

# CENTRAL BANK MONEY AND PAYMENT FINALITY

by

Sergio Rossi\*

## *Introduction*

Payment finality, that is, ‘the discharge of an obligation by a transfer of funds and a transfer of securities that have become irrevocable and unconditional’ (Committee on Payment and Settlement Systems, 2003a, p. 496), is crucial for the orderly working of modern economic systems. As a matter of fact, monetary transactions are the backbone of production and exchange, national as well as international. Payments equivalent to a country’s annual GDP are presently made over a few working days within any national economy. The large volume and scope of today’s payments imply that problems in their settlement could affect the financial sector and even the economy as a whole. Further,

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\* Assistant Professor of Economics at the Universities of Fribourg and Lugano, Switzerland; member of the RMElab. This paper is the result of previous work presented at the first bi-annual Canada/US Eastern Border Post-Keynesian workshop held at the University of Ottawa, Canada, on September 19–20, 2003, and at a conference in honour of Augusto Graziani held at the University of Sannio, Benevento, Italy, on December 5–6, 2003. For their helpful comments, the author would like to thank workshop and conference participants, and especially Alvaro Cencini, Ghislain Deleplace, Giuseppe Fontana, Alberto Giacomini, Claude Gnos, Jochen Hartwig, Marc Lavoie, Giovanni Pavanelli, Riccardo Realfonzo, Louis-Philippe Rochon, Mario Seccareccia, and Domenica Tropeano. Even though their comments proved to be an asset to the author, they should not be booked as anyone else’s liability.

the implementation and transmission mechanism of a central bank's monetary policy depends also on the smooth functioning of domestic payment systems, and hence the issue of payment finality is of both a private and a public concern.

While the question of payment finality has been addressed by lawyers and central bankers, especially by those involved in the management and/or supervision of settlement systems, it has received little attention from economists of any pedigree. Only in recent years has the economics profession begun to consider this question at both the theoretical and policy level, focusing however mainly, if not exclusively, on the importance of payment finality for non-bank agents (see for example Kahn and Roberds, 2002, and Holthausen and Monnet, 2003). In particular, analyses focus on bank money and its role in facilitating exchange when the issue of payment finality has been settled by setting up a triangular payment structure in which a bank is the 'go-between' facing the payer and the payee. This framework, in fact, was put to the fore by monetary circuit theorists well before the recent attention it received from the economics profession. It is namely to be found in the work of a number of twentieth-century economists, led by authors such as Graziani in Italy, Parguez in France, and Lavoie and Seccareccia in Canada, who indeed trace their approach back to several founding fathers of our science like Wicksell, Schumpeter, and Keynes, to quote only the most well-known of them (see Realfonzo, 1998). This approach has proven fruitful for explaining the nature of bank money and its credit-driven emission (see, among others, Graziani, 1990, Lavoie, 1996, Parguez and Seccareccia, 2000). Up to now, however, monetary circuit theorists have not devoted much attention to the role of central bank money in interbank payments, that is, for the settlement of debt within the banking system (see, however, Lavoie, 2004). This paper aims to expand on this role in

the latter framework by investigating the question of payment finality at the interbank level, that is, in the monetary circuit involving banks and the central bank at the top of them. As pointed out by Graziani (1990, p. 18), '[t]he role of the Central Bank is in fact of acting as a third party between single banks so far as their reciprocal payments are concerned'. Taking stock from the nature and role of bank money in the settlement of non-banks' debt, this paper aims at explaining the nature and role of central bank money in the settlement of interbank debts within a closed economy. To be sure, the coexistence of central and commercial bank monies in modern capitalist economies is to be explained with reference to the same methodological approach, since the nature of modern money does not change when analysis switches from commercial to central bank money.

The structure of the paper is as follows. The first section analyses the coexistence of central and commercial bank monies, and explains the money-purveying role of the settlement institution at the interbank level on the grounds of a circular-flow paradigm. Within this framework, the second section shows that a distinction exists between the money-purveying and the credit-purveying functions of central banks in domestic settlement systems. In this respect, the third section provides a few hints in order for the theory of the monetary circuit to expand on international monetary economics issues. It namely points out the need to set up an international settlement institution for cross-border transactions that involve central banks. The fourth section concludes.

