprocity approach relies not so much on self-interest but more on an imbedded psychological response. For instance, Fehr and Schmidt (1999, as cited in Fehr and Gächter, 2000:165) show theoretically in a 'free rider public good' framework that even a minority of reciprocal subjects is capable of inducing a majority of selfish subjects to co-operate, if they have an ability to punish. The power of such social norms is illustrated by Ellickson (1991), who argues convincingly in a 'property rights' framework, that people do not necessarily base their economic interactions on underlying legal entitlements, as Coase theorem suggests. Instead, they develop and enforce adaptive norms of neighbourliness to govern their inter-actions.

Considering, that community currencies bear on groups or regions with economic (and social) interconnections, these theories are highly relevant and suggest that monitoring will take place given the right institutional arrangements.

6. *Conflict-resolution mechanisms*

These serve to mediate conflicts between members over the compliance and enforcement of appropriation and provision rules. The central administration unit in a MCS is a natural candidate for mediation between individual appropriators.

7. *Minimal recognition of rights to organise.*

This pre-empts inappropriate government regulation crowding out community regulation. This is potentially the greatest threat to the MCS. As we have seen with the Wörgl case and the

stamp scrip experiments in the U.S., governments are quite attached to their monopoly on the issue of money. It would not be surprising if they intervene once MCSs become similarly successful. Moreover, regulation concerning social security and the unemployed can have profound effects on the success of MCSs in increasing local employment. New Zealand's policies, which include unemployment benefit authorities referring applicants to the LETS in their area are encouraging in this light.

8. *Organise activities in multiple layers of nested enterprises.*

Currently, MCSs, such as LETS operate mainly on a local level. However, there is already significant interregional and international co-operation and interaction. If MCSs were to increase coverage through an interregional network, as is currently attempted in Austria, it is essential that rules between and within layers are congruent.

This analysis of the (potential) institutional qualities of the MCS suggest that it is particularly well-suited to preserving its CPR. By invoking social norms or a self-interested strategy of 'quasi-voluntary compliance', congruent appropriation and provision rules can be policed without eliminating the capacity for endogenously supplying the medium of exchange in response to immediate transaction needs.

How social norms and quasi-voluntary compliance may yield a stable system:

In addition to institutional factors, economic variables determine the severity of the commons problem also and, as the analysis below suggest, may even determine the optimal size of an MCS. Suppose an MCS for which its members have a prior distribution of 'friends', i.e.

trusted transactors with whom they can trade at low transaction costs. Friends can punish for opportunism through social repercussions or by refusing to trade and thus eliminating the low-transaction cost exchange partners for the opportunist. This distribution of friends yields an initial number of opportunists for whom the utility of running up a debt and leaving outweighs the disutility from the reputational punishment and the loss of utility from future trading possibilities within the system.

During trading, transactors build up informational capital, increasing future valuation of trading possibilities, and make new 'friends', thus increasing potential reputational costs and reducing transaction costs. However, as they monitor in accordance with 'quasi-voluntary compliance' to avoid being a 'sucker', they encounter opportunists. Each encounter requires a downward adjustment of credibility, hence future valuation. If, due to the particular pattern of exchange and the initial distribution of friends, a small proportion of non-opportunists meets opportunists relatively often, some may have to adjust their credibility downwards sufficiently to become opportunist also, yielding an increasing number of opportunists. It is easy to see how these interactions may lead to an eventual collapse of the system.

Alternatively, the number of encounters of non-opportunists with opportunists may be low and evenly distributed, leading to a minor 'communal tax' through opportunist debt default and in some cases opportunists reverting to becoming non-opportunists as a result of making more 'friends', yielding a stable system. Clearly, it is beneficial to admit new members with many 'friends' or with low disutility of supplying work into the system, that is a low valuation of debt default. For example, an unemployed person with a low disutility of supplying work, who is introduced into the system by one or more friends, is better for system stability than an

investment banker, who has a high disutility of supplying additional work and no friends within the system.

This analysis allows several conclusions to be drawn. Firstly, as valuation of future trading possibilities is discounted, the system stability is inversely related to the discount rate (i.e. impatience and risk aversity). Secondly, system stability is positively related to the proportion of people's income transacted within the system. Thirdly, it is positively related to the quality of market matching provided by the system²¹. Fourthly, it is negatively related to geographical-economic inter-connectedness between the region and other regions. That is, as labour mobility across regional, social, or occupational economic systems increases, both the force of reputational punishment and the value of future trading possibilities diminish relative to the utility of exit.

