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**Working Paper No. 457**

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**Why Central Banks (and Money) “Rule the Roost” ♦**

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## **ABSTRACT**

Some have argued that a significant decrease in the demand for money, due to financial innovations, could imply that central banks are unable to implement effective monetary policies. This paper argues that central banks are always able to influence the economy's interest rates, because their liability is the economy's unit of account. In this sense, central banks "rule the roost." In the 1930s, starting from Keynes's ideas and referring to money in general, Kaldor had followed a similar line of analysis.

In principle, a new unit of account could displace conventional money and, hence, central banks. But this process meets relevant obstacles, which essentially derive from the externalities and network effects that characterize money. Money is a "social relation." Money and central banks are the outcome of complex social and economic processes. Their displacement will occur through equally complex processes, rather than through mere innovation.

JEL Classifications: E41, E42, E52, E58

Keywords: Money, monetary policy, financial innovation, central banking

## I. INTRODUCTION

In the last few years, there has been a growing concern about the “future of money.”<sup>1</sup> In a world characterized by intense processes of financial innovation, many of which are related to advances in the field of information and communication technology (ICT), money “as we know it” could be replaced by some other instrument in its fundamental functions. The discussion on the future of money has been carried out from several different perspectives. Of particular interest is the discussion of the effects of financial and technological innovations on central banks and monetary policy.<sup>2</sup> In modern economies, conventional money and central banks are inherently connected to one another. If innovation brings about a significant reduction in the demand for money, this may imply an equally significant weakening of the central banks’ ability to affect the behavior of the economy through monetary policy. The present paper looks at the debate on the future of money and its implications for central banking and monetary policy. This issue is discussed by concentrating on its more general aspects, rather than on the technicalities of the implementation of monetary policy in economies characterized by intense processes of financial innovation.

Some regard recent financial innovations as a threat to the central banks’ ability to affect the behavior of the economy through their policies. Financial innovations determine a declining demand for conventional money and, in particular, for base money in the form of banks’ reserves at central banks. As a consequence, it is argued, central banks could meet increasing difficulties in their attempts to affect the economy through changes in interest rates. Alternatively, others argue that, even in an extreme and unrealistic situation in which the demand for reserves vanishes altogether, central banks would still be able to implement monetary policy by influencing the economy’s interest rates. The possibility for central banks to always affect market interest rates derives from the fact that they do not necessarily have to control interest rates through variations in their supply of reserves. Central banks,

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<sup>1</sup> In the last years, several books with a title that contains “the future of money” have been published in English; see, for example, Dorn (1997), OECD (2002), Cohen (2004).

<sup>2</sup> In 2000, the journal *International Finance*, organized a symposium on the future of monetary policy, in which most of the participants looked at the effects of the “ICT revolution” on central banking.

instead, can directly fix an interest rate on their liability and affect all the other rates without having to change the supply of reserves.

The ultimate reason why central banks can operate in this way is that their liability, i.e., base money, is the economy's unit of account or standard of value, which has no inherent equilibrium value, unless it is determined by the central bank through its policy. The central banks' ability to fix an interest rate that affects the whole economy can be expressed by saying that they "rule the roost."

The use of the notion of "ruling the roost" in the present context is not casual, but is related to an earlier debate on money and its properties. In the 1930s, Keynes had used the term to point out that the money-interest rate is the crucial variable that affects the interest rates on all other assets and, hence, the behavior of the economy as a whole. Kaldor developed Keynes's idea in a critical way and showed that money rules the roost because it is the economy's unit of account. Thus, the idea that the essentiality of money — and, hence, of central banks — ultimately derives from it being the economy's unit of account can find an inspiration also in the Keynesian tradition, while participants in the current debate, like Woodford, find it in Wicksell.

Emphasizing the function of money as the economy's unit of account has relevant implications. In the "world in which we live", characterized by uncertainty about the future and by the crucial role played by institutions, trust and confidence, the function of money as the unit of account is inextricably linked to its function as the economy's ultimate means of payment. This, in turn, implies that the demand for base money remains positive and, in some circumstances, it can rise to a significant extent. Such situations occur when the degree of trust and confidence among agents declines significantly so that they demand the instrument that can be trusted more because it is guaranteed, though indirectly, by the state. This is an aspect that has not been given sufficient attention by many participants in the current debate on money and monetary policy.

