

THE INFORMAL SYSTEM OF REMITTANCES AND CURRENCY BOARD: COMPLEMENTARITY OR ANTAGONISM? THE CASE OF *HAWALA* TRANSFERS IN DJIBOUTI

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Abstract

We propose an empirical study analyzing the link between monetary regime (Currency Board) and informal monetary practices (hawala transfers) in Djibouti. The analytical and empirical results both from monetary accounting and econometric simulations, particularly from different tests for cointegration between the balance of payments, reserve money, and hawala transfers for the period 2002-2011, show that informal practices develop in harmony with the highly rigid monetary regime. The interaction of formal and informal sector provides a macro-monetary balance and stability, thereby perpetuating the regime of Currency Board.

Key words: *Currency Board, automatic mechanism, hawala, liquidity.*

JEL: C01, E41, F24.

1. INTRODUCTION

A Currency Board belongs to those monetary strategies that are constrained by the “tying of its proper hands”: creating money only as a counterpart of foreign exchange reserves under a legally fixed exchange rate. It represents a hard way of preventing the monetization of public deficits and imposing public sector discipline. A Currency Board can create money only if exports exceed imports, or if capital inflows are larger than capital outflows. For a Currency Board to be sustainable, it also requires a high level of real economy flexibility. Without these conditions in place, the monetary authorities in most countries operating a Currency Board recognize the need for some additional discretionary actions. The only countries without such

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additional intervention are Brunei, Djibouti, Bosnia, and Herzegovina (Nenovsky et al., 2001; Hanke, 2002; Wolf et al., 2008; Gedeon, 2013). This kind of additional intervention seems in contradiction with the automatic nature of the Currency Board mechanism where, according to theory, the balance of payments developments should be closely linked to money supply dynamics.

In the case of Djibouti, the period of Currency Board operation is one of the longest in modern history, even with the lack of capital inflows needed to compensate the structural deficit of the trade balance. The Currency Board in Djibouti was established in 1949 and since 1973 the parity of the exchange rate against the dollar has been unchanged (see Central Bank of Djibouti, 2011, IMF, 2013). However, an important source of funding to the Djiboutian economy comes through an unofficial system of remittances, which are not included in the balance of payments. It should be noted that in general the economy of Djibouti is highly informal, the *hawala* transfers being one of its major components (African Development Bank, 2011). Thus, we have on one side an official and formal monetary arrangement (the Currency Board), and on the other – an informal monetary transfer system (*hawala*). Whence a theoretical and practical question arises concerning their common functioning, i.e. whether they are complementary or antagonistic.

The research problem is therefore to understand the importance of *hawala* transfers and their impact on the adjustment of the Currency Board mechanism. To accomplish our agenda, first, in Section 2, we introduce the two institutions – the Currency Board and the *hawala* system. Next, in Section 3, we propose an accounting framework which helps us interpret their possible liquidity interactions. And finally, in order to improve our empirical knowledge of the relationship between the *hawala* transfers, the balance of payments, and money supply, we rely on different econometric studies (Section 4). Concretely, we construct a small VAR model of the adjustment mechanism of the Currency board in Djibouti to check the presence of cointegration between the foreign reserves and the monetary base (or money supply) and to observe if the automaticity of the adjustment mechanism is in any way affected by the *hawala* transfers.

Overall, the originality of our research lies in: (i) elaborating empirical measures of *hawala*; (ii) integrating *hawala* transfers into the adjustment process of the Currency Board, and (iii) checking econometrically this *hawala* impact on the automatic mechanism of the Currency board.