Finally, the size of the system relates to its stability. Although the complexity of the relevant functions do not warrant a generic conclusion, the most plausible relationship appears to be an inverted U-shape, such that stability increases with size, then stabilises, and finally falls with further increases in size. As membership rises, both the diversity of goods and services offerings and the size of potential demand increase, raising the valuation of trading possibilities.

Simultaneously, the reputational punishment increases as the number of people that have to be faced after opportunist default rises. However, the average communal tax, which increases reputational costs, per opportunist default falls as it is spread over a greater number of people. These effects are unlikely to balance out at first. People appear to adhere strongly to 'fairness' principles even if losses and gains are small (Rabin, 1998:16-24), and establish 'social order

²¹ The inter-linked markets debate, pertaining to rural credit markets in developing countries, bears on this analysis. That is, the inter-linkage between the functions of the MCS, namely provision of transaction services, credit, and market matching, allows a more stable system due to reduced default incentives (See Braverman and Stiglitz, 1982).

without law' (Ellickson, 1991). Consequently, the reputational punishment is likely to increase with membership.

However, as membership increases beyond the lines of social control these arguments may be reversed. Firstly, monitoring becomes more expensive as the proportion of friends, that is 'trusted transactors, of the total membership falls because when transactors do not know each other, information and gossip is only available through the formal channels. For instance, Ellickson (1991:283) finds that people start resorting to the law when the social distance between them increases. Similarly, graduated reputational sanctions are harder to administer as the effectiveness of gossip diminishes when the group becomes too large. Whereas some gossip may be very effective in a small town where people meet regularly, in a large city it is unlikely to carry through the entire system, leaving groups of uninformed members where the perpetrator can transact without increased transaction costs until harsher sanctions are administered through the formal channels.

Thus, the nature of the commons problem combined with economic factors, such as the discount rate, utility premiums on exchange, and social capital, may determine the optimal size of the MCS in terms of system credibility and the degree of execution of excess demands and supplies. In this light, a 'well-managed' MCS, with suitable institutional features and an appropriate size, provides a stable alternative to centrally supplied Community Currencies.

Section 5

Conclusion:

A rich variety of complementary currencies have facilitated exchange between groups of people in the past and present. In many cases, these currencies have successfully increased the volume of trade and levels of production and consumption, despite the availability of a more widely accepted medium of exchange.

When inter-regional trade causes a sub-optimal distribution of such a medium of exchange, this prevents complete execution of excess demands and supplies. The problem can be alleviated by partially replacing national money with a more effective money (for example stamp scrip) or supplementing it with a locally circulating currency (for example Ithaca Hours), or both through an MCS (for example LETS).

The benefits arising from the extra business generated by the community currency provide a powerful incentive to hold more than one medium of exchange, even in the presence of high transaction costs. Moreover, if the exchange rate between the community and national currency is flexible, this may provide the additional benefit of introducing collective price and wage flexibility for those transacting in the community currency. Such benefits are expected to be robust to normal fluctuations in the local economy. For this, however, it is essential that the system can manage its money supply effectively.

The MCS enables the money supply to adjust endogenously as individuals adapt it to their transaction needs. Moreover, through its function as a medium of exchange, the MCS alleviates problems of sub-optimal money distribution whilst simultaneously relaxing the synchronisation constraint on exchange via its credit function. The commons problem, which forms an inherent part of the MCS, may be overcome by the ability of its institutions to mobilise social norms or

invoke quasi-voluntary compliance. Because the MCS operates as an accounting system of exchange, it can easily incorporate a demurrage charge for increased efficiency and credibility. Therefore, the MCS provides novel and robust solutions to the main problems posed in this paper.

To conclude, both with money and love, common wisdom advocates a single source, and considers those who advise otherwise as entering the realms of the illegitimate and subversive. Our inquiry into the potential benefits of a complementary currency has shown that, in the case of money, alternative sources need neither be illegitimate nor subversive in nature. On the contrary, they potentially yield real, legitimate benefits in a *second-best* world.

The theory in this introductory survey leaves many empirical and theoretical issues unresolved. These include the optimal size of a currency area; under what circumstances a *backed currency*, *fiat currency*, or an *MCS* is the optimal currency arrangement; to what extent national money fails to facilitate potential exchanges; and more fundamental issues such as the way in which price-determination in a multi-currency framework, and asset and precautionary motives for money demand affect the analysis. If the reader considers such issues worthy of further exploration, then I have achieved my primary aim: to show that complementary community currencies are indeed worthy of serious economic research.

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