In principle, the instrument that currently functions as the unit of account, and is administered and issued by the central bank, could be displaced by a new instrument, administered and issued by an institution other than the central bank (e.g., a private bank or firm). This process of displacement, however, meets relevant obstacles, which essentially derive from the network effects and externalities that

characterize money. Money is a “social relation.” The emergence of money, both as unit of account and as medium of exchange, is the outcome of a social and economic process, rather than the outcome of technological innovations and the optimizing behavior of individual agents. Therefore, the displacement of money cannot be the result of spontaneous market processes or mere technological progress. The same line of reasoning can be followed with regard to central banks. Financial innovations related to technological advances *per se* do not represent a threat to the central banks. The existence and importance of central banks are explained as the outcome of complex historical, social, and economic processes; hence, their demise cannot be simply the result of spontaneous processes triggered by innovation.

The paper is organized as follows. Section two summarizes the contemporary debate on central banks and monetary policy. Section three looks at aspects of Kaldor’s contribution to the debate on the properties of money and relates them to the current discussion on central banking. Section four presents considerations on the nature of money in relation to the possibility that it can be displaced by the emergence of new instruments and/or technologies. Finally, section five draws some conclusions.

## **II. MONETARY POLICY IN A “WORLD WITHOUT MONEY”**

In traditional “textbook models,” the central bank determines the economy’s interest rate by varying the supply of money, the demand for which is assumed to be a sufficiently stable function. By varying the supply of money, the central bank creates a gap between the amount of money that the public wishes to hold and the amount that is available in the economy. Equilibrium in the money market is restored by changes in the interest rate. The IS-LM model is the most popular representation of this idea of how central banks operate (White 2001).

The above description of how central banks realize their target rate faces a difficulty. Although there is a considerable consensus on the actual ability of central

banks to implement effective monetary policies, that is to say, to affect interest rates,<sup>3</sup> many observe that the value of transactions in which they are engaged in advanced economies is too small a percentage of total transactions to be able to have significant effects on interest rates. Benjamin Friedman (1999) underlines this difficulty and proposes an explanation of why central banks can affect the economy's interest rates, even though they engage in a relatively small volume of transactions.

Central banks can implement effective monetary policies because of the special nature of their transactions. Any transaction in securities made by a central bank implies a variation in the commercial banks' reserves, which is not true for all the other participants in the market. The central bank is a monopoly supplier of reserves. For Friedman, whatever is the adopted view of monetary policy, the central bank's effectiveness depends on it being the monopoly supplier of reserves.<sup>4</sup> In particular, the central bank's monopolistic position is also crucial when it operates through "moral suasion," i.e., by signaling to the market its intention to vary interest rates at some date in the future. In this context, the market responds to the central bank's signal by changing its expectations about future rates, so that it is the market itself that produces the variation in interest rates, without any engagement of the central bank in actual transactions.

In order for the mechanism described above to work, the central bank's signal must be credible, which is true only if the bank can actually vary short-term rates when the announced time to do so comes and the market has not yet responded in the expected way. On the grounds of his explanation of why central banks affect interest rates in the current situation, Friedman examines the processes that can represent a threat for the central banks' effectiveness. Advanced economies can evolve to a

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<sup>3</sup> The notion of effectiveness used here is limited. The central bank's monetary policy is said to be effective if it can influence short-term market rates. It is not an object of this paper to further investigate either the way in, and the extent to, which changes in short-term interest rates affect longer-term rates or the extent to which changes in interest rates in general produce significant changes in the real sector of the economy (output, employment, etc.).

<sup>4</sup> In the "monetary view," the public demands bank-issued money, against which commercial banks must have reserves at the central bank. When the central bank changes the supply of reserves, banks must change their supply of money to the public and changes in the interest rate follow. In the "credit view," the public demands loans from banks, which create money by lending. The banks' demand for reserves is positively related to the volume of their lending. If changes in the demand for reserves are not matched by changes in their supply by the central bank, there must be changes in the amount of bank loans, with consequent variations in interest rates.

situation in which central banks become monopoly suppliers of something for which the demand has vanished or has been greatly reduced.