### *The coexistence of central and commercial bank monies*

Money is fundamental to the existence and functioning of national economies as these are based on production and exchange, be it in a closed- or open-economy framework. Without money, economic activity could not be measured, and values and prices could not be expressed in a social form necessary to homogenize and thus commensurate the thousands of goods and services produced in any dynamic market economy over any particular period. Yet, in any national economy there are several money issuers, namely, the central bank and the commercial banks making up the domestic banking system, each of them issuing its own means of payment. ‘The multiplicity both of issuers of money and of payment mechanisms is a common feature in all developed economies’ (Committee on Payment and Settlement Systems, 2003b, p. 1). As a result, central and commercial bank monies coexist in our economies, and an institutional mechanism must exist to make sure that “one dollar is one dollar”, whatever form it takes (whether central or commercial bank money)’ (p. 1). The ‘singleness’ of a currency, in fact, is a necessary (but not yet sufficient) condition for money to be the measure of value and the means of payment in the economic area where it is issued. The other condition is that money and payments are to be linked to production as the two faces of a single object. If there were no production, money could not exist and hence be the measure of value, but this issue lies outside the scope of the present paper (see Schmitt, 1984, Cencini, 1995, 2001, and Rossi, 2003).

Commercial bank money is used by non-bank agents for the settlement of their debt on factor, goods, and financial markets as well. Note, however, that at this level fund ‘transfers generally take place within organized “payment systems” where commercial and central bank money often complement each other in more complex chains of

payments' (Committee on Payment and Settlement Systems, 2003b, p. 9). As a matter of fact, central bank money, in the form of notes and coins, may also be used by non-bank agents: the payer can pay for his purchases on any markets by surrendering to the payee a number of notes worth the amount of the transaction. Both commercial and central bank money (here in the form of notes and coins) are indeed means of final payment for the non-bank sector.

Now, in any national economy modern payment systems involve a great number of banks dealing with the settlement orders of non-bank agents. In fact, any transaction on any markets involves two agents and quite possibly two banks, each of the latter issuing its own means of payment in the form of commercial bank money. Because of the involvement of two banks, the notion of payment finality has been a crucial issue for central banks in the last decade or so, both on theoretical and practical grounds. In an environment of multiple banks, in fact, at any point in time a particular bank may be indebted to another bank within the banking system, as a result of the great number of incoming and outgoing payments initiated by and destined to the non-bank sector (Lavoie, 2003, p. 516). The inflows and outflows elicited by monetary transactions require therefore that the banking system be complemented by a settlement institution providing payment facilities in order for the bilateral debt–credit relations at interbank level to be finally settled without systemic disruption or failure (Rochon and Rossi, 2004). As the Committee on Payment and Settlement Systems (2003b, p. 4) recently put it:

“While the role of the central bank as settlement institution is a long-standing one, in many cases this role only required the central bank to settle the relatively small net

positions of commercial banks resulting from a netting procedure. Moreover, this occurred only once each day, at the end of the day. But with the introduction of newer, safer systems to handle the substantially increased payment system values, and in particular with the widespread adoption of real-time gross settlements (RTGS), where each payment is settled in real time throughout the day, central banks and central bank money have come to take on a much wider and more active role.”

To expand on this point, let us consider a central bank facing two banks,  $B_1$  and  $B_2$ , that are involved for the settlement of a monetary transaction between their non-bank clients, I and II. Suppose for example that a payment order of  $\text{£}x$  has to be settled in a RTGS system, which is the institutional form of most, if not all, large-value transfer systems existing at present. If the payer, I, and the payee, II, hold their accounts with the same bank, say  $B_1$ , the accounts concerned can simply be debited and credited by the latter, which issues its own means of payment in order for the final settlement between clients I and II to take place (in-house settlement). On the contrary, if both parties are not clients of the same bank, the payment involves two distinct banks,  $B_1$  and  $B_2$ , each of them issuing its own means of payment and recording the result in their balance sheets as shown in Table 1.

**Table 1.** *The result of a payment between two clients of distinct banks*

Bank B <sub>1</sub>		Bank B <sub>2</sub>	
Assets	Liabilities	Assets	Liabilities
Client I ( <i>payer</i> )	£x	Bank B <sub>1</sub>	£x
	Bank B <sub>2</sub>		Client II ( <i>payee</i> )

As Table 1 shows, the final payment between the non-bank agents, namely, clients I and II, gives rise to a debt–credit relation between the paying and the receiving bank, that is, B<sub>1</sub> and B<sub>2</sub> respectively. In other words, B<sub>2</sub> acquires a commercial bank deposit created by B<sub>1</sub> as a liquid asset. B<sub>1</sub> is thus indebted to B<sub>2</sub> for an amount of £x as a result of the payment having occurred between client I (that is, the payer) and client II (the payee), who is finally paid by the latter bank.