Due to financial innovations, both the demand for bank money and for bank credit are declining significantly (Friedman 1999), and so the demand for reserves is diminishing as well. If the demand for reserves keeps on declining, at a certain point central banks would no longer be able to affect the economy's interest rates — changes in the supply of reserves would not produce any significant change in market interest rates. This is what Friedman calls “decoupling at the margin,” i.e., changes in the variables controlled by central banks would not give rise to corresponding changes in the relevant variables for the economy as a whole (Friedman 2000). In such a world, the monopolistic nature of central banks would no longer be relevant: “being a monopolist is of little value if no one needs, or even wants, to have whatever the monopoly is of” (Friedman 1999). Central banks could not exert their influence through moral suasion: “with nothing to back up the central bank's expressions of intent (...), in time, the market would cease to do the central bank's work for it” (Friedman 2000).

Woodford (2000; 2001; 2002; 2003) opposes Friedman's viewpoint. For Woodford, the central bank can also implement an effective monetary policy in a world in which the demand for base money is nil.<sup>5</sup> Even in this highly unrealistic world, the central bank can influence the entire constellation of short-term interest rates by paying an interest on the commercial banks' reserves with it. In the world depicted by Woodford, commercial banks would not have to clear through the central bank's settlement balances, i.e., demand reserves with the central bank, but could adopt different systems of clearing. Banks regard balances with the central bank as useful as any other equally riskless overnight investment. Therefore, their demand for reserves with the central bank would be nil at any interest rate higher than the settlement cash rate and horizontal at any rate equal to or lower than the settlement cash rate. In other words, banks hold balances at the central bank only if the overnight rate is lower than the central bank's rate paid on settlement balances. In this framework, if the central bank changes its rate, the market rate has to change as well,

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<sup>5</sup> In his writings, Woodford also considers more realistic cases in which the demand for base money (reserves) is small but still positive.



because otherwise there would be an excess demand (supply) for market liquid assets, eliminated by arbitrage (Woodford 2001).

The crucial question is why the central bank is always able to fix the interest rate on its liability. For Woodford, the central bank can always fix the interest rate on its liability because there is no inherent equilibrium value for a fiat unit of account, like the “dollar” (the central bank’s liability), unless a particular value is determined through the monetary policy commitments of the central bank itself (Woodford 2000). A contract promising to deliver a certain amount of dollars at a certain date implies a payment in terms of settlement balances at the central bank, or in terms of some kind of payment that the payee is willing to accept as a suitable equivalent. In any case, settlement balances at the central bank define the value of whatever is contractually accepted as payment: “Even in the technological utopia imagined by the enthusiasts of ‘electronic money’ — where financial market participants are willing to accept as final settlement transfers made over electronic networks in which the central bank is not involved — if debts are contracted in units of a national currency, then clearing balances at the central bank will still define the thing to which these other claims are accepted as equivalent” (Woodford 200).

The value of a dollar deposit with the central bank cannot be anything other than a dollar. This is not true of instruments of private financial institutions, which can offer liabilities that promise to pay a certain amount of dollars in the future but must accept the market’s present evaluation of such liabilities. Even if these liabilities were not perfect substitutes for other financial instruments, private financial institutions could not determine both the value and the nominal yield of their liabilities, whereas the central bank can determine both the value of its settlement balances in existence and the nominal yield on those balances. This is the fundamental reason why the central bank can affect short-term rates without engaging itself in large transactions.

Friedman is not convinced by Woodford’s argument. For him, central banks can implement effective policies because “market participants know that, under current circumstances, the central bank *can* make the interest rate whatever it wants — if necessary, by engaging in very large transactions — and as a result those large

transactions are *not* necessary.” (Friedman 2000).<sup>6</sup> However, Friedman seems to underestimate that the possibility of arbitrage between reserves and other overnight investments makes the central bank’s engagement in large transactions unnecessary; as soon as the rate on reserves is varied by the central bank, the market makes the other rates change in step. In other words, the market anticipates that the demand for borrowed reserves is going to change and adjusts the other rates rapidly, before the central bank is “forced” to engage in large transactions. In a sense, the possibility of arbitrage works in a similar way to the central banks’ moral suasion. If anything, the arbitrage effect is stronger than moral suasion — markets do not have to believe in the central bank’s announcement to change interest rates; it is sufficient that they respond by acting in a maximizing way. Thus, in conclusion, in so far as their liability is the economy’s unit of account, central banks “rule the roost” — the rate that they can fix affects other market rates.