Now, while the settlement of debt between the payer and the payee is done in bank money, the settlement of debt between banks is carried out in central bank money. As bank practitioners and actual practices indicate, ‘banks do not accept bank money in interbank transactions, but ultimately require their claims to be settled in central bank money’ (Deutsche Bundesbank, 1994, p. 46). The requirement of central bank money for the final settlement of interbank debt–credit relationships is usually explained by the need to control settlement as well as systemic risks that would exist and spread if the relevant payments were not finally paid using central bank money (see for example De Bandt and Hartmann, 2000, and Heller and Sturm, 2003). In short, using central bank money to settle interbank transactions maintains stability and promotes efficiency of the financial system, which in turn enhances the allocation of resources, supports economic growth, and improves social welfare (Committee on Payment and Settlement Systems,

2003b, p. 8). As Graziani (2003, p. 63) points out, a monetary economy needs a central bank in order to prevent an unlimited expansion of credit by commercial banks, which could give rise to an inflationary increase of total demand by the public if banks moved forward ‘in step’. This argument can be reinforced on analytical grounds, on account of the fact that each bank issues its own means of payment in the form of commercial bank money. The ‘singleness’ of money in any national economy is provided by the central bank, which homogenizes the various means of payment issued by commercial banks by issuing its own means of payment (that is, central bank money) used to finally settle debts at interbank level.

In fact, as far as interbank settlements are concerned, the central bank, that is, the settlement institution, must create the number of money units needed to ensure that, in our stylized example, B<sub>2</sub> has no further claims against B<sub>1</sub> (Table 2).

**Table 2.** *Central bank money as the means of interbank settlements*

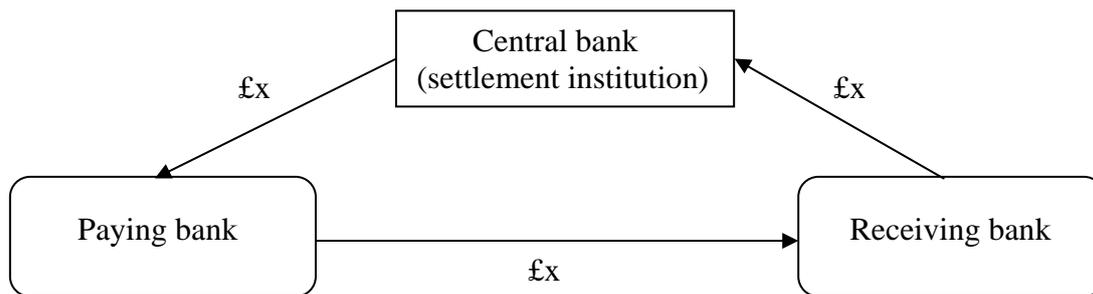
Bank B <sub>1</sub>				Bank B <sub>2</sub>			
Assets		Liabilities		Assets		Liabilities	
Client I	£x	Bank B <sub>2</sub>	£x	Bank B <sub>1</sub>	£x	Client II	£x
Bank B <sub>2</sub>	£x	Central bank	£x	Central bank	£x	Bank B <sub>1</sub>	£x
Client I	£x	Central bank	£x	Central bank	£x	Client II	£x

Central bank			
Assets		Liabilities	
Bank B <sub>1</sub>	£x	Bank B <sub>2</sub>	£x

At a technical level, the simplest case of interbank final settlements obtains when ‘[t]he paying and receiving banks are both direct participants in the interbank payment system

and hold accounts at the settlement institution, and the settlement is effected by a debit from the account of the paying bank and a credit to the account of the receiving bank' (p. 9). This case is shown in Figure 1.<sup>1</sup>