### **III. WHY MONEY “RULES THE ROOST”**

To ground the effectiveness of central banks’ monetary policy on the fact that their liability is the economy’s unit of account recalls some aspects of Kaldor’s treatment of the own-rates of interest, which Keynes had introduced in chapter 17 of *The General Theory* (1936). As is well known, Keynes argued that money “rules the roost” because the interest on it sets a limit to the level of employment that the economy can realize. It is so because the interest rate on money is the most reluctant to decline as the stocks of all assets increase. If it is assumed that the yield of assets is

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<sup>6</sup> Friedman also argues that there is an inconsistency in Woodford’s analysis. Friedman carries out his reasoning in terms of the IS-LM model. Since, along the IS function, the equilibrium interest rate is undetermined, the central bank can fix it at whatever level by appropriately positioning the LM function. However, the IS-LM model is based on the hypothesis that the demand for money is defined for a zero (or fixed) interest rate on money itself, so that it is an inverse function of the interest rate on the alternative asset(s). If the rate on money changes in step with the rate on other assets, the demand for money is no longer a function of the interest rate and, therefore, the LM function becomes vertical. This does not mean that interest rates in the economy cannot be fixed by positioning the LM function, but a vertical LM function contradicts Woodford’s argument, for which it should be horizontal, because the central bank should be ready to borrow and lend any amount at the rate it fixes (Friedman 2000). For a similar criticism, see also (Lahdenperä 2001). Friedman’s arguments, however, seem to show the inadequacy of the IS-LM model to deal with such issues, rather than a flaw in Woodford’s line of analysis.

a decreasing function of their quantity, the equilibrium quantity of all assets is determined by the asset's yield that is fixed, or highly sticky; the production of all the other assets will not be pushed beyond the level at which their yield equates the "sticky yield." For Keynes, money "as we know it" (unit of account, medium of exchange, and store of value) has such properties that make it the asset whose yield is sticky.<sup>7</sup> However, for him, the roost also could be ruled by another asset that is not the economy's unit of account; for example, land, whose elasticity of production is nil (Keynes 1936).

Kaldor (1980) criticizes Keynes's position and argues that the fundamental reason why money rules the roost is that it is the economy's unit of account. Kaldor considers the two following notions of interest rate already used by Keynes.

- i) The *own-rate of own-interest*, which is the asset's yield in terms of itself.
- ii) The *own-rate of money-interest*, which is the own-rate of own-interest corrected by the expected asset's appreciation/depreciation in terms of money.

The own-rate of own-interest of the *i-th* asset is given by  $(q_i - c_i - r_i)$ , where  $q_i$  is the yield of the *i-th* asset in terms of itself,  $c_i$  is the *i-th* asset's carrying cost and  $r_i$  is the *i-th* asset's marginal risk premium, which is defined as a deduction from "the yield of those assets which, on account of the uncertainty of future value (or return) in terms of money, or on account of their marketability, carry a risk premium for which this yield must compensate." (Kaldor 1980).

The own-interest of money-interest of the *i-th* asset is:

$$R_i = a_i + q_i - c_i - r_i \tag{1}$$

where  $a_i$  is the appreciation or depreciation of the *i-th* asset in terms of money.

If there exist  $n$  assets in the economy, equilibrium is realized when the assets'

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<sup>7</sup> The "essential properties" of money are: it has a zero, or very small, elasticity of production; a zero, or very small, elasticity of substitution; a negligible carrying cost (Keynes 1936).

own-rates of money-interest are equal, i.e.,

$$R_i = a_i + q_i - c_i - r_i = R_j = a_j + q_j - c_j - r_j$$

$$(i, j = 1, 2, \dots, n; i \neq j) \quad (2)$$

As to money (the *m*-th asset), it is the economy's unit of account and cannot appreciate or depreciate in terms of itself ( $a_m = 0$ ). Moreover, as there is no uncertainty about its future value and it is perfectly marketable, money has a nil marginal risk premium ( $r_m = 0$ ). Money's carrying cost is negligible and, for simplicity, it can be considered as nil ( $c_m = 0$ ). The yield of money in terms of itself,  $q_m$ , is defined by Kaldor as the "convenience yield" of money, which derives from money being the medium of exchange.<sup>8</sup> Thus,

$$R_m = q_m \quad (3)$$

The nearest substitute for money is short-term bills (the *b*-th asset), however they cannot be used as a means of payment. They have a small risk premium (fairly insensitive to their quantity); their carrying cost can be assumed to be nil. Finally, short-term bills have also a negligible or nil expected price change. Therefore,

$$R_b = q_b - r_b \quad (4)$$

In equilibrium, it must be  $R_m = R_b$ , that is to say

$$q_m = q_b - r_b \quad (5)$$

$r_b$  sets the lower limit to the bill-rate of interest. When the marginal convenience yield of money,  $q_m$ , falls to zero,<sup>9</sup> the bill-own rate of interest ( $q_b$ ) reduces to  $r_b$ .<sup>10</sup>

Kaldor then turns to the determination of the long-term interest rate by adopting Hicks's theory of long-term interest rates (Hicks 1946).<sup>11</sup> Neither  $q_m$  nor  $R_b$

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<sup>8</sup> The convenience yield of money is similar to the "convenience yield of wheat to the miller or stocks of cotton to the yarn-maker". The convenience yield of money depends on the ratio of the money stock to the volume of money payments. It falls to zero when the ratio exceeds a certain critical value (Kaldor 1980).

<sup>9</sup> Because the amount of money in circulation exceeds its critical level (see the previous footnote).

<sup>10</sup> For Kaldor, in a modern economy, it is the central bank that fixes the short-term rate  $R_b$  by adjusting the supply of money to the public's demand for it (Kaldor 1980). In other words, the supply of money is an endogenous variable, determined by the central bank's target rate and the public's demand for money.

depend on expectations on future interest rates, but this is not the case of the long-term rate,  $R_t$ , which depends on the current short-term rate, the expected future short-term rates, and risk premia. Kaldor analyzes how the long-term interest rate defined as such sets the standard for all the other rates in the economy.

If it is assumed that the expected prices of reproducible assets are given by their long-period supply prices (their normal prices), an asset is produced only when its current price is higher than its supply price, i.e., when  $a$  is positive. When, for an asset,  $a = 0$ , its current price is equal to its expected price (its normal price) and, hence, the marginal efficiency of the asset,<sup>12</sup> its own-rate of own-interest, and its own-rate of money-interest are all equal.

In this framework, the general level of the own-rates of money-interest is set by the greatest of the own-rates of own-interest among those assets whose own-rate of money-interest ( $R_i$ ) cannot vary with respect to their own-rate of own-interest ( $q_i - c_i - r_i$ ). The only asset with such a characteristic is money because it is the unit of account and, hence,  $a_m = 0$ : "... all assets other than money can adjust their own-rates of money-interest to that of money by a variation of their current price in terms of money; while the money-rate of money-interest can only be changed by varying money's own-rate of own-interest" (Kaldor 1980).

The current money-rate of money-interest rate can change only if the current money's own-rate of own-interest changes. This, for Kaldor, could happen if the stock of money in circulation changes and affects  $q_m$ . However, *provided that* the change in the current money's own-rate of own-interest does not affect its expected future values, the impact on the long-term interest rate is small. In fact, the long-term rate is an average of the current  $q_m$ , the expected future values of  $q_m$ , and risk premia.

From this analysis, it follows that if there existed an asset other than money whose yield is sticky with respect to its level of production, it could not play the same role as money (the unit of account). The price in terms of money of such an asset, in fact, would increase and, consequently, its own money-interest rate would fall relative

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<sup>11</sup> If there is a long-term loan market and there exist forward markets, the long-term interest rate is an average of forward short-term rates, which depend on expected short-term rates and the risk premia attached to them.