**Figure 1.** *The circular flow of central bank money in the interbank market*

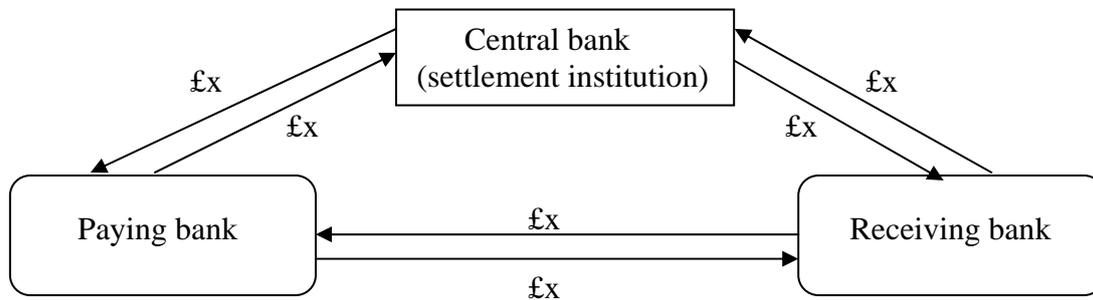
A sum of central bank money worth  $\pounds x$  is created on Bank  $B_1$ 's demand – hence the endogenous nature of central bank money –, which uses it to settle its debt to Bank  $B_2$ . As a mark of payment finality, Bank  $B_2$  acquires an equivalent central bank deposit at the settlement institution. As a result of the payment in central bank money,  $B_1$  is now indebted to the central bank, for an amount of central bank money worth  $\pounds x$ , and  $B_2$  is entitled to an equivalent deposit at the central bank. So far, the payment between  $B_1$  and  $B_2$  has been finalized by an emission of central bank money. The creditor bank,  $B_2$ , has no further claims on the debtor bank,  $B_1$ . The credit–debt relationship is now defined with respect to the central bank.

*The circular flow of central bank money and credit*

The analysis in the previous section can be developed further if one distinguishes the money-purveying and the credit-purveying functions carried out by the settlement institution in the interbank market. Money and credit are indeed two separate things, at both commercial bank and central bank level. In fact, as the Committee on Payment and Settlement Systems (2003b, pp. 9–10) puts it, ‘[t]he payment [from the paying to the receiving bank (see Figure 1)] may either be financed with funds already on the account of the paying bank, or with credit provided by the settlement institution’. In the first case, a circuit of central bank money as depicted in Figure 1 can be observed, and the analysis provided in the previous section holds. In the second case, analysis is more complex since both central bank money and credit are involved.

In the latter case, which often occurs in the form of intraday credit, the settlement of interbank debt elicits in fact two distinct circuits of central bank money. The first circuit concerns the payment leg on the money market, where an imbalance between banks  $B_1$  and  $B_2$  is settled using central bank money. The second circuit concerns, in contrast, the payment leg in central bank money of a financial transaction on the credit market that is induced by the first circuit. To explain this induction let us recall that payment finality is ‘the discharge of an obligation by a transfer of funds and a transfer of securities that have become irrevocable and unconditional’ (Committee on Payment and Settlement Systems, 2003a, p. 496). As far as interbank settlements are concerned, this means that securities are to be transferred from the payer, say  $B_1$ , to the payee, say  $B_2$ , at the same time as the funds in central bank money are transferred from the paying to the receiving bank. In modern banking practice this principle is known as ‘delivery versus payment’.<sup>2</sup>

Now, since the circuit of central bank money on the credit market is induced by the circuit on the money market, let us analyse them together (Figure 2).



**Figure 2.** *The two circuits of central bank money*

The first circuit of central bank money, which in Figure 2 is represented anticlockwise, results from the money-purveying role of the central bank within the banking system: commercial banks need to ask the central bank in order for their reciprocal payments to be finally settled. The central bank is their settlement institution and guarantees monetary homogeneity within the domestic payment system (see previous section). The second circuit of central bank money, which in Figure 2 is represented clockwise, occurs on the credit market when the paying bank,  $B_1$ , needs to ask for a credit to settle its debt with the receiving bank,  $B_2$ .

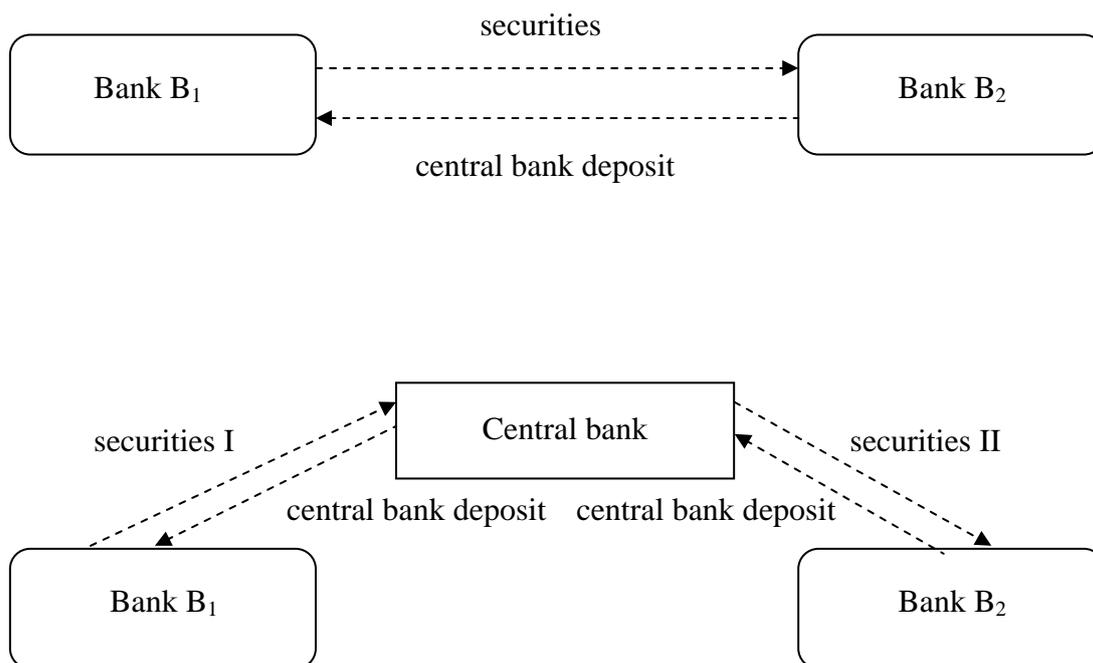
As regards this second circuit, two cases may be singled out.

The first case occurs when the debtor bank, say  $B_1$ , asks for and obtains a credit from the interbank market, represented in our stylized example by the creditor bank,  $B_2$ . For instance,  $B_2$  may grant an intraday credit of  $£x$  to  $B_1$ , in order for the latter to settle the interbank transaction elicited by the payment occurring between non-bank agents I and II (see above). In this case, the credit operation between the two banks involved may

take the form of a daylight credit or a repurchase agreement, which as a general rule is fully collateralized and hence implies a transfer of securities from the borrowing to the lending bank to guarantee payment finality.<sup>3</sup> Since this transaction on securities requires payment, and since it occurs in the interbank market, the central bank has to provide the means of final payment in the form of a sum of central bank money that it creates on  $B_2$ 's demand (which needs it to purchase the securities sold by  $B_1$  in the interbank market). As a result of this payment (see the clockwise circuit of central bank money in Figure 2),  $B_1$  obtains a central bank deposit and can thus balance its account at the settlement institution.

The second case obtains when the debtor bank,  $B_1$ , does not find in the interbank market the funds necessary to finally pay the creditor bank,  $B_2$ .<sup>4</sup> This is where and when the so-called lender-of-last-resort facilities available at the central bank may be put to practical use. In short, the central bank might grant an intraday credit, also called daylight overdraft, to a debtor bank that neither has enough funds nor finds them in the interbank market. In this respect, the central bank acts as a lender of last resort, and – as the phrase goes – creates the necessary credit in the process. Let us analyse this case more closely, to show that, in fact, the credit granted as a last resort by the central bank is not created by the latter, but results from its financial intermediation services through which it merely advances the result of an incoming payment that today's paying bank, say  $B_1$ , will obtain (the next working day or shortly thereafter) from any other bank participating in the domestic settlement system.

The central bank's financial intermediation between banks  $B_1$  and  $B_2$  can indeed be explained as a bilateral or a multilateral transaction on securities (Figure 3).

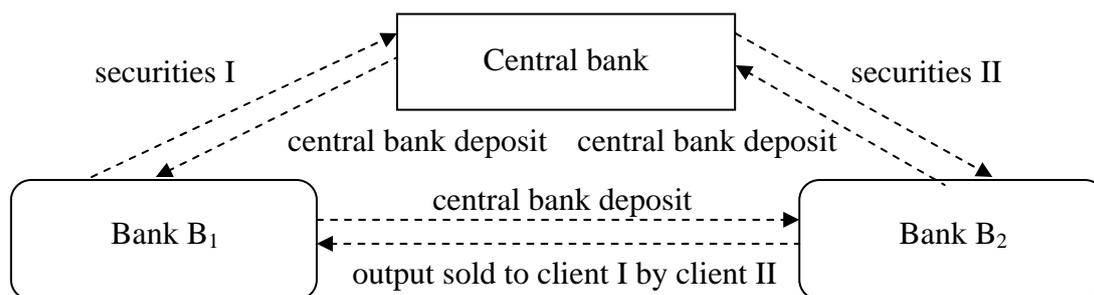


**Figure 3.** *Bilateral and multilateral credit operations between banks*

If and when  $B_2$  decides to spend its central bank deposit, usually bearing no interest, for acquiring an interest-bearing asset, then the resulting financial transaction can be stylized as shown in the top part of Figure 3 (where  $B_1$  may also be considered as the banking system as a whole). So, if  $B_2$  buys those securities sold by  $B_1$  directly, the financial transaction is bilateral because it implies a seller ( $B_1$ ) and a purchaser ( $B_2$ ) of the same securities. If, on the contrary, the securities sold by  $B_1$  are purchased by the central bank – for instance in the repo market –, as shown in the bottom part of Figure 3, then the financial transaction is multilateral in so far as a reverse repo between the central bank and  $B_2$  brings to the latter the same securities sold by  $B_1$  or other assets. In this second case, the central bank’s explicit intervention in the financial market provides an institutional guarantee that commercial banks use eligible assets for the smooth