<sup>12</sup> The marginal efficiency of an asset is defined by Kaldor as the relationship of its future return to its present cost of production, i.e., its long-period supply price (Kaldor 1980).

to its own rate of own-interest and “thereby lower the standard to which the own-rates of interest of other assets must conform” (Kaldor 1980).

The analysis above was conducted by taking the assets’ long-period supply prices as their expected prices, which amounts to assuming that price expectations are *inelastic*. The analytical framework changes if expectations are assumed to be *elastic*. In this case, when the current price of an asset rises, its expected price rises as well, so that the asset’s rate of money-interest does not necessarily decrease with respect to its own-rate of own-interest. However, the increase in the asset’s money price would reduce its own-rate of own-interest; if the asset’s yield is fixed in money terms, the increase in its price reduces its yield in terms of itself. The exception is when there is an asset whose yield is fixed in terms of itself. Such a case, however, for Kaldor is very unlikely. Moreover, to assume that an asset’s yield is fixed in terms of itself basically amounts to assuming that such asset is the economy’s standard of value.

Thus, Kaldor’s general conclusion is that money “rules the roost” because it is the asset whose “price” cannot vary. Therefore, “the kind of liquidity preference which is capable of setting a limit to the level of employment is inherently associated with the commodity which serves as the unit of account, and cannot reside in an asset other than money.” The money interest rate cannot become negative and this sets a limit to the profitable production of real assets and, hence, employment (Kaldor 1980).<sup>13</sup>

Kaldor’s analysis of why money “rules the roost” relates to the current discussion of why the central bank can always implement effective monetary policies, namely to Woodford’s position in the debate.<sup>14</sup> In both cases, “one dollar is always one dollar,” that is to say money administered by the central bank is the economy’s unit of account. Woodford finds in Wicksell’s notion of a pure credit economy the theoretical inspiration for his analysis of monetary policy (Woodford 2003).

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<sup>13</sup> However, a tax on money holdings or a continuous increase in prices and wages could have the same effect as a negative money-interest rate, so that “a sufficient level of investment to secure full employment could always be ensured.” (Kaldor 1980)

<sup>14</sup> There are, however, also differences between Kaldor’s analytical framework and the framework to which the current debate refers. In particular, Kaldor assumes that money is demanded as a medium of exchange, i.e., it has a convenience yield that derives from its use in transactions. In the current debate, attention is concentrated on the demand for base money in its function of commercial banks’ reserve at the central bank, while it is accepted that the demand for money as a medium of exchange might vanish.

Consideration of Kaldor's contribution shows that an inspiration for the sort of position taken by Woodford can be also found in the Keynesian tradition.

#### **IV. SOME GENERAL CONSIDERATIONS ON THE NATURE OF MONEY AND ITS "FUTURE"**

Both in Kaldor's analysis of general equilibrium in a monetary economy and in Woodford's analysis of the working of modern payment systems, money and central banks "rule the roost" because money — the central banks' liability — is the economy's unit of account. Emphasizing the function of money as the economy's unit of account has important theoretical implications, which are not always given sufficient attention by many participants in the current debates on money and central banking.

First of all, it can be argued that, in so far as the central bank's liability is the economy's unit of account, there necessarily is a positive demand for it. The economy's unit of account is also its ultimate means of payment, i.e., the instrument by which final payments and settlements are made. Contracts are expressed and enforced by law in money. They can be underwritten by using any type of instrument as a specific unit of account but, ultimately, the payee can claim the payment in money if the payer does not fulfill his/her contractual obligations. In this sense, the central bank's liability is *fully money*, whereas any other instrument is *quasi-money* (Hicks 1989).<sup>15</sup> The instrument that plays the role of unit of account is also the instrument that agents trust more than any other.