functioning of the settlement system. (Note that in Figure 3 the circuit of central bank money is implicit in both stylized cases, and indeed exists in the form illustrated in Figure 1, but it is not drawn explicitly because it is not germane to the point discussed at this juncture.)

Be that as it may, the end result of these financial transactions on eligible assets shows that the money-purveying and the credit-purveying functions of the central bank have to be kept separate analytically. When the settlement institution creates a sum of central bank money for the final payment between two banks to be made, it does not necessarily enter into a credit operation with any of these banks. It is only when one of the latter banks does not find in the interbank market the funds it needs to clear its position towards the banking system as a whole, that the central bank intervenes by granting it a credit (say, in the form of a repurchase agreement), in order to reduce settlement and systemic risks and hence not to jeopardize the working of the whole payment system, the *conditio sine qua non* for production and exchange. In fact, even in this case the securities sold by  $B_1$  to the central bank are paid for with a central bank deposit owned by  $B_2$ , which lends it to  $B_1$  via the central bank (see the bottom part of Figure 3). As a result, in a monetary production economy the circuit of central bank money gives rise to the financial (real) flows depicted in Figure 4, where the monetary flows are implicit and look like those represented in Figure 2.



**Figure 4.** *The real flows of a central bank's monetary circuit*

This analytical framework helps us conclude that the lender-of-last-resort facilities provided by a central bank are a twofold endogenous phenomenon involving both a money creation and a credit operation between the central bank and the domestic banking system. They involve, in fact, an emission of central bank money ensuring payment finality in the interbank market, and they also imply a fully collateralized credit operation to ensure the smooth working of the domestic payment system.

*Payment finality for cross-border transactions*

Cross-border transactions are an essential component of modern open economies, be they advanced, emerging, or in transition, and their importance has been growing in line with the emergence of a globalized financial market. The issue of payment finality applies therefore also to cross-border transactions, and failure to settle them properly may have dramatic consequences for the countries involved. In fact, '[c]ross-border clearing and settlement requires access to systems in different countries and/or the interaction of different settlement systems' (Giovannini Group, 2002, p. i). From the perspective of systemic risk and central bank control, the settlement of cross-border transactions seems therefore more problematic than payment finality in domestic transactions.

Today, despite highly integrated financial markets, the international infrastructure for the settlement of cross-border transactions remains fragmented, and one may even say

cacophonous. This represents a major limitation of international transactions, since they lack a sound monetary–institutional framework within which cross-border final payments can occur without destabilising effects on exchange rates, capital accounts, interest rates, and hence economic performance. The architecture of the cross-border payment systems available today could be significantly improved by the creation of a truly international settlement system integrating national systems within a significantly shorter timeframe than that required for system unification, that is, creation of a world currency that for the time being remains highly utopian.

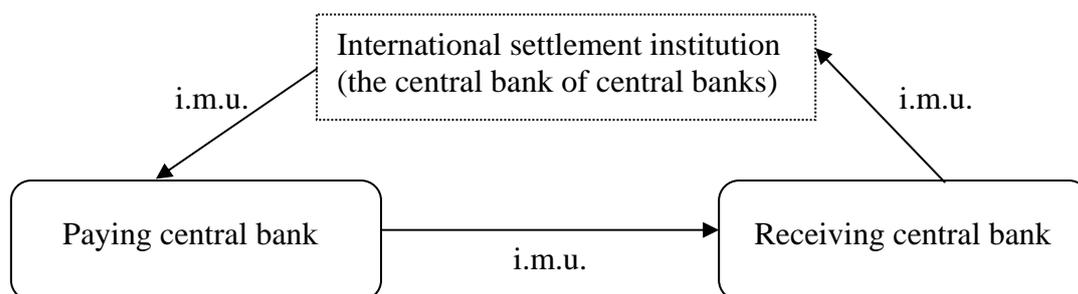
By applying a payment-versus-payment settlement mechanism,<sup>5</sup> the Continuous Linked Settlement (CLS) system operated by the New York based CLS Bank as from 9 September 2002 represents the private sector answer to globalized financial markets, and allows for the settlement of foreign-exchange transactions in some main currencies, including the US dollar, the yen, and the euro (see European Central Bank, 2003). In this framework, a number of central banks provide accounts and, in most cases, offer settlement services for CLS participating banks. What cross-border settlement systems are still lacking is a settlement institution for national central banks themselves that would homogenize the various national currencies by the emission of a supranational central bank money. As a matter of fact, recall that within any national economy the central and commercial bank monies that are used as means of payment are homogeneous owing to the existence of a settlement system headed by the national central bank, which guarantees payment finality by issuing its own means of payment at interbank level.

To allow for the final settlement of international transactions, therefore, an international settlement institution – a central bank of national central banks – has to be

put into place, with the task of issuing a means of final payment for cross-border transactions that homogenizes the various currencies involved in the international monetary economy. Without entering here in a debate that would lead us far beyond the scope of this paper (see Schmitt, 1977, Cencini, 1995, and Rossi, 2004), let us merely point out that it would be relatively easy to issue an electronic, interbank money at the international level, which would not be available to the public, each time that a central bank is implied for the settlement of a foreign transaction – initiated by and destined to the non-bank sector across borders. This international money would exist only within the self-contained bookkeeping system linking the international settlement institution to the participating central banks. Private speculation on it would thus be mechanically avoided by the fact that this monetary unit could not leave the system that creates it, and hence could not enter into domestic circulation. This would be sufficient to make sure that the exchange rate between any participating national currency and this new, international monetary unit cannot be affected by private-market speculation, an issue that indeed might pose a problem for the CLS-based system as long as this system does not provide a means of final payment for the central banks involved in it as a result of cross-border transactions.

In short, the policy proposal that follows from a circular-flow analysis of payment finality as regards cross-border transactions calls for the creation of an international settlement system that replicates between countries the institutional architecture of the settlement systems existing today within them. An international settlement institution would therefore act as a ‘go-between’ facing any two central banks involved by the final settlement of a cross-border transaction between two non-bank agents residing in two

different countries (see Figure 5, where i.m.u. stands for the international monetary unit).



**Figure 5.** *The circular flow of an international central bank money*

Needless to say, analogously to what happens within any domestic settlement system, where the central bank carries out both a money-purveying and a credit-purveying function, at the international level the settlement institution (to be set up) will have a money-purveying and a credit-purveying role that need to be distinguished in both theory and practice. In this respect, the contribution of monetary circuit theory is a further proof of its policy relevance in analysing and proposing a solution to important economic problems of modern capitalist societies. The theory of the monetary circuit has indeed a well-established tradition in economic analysis, and its perspectives are far-reaching. It has the potential to become the monetary theory of production and exchange of the twenty-first century, to equip policy makers with the necessary set of analytical tools to address the challenging issues of increasingly open economies – be they advanced, emerging, or in transition.

### *Conclusion*

This paper has focused on the issue of payment finality at interbank level in a closed-economy framework. Using a circular-flow paradigm, it has shown that any domestic settlement system is eventually based on a central bank to homogenize the various bank monies issued within it. The distinction between money and credit at central bank level pointed out in this paper has led us to the conclusion that the settlement institution for interbank transactions carries out two separate functions: it issues the means of final payment according to the endogenous-money view, and offers also financial intermediation services in the form of very-short-term central-bank advances. As a hint to further analysis and policy agenda, the last section has raised the issue of payment finality at the international level, where cross-border transactions elicit the need for a means of final settlement between nations, represented in the international monetary economy by their central banks.

#### *Notes*

<sup>1</sup> More complex payment arrangements may involve different tiers within and between which payments are made (see Committee on Payment and Settlement Systems, 2003b, pp. 10–11). This, however, would change neither our analytical framework nor our conclusions, and we may thus ignore it here.

<sup>2</sup> The delivery-versus-payment mechanism is ‘a link between a securities transfer system and a funds transfer system that ensures that delivery occurs if, and only if, payment occurs’ (Committee on Payment and Settlement Systems, 2003a, p. 492).

<sup>3</sup> Note in passing that ‘in a credit transfer system with end-of-day final settlement, daylight credit is tacitly extended by a receiving institution if it accepts and acts on a

payment order even though it will not receive final funds until the end of the business day' (Committee on Payment and Settlement Systems, 2003a, p. 490).