Trust is a fundamental factor in the explanation of money and its origins. The agents in the economy accept an instrument as money in so far as they believe that everyone in the market will accept this instrument. Historically, the instrument universally accepted and used as the ultimate means of payment has become the central banks' liability. In fact, central banks can offer guarantees that no other agent

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<sup>15</sup> Goodhart takes a partially different position — the economy's unit of account is *not necessarily* the means of payment, but it is *efficient* to treat the means of payment as the economy's unit of account (Goodhart 1989).

can.<sup>16</sup> It is for these reasons that, in the “world in which we live,” the instrument that functions as the unit of account is not merely a *numeraire*,<sup>17</sup> but there is a positive demand for it. In the real world, there arise situations in which the agents demand fully money rather than quasi-money. Such situations arise when the degree of confidence and trust among agents declines drastically. At the individual level, this happens whenever a certain contract is not fulfilled and the trust implicit in it disappears, so that the payee demands money to discharge the payer’s obligations. More importantly, the lack of trust and confidence can become a systemic phenomenon. Severe economic shocks that lead to a general crisis are situations in which the demand for fully money is not only positive but significantly large. In such situations agents trust only, or almost only, the central bank’s liability that, though indirectly, is guaranteed by the state.

Woodford underlines the importance of the central bank’s liability as the economy’s unit of account and holds that the central bank can implement an effective monetary policy even in a “cashless economy,” i.e., a frictionless world in which it is rational for an agent not to demand money. But Woodford fails to point out that the central bank’s liability being the unit of account also implies that it is the economy’s ultimate means of payment and, hence, there is a positive demand for it, regardless of the existence of the sort of “frictions” that he takes into account. Also Friedman, in discussing the possibility of decoupling at the margin, does not consider that it is the function of money as unit of account that makes its displacement an unlikely outcome as the demand for it remains positive in actual market economies. Laidler takes a different position and points out that there are “... situations arising from time to time, in which information about the ability of counter-parties to meet their obligations suddenly becomes unusually hard and expensive to obtain, and under such circumstances we should expect a positive demand for stocks of precautionary balances on the part of banks to reappear for as long as those circumstances persist.”

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<sup>16</sup> Hicks (1989) succinctly explains why it is so. Giannini (2004) explains the emergence and the existence of central banks by the necessity to support the economy’s trust in the instrument that is adopted and used as money. On the origins and the evolution of central banks as a complex social, institutional, and economic process, see also Goodhart (1988).

<sup>17</sup> Hicks, who holds that the representative transaction is one that implies a contract between the parties and promises of payment and delivery, prefers to use the term “standard of value” instead of unit of account, in order to stress that money (the standard) is more than merely the economy’s *numeraire* (Hicks 1989).



As an example of such a situation, Laidler refers to September 11 in the United States but, for him, it is not hard to imagine that “the threat of a panic arising from reasons endogenous to the workings of financial markets might also generate such a demand for reserves” (Laidler 2004).

In conclusion, in a market economy in “normal” conditions, transactions can be made by using whatever, if any, instrument the agents regard as efficient. In these conditions, the demand for the instrument that is the standard of value can be very little, if not nil. Money plays a similar role to that it plays in economic models with the assumptions of certainty and no imperfections and transactions frictions, i.e. it is a mere *numeraire*. During critical situations, however, the demand for money can become significant. The central bank’s liability is seen by the economy as the instrument that can be trusted most.

In principle, however, money “as we know it” could be displaced by another new instrument. If this new instrument were not issued and administered by the central bank, the latter would lose its power and ability to affect the behavior of the economic agents through monetary policy. In other words, this instrument could become the new economy’s unit of account and its issuer(s) could come to play the same role as today’s central banks. In the literature, such a possibility has been considered and different conclusions have been reached. Here, we concentrate on those positions that underline the existence of significant obstacles to a process of displacement of money and central banks. These obstacles essentially derive from the existence of externalities and network effects that characterize money both as medium of exchange and as unit of account.<sup>18</sup>

The displacement of conventional money faces, first of all, a certain degree of “inertia,” which is due to a possibly high “switching cost” (the cost implied by moving from one instrument to another) and a problem of coordination. The new instrument can actually be more efficient than the old only if it is adopted by a large number of agents in the economy, but no single agent knows when and if the others are going to switch to the new medium, so that the probability that nobody will adopt

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<sup>18</sup> Dow and Smithin (1999) provide a useful short survey of those positions that, not necessarily for the same theoretical reasons, see the displacement of money and central banks as possible and/or desirable. See also Holthausen and Monnet (2003).