<sup>4</sup> The reasons why a debtor bank fails to raise funds in the interbank market are not germane to the point at stake. They may be ascribed to an already too high leverage ratio of this bank, or to any other reasons linked to its creditworthiness that we do not pursue further here.

<sup>5</sup> In a foreign-exchange settlement system, the payment-versus-payment mechanism 'ensures that a final transfer of one currency occurs if and only if a final transfer of the other currency or currencies takes place' (Committee on Payment and Settlement Systems, 2003a, p. 510).

#### *References*

Cencini, A. (1995), *Monetary Theory, National and International*, London and New York: Routledge.

Cencini, A. (2001), *Monetary Macroeconomics: A New Approach*, London and New York: Routledge.

Committee on Payment and Settlement Systems (2003a), *Payment and Settlement Systems in Selected Countries*, Basle: Bank for International Settlements.

Committee on Payment and Settlement Systems (2003b), *The Role of Central Bank Money in Payment Systems*, Basle: Bank for International Settlements.

De Bandt, O. and P. Hartmann (2000), "Systemic risk: a survey", *European Central Bank Working Papers*, no. 35.

Deutsche Bundesbank (1994), "Recent trends in the Deutsche Bundesbank's cashless payments", *Monthly Report*, **46** (8), 45–61.

- European Central Bank (2003), “CLS – purpose, concept and implications”, *Monthly Bulletin*, **5** (1), 53–66.
- Giovannini Group (2002), “Cross-border clearing and settlement arrangements in the European Union”, *European Commission Economic Papers*, no. 163.
- Graziani, A. (1990), “The theory of the monetary circuit”, *Économies et Sociétés* (“Série Monnaie et Production”, 7), **24** (6), 7–36.
- Graziani, A. (2003), *The Monetary Theory of Production*, Cambridge: Cambridge University Press.
- Heller, D. and A. Sturm (2003), “The role of the Swiss National Bank in the electronic payment system”, *Swiss National Bank Quarterly Bulletin*, **21** (1), 44–56.
- Henckel, T., A. Ize and A. Kovanen (1999), “Central banking without central bank money”, *International Monetary Fund Working Papers*, no. 99/92.
- Holthausen, C. and C. Monnet (2003), “Money and payments: a modern perspective”, *European Central Bank Working Papers*, no. 245.
- Kahn, C.M. and W. Roberds (2002), “The economics of payment finality”, *Federal Reserve Bank of Atlanta Economic Review*, **87** (2), 1–12.
- Lavoie, M. (1996), “The endogenous supply of credit-money, liquidity preference and the principle of increasing risk: horizontalism versus the loanable funds approach”, *Scottish Journal of Political Economy*, **43** (3), 275–300.
- Lavoie, M. (2003), “A primer on endogenous credit-money”, in L.-P. Rochon and S. Rossi (eds), *Modern Theories of Money: The Nature and Role of Money in Capitalist Economies*, Cheltenham and Northampton: Edward Elgar, 506–43.
- Lavoie, M. (2004), “On the full endogeneity of high-powered money: lessons from the Canadian case”, in G. Fontana and R. Realfonzo (eds), *Monetary Theory of*

- Production: Tradition and Perspectives*, London and Basingstoke: Palgrave, forthcoming.
- Parguez, A. and M. Seccareccia (2000), “The credit theory of money: the monetary circuit approach”, in J. Smithin (ed.), *What is Money?*, London and New York: Routledge, 101–23.
- Realfonzo, R. (1998), *Money and Banking: Theory and Debate (1900–1940)*, Cheltenham and Northampton: Edward Elgar.
- Rochon, L.-P. and S. Rossi (2004), “Central banking in the monetary circuit”, in M. Lavoie and M. Seccareccia (eds), *Central Banking in the Modern World: Alternative Perspectives*, Cheltenham and Northampton: Edward Elgar, forthcoming.
- Rossi, S. (2003), “Money and banking in a monetary theory of production”, in L.-P. Rochon and S. Rossi (eds), *Modern Theories of Money: The Nature and Role of Money in Capitalist Economies*, Cheltenham and Northampton: Edward Elgar, 339–59.
- Rossi, S. (2004), “EMU and EU enlargement: lessons and perspectives”, in C. Gnos and L.-P. Rochon (eds), *Post Keynesian Principles for Economic Policy*, Cheltenham and Northampton: Edward Elgar, forthcoming.
- Schmitt, B. (1977), *La monnaie européenne*, Paris: Presses Universitaires de France.
- Schmitt, B. (1984), *Inflation, chômage et malformations du capital*, Paris and Albeuve: Economica and Castella.