the new instrument is high.<sup>19</sup> The obstacles to displacement exist both for conventional money as a medium of exchange and as the economy's unit of account. They, however, are more relevant and stronger in the case of the passage from a standard to a new one, because externalities and network effects are more significant when we consider this function of money (Krueger 1999).<sup>20</sup>

The considerations above can be expressed in more general terms by emphasizing the social nature of money. To stress the importance of trust and confidence in the analysis and explanation of money and central banks makes it quite natural to characterize money as a “social relation,” from which externalities and network effects derive. The emergence and adoption of money is the outcome of complex social and economic processes and not, like in the Mengerian approach (Menger 1892), of a spontaneous evolution from barter, driven by individual optimizing behavior.<sup>21</sup> If money is seen as a “social relation,” it cannot be displaced — either by agents' spontaneous choices or by technological innovations. This does not imply that the displacement of money, and central banks that administer it, is impossible altogether. The crisis affecting an economy can be so severe that not even the instrument backed by the central bank is trusted by agents, who thus switch to an alternative money. Phenomena of hyperinflation and/or social and economic turmoil that lead to the adoption of a foreign currency as the economy's medium of exchange and unit of account (e.g., cases of dollarization) are obvious examples. If such extreme situations are not considered, the displacement of the currently adopted currency would require some form of “exogenous” intervention to overcome the obstacles associated with the existence of strong network effects.<sup>22</sup>

In any case, the displacement of conventional money is a process that, though possible, is necessarily more complex and articulated than the outcome of individual

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<sup>19</sup> See Dowd and Greenaway (1993). Their analysis is mostly concerned with switching from one currency to another, but it can be easily extended to the choice of competing means of payment. On network externalities, see also Holthausen and Monnet (2003).

<sup>20</sup> Krueger also observes that different media of exchange can coexist if they are perfectly convertible into one another at a fixed exchange rate of 1:1, as is the case, for example, of currency and demand deposits.

<sup>21</sup> Recently, Ingham (1996; 2002; 2004) has developed the analysis of money as a social process. The chartalist approach is also based on the rejection of the traditional neoclassical notion of money. See, e.g., Wray (1998).

<sup>22</sup> Goodhart (2000), for example, points out that the demise of conventional money could happen only if “an authoritarian government should decree that it must happen”.

agents' spontaneous optimizing decisions and/or technological innovations. In the same way, the demise of central banks cannot be seen as the mere outcome of technological changes. There are economic, as well as institutional and historical, factors for which ordinary banks keep regarding central banks as the privileged locus of their settlements, regardless of the existence of legal requirements to do so.<sup>23</sup>

The sense of the position presented above can be well expressed by consideration of the recent adoption of the Euro. The adoption of the Euro by 12 European countries is a concrete historical example of the displacement of currencies previously used as media of exchange and units of account. According to the theory of money of Mengerian inspiration, the Euro should have emerged as the unique currency of a number of countries that constitute an optimal currency area, but it is universally acknowledged that Euroland is far from even approaching the characteristics of an optimal area.<sup>24</sup> The displacement of the European currencies by the Euro has not been the outcome of spontaneous market processes, but of decisions taken by the European institutions and governments. National government and central banks have voluntarily renounced important elements of their power for many historical, political, and economic reasons.

## V. CONCLUSION

The crucial importance of money "as we know it" and, hence, of central banks, is contingent on the fact that the central banks' liability is the economy's unit of account and, therefore, its ultimate means of payment. In principle, conventional money and central banks could be displaced, but to lay emphasis on the role of money as the economy's unit of account puts the discussion of this possibility in a perspective that is more general and different from the mere consideration of technological innovations and individual optimizing choices. Money is a social relation and,

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<sup>23</sup> See an interesting contribution by Freedman (2000) for an analysis of historical and institutional factors that make ordinary banks prefer central banks for their settlements.

<sup>24</sup> For a thorough critique of the analysis of the Euro in terms of the dominant monetary theory, see Goodhart (1998), who offers a chartalist interpretation of the process of creation of the new European currency.

therefore, its demise requires more than technological change and agents' decisions based on individual criteria of convenience. The recent creation of the Euro can be regarded as a confirmation of this.

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