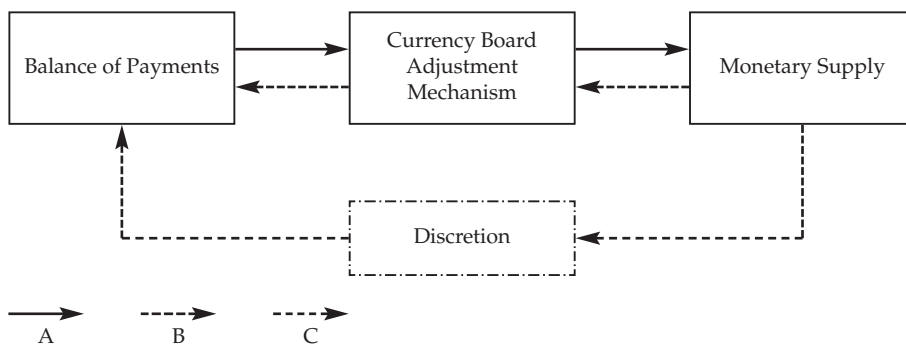
2. CURRENCY BOARD AND HAWALA TRANSFERS MECHANISMS

2.1 Currency Board adjustment mechanism

The Currency Board is a monetary system based on a simple and automatic rule of currency creation and destruction according to the balance of payments dynamics. For a Currency Board to be “pure”, it should meet at least six prudential rules: (i) all Currency Board rules should be stipulated in the law. The case of exit from the Currency Board should be legally fixed. This ensures the commitment of the government and therefore the credibility of the system; (ii) the law designates the reference currency and the level of fixed exchange rate parity; (iii) the principle of automatic convertibility should be respected. The law should guarantee the conversion between the two currencies will be made immediately, at any time, and without limits; there should be no exchange control and capital mobility should be perfect; (iv) to guarantee the convertibility of the base currency, the backing rule requires the Currency Board to keep the volume of foreign exchange reserves stock equivalent to at least 100% of the monetary base. No significant surplus of reserves is allowed, and (v) a strict monetary policy involves no refinancing of private banks or of the state (rule of non-sterilization) (See Hanke and Schuler (1994), Wolf et al. (2008) for more information).

The automatic mechanism of the Currency Board is effective, *if and only if*, over a specific period of time the dynamics of the money supply follows closely the dynamics of the balance of payments and any deviation from this parallel movement is automatically repaired (without discretionary intervention by the Central Bank or any other macroeconomic institution). When discretionary variations (deviations) are present inside the adjustment mechanism, we speak of “adjustment mechanism with discretion” or, consequently, of “impure or distorted Currency Board”.

There are two possible empirical approaches to test the operation of the automatic mechanism of Currency Boards: testing the whole mechanism at once, or a detailed testing of each unit in the adjustment mechanism chain. The last approach is extremely complex; requires a detailed study of each link within the chain, and the construction of a macro structural model describing the operation of the automatic mechanism of a Currency Board. We consider the first approach more manageable econometrically because it assumes that the automatic mechanism is a sort of a “black box”, which includes foreign exchange inflows in the balance of payments (current and capital account), money supply, and the rule of feedback (see Figure 1). The latter can be automatic, i.e. inside the adjustment mechanism (lines A and B) or discretionary, i.e. outside the mechanism (lines A and C) (for methodological details see Nenovsky et al., 2001 and Nenovsky and Hristov, 2002).

Figure 1: Currency Board mechanics

Source: Nenovsky et al (2001)

In the case of Djibouti, we assume that some sort of discretion exists which comes from the *hawala* transfers, i.e. passing through an informal monetary system⁴.

2.2 *Hawalas*: the informal system of monetary transfers

Hawala in Arabic means “transfer” and in Hindu it means “trust” or something of value that is passed to a trusted person for delivery. In general terms, the *hawala* system refers to the entire system or transfer mechanism of informal funds that exist in the absence of, or in parallel with, traditional banking channels. However, in some countries, commercial banks use the term “*hawalas*” to describe the formal transfer of funds. In our case, we exclude (similarly to the World Bank and the IMF) the use of *hawala* by the banking system.

Usually, there are two main aspects to the *hawala* system. The first is the sending and receiving of funds from customers who want to transfer funds. The second is the process of clearing and settlement. The first concerns the relationship between a financial intermediary (*hawaladar*) and its customers, and the second – the relationship between financial intermediaries (*hawaladars*). For the *hawala* system to function optimally, the financial intermediaries (i.e. both in the funds exporting country and in the recipient countries) must hold liquid cash reserves, each *hawaladar* making payments to customers of the other and not having to make cross-border money transfers.

⁴ The same line of reasoning but different empirical methodology can be found in the two studies – Hanke (2002) and Veyrune (2004).

The *hawala* system works as follows: a client from country *A*, wishing to send some money to a person living in country *B*, will assign that sum to a financial intermediary (in country *A*). The financial intermediary in country *A* contacts by e-mail, phone or fax another trusted intermediary person in country *B* asking him to deliver the appropriate amount to the recipient. The recipient has a password (code) which he should communicate in order to receive the money. The transfer is subject to a fee. No formal rules govern these transactions. The words and the mutual trust are the only important elements of the contract.

Accounts between two financial intermediaries of *hawala* are settled by compensation payments (or “reverse *hawala*” when someone in country *B* sends money to a person in country *A*). In cases where capital flows are larger on one side, the differences in the positions will be settled according to the regulations of the country: by check, bank transfers, physical transfer of currency (cash), purchases of securities, or mandates (Passas, 2005).

The *hawala* escape official statistics and are difficult to estimate. The result of a survey conducted between 2002 and 2006 including six agencies for informal funds transfer in Djibouti showed that *hawala* transfers surpassed Official Development Assistance (ODA) and Foreign Direct Investment (FDI) (Mahamoud, 2008). In Djibouti, the unwinding of positions is done primarily in cash but also by in-kind transfers (imports of goods and services).

Table 1: Evolution of the flows of received *hawala* (2002-2006), FDI, ODA and GDP (Million USD)

	2002	2003	2004	2005	2006
Flows of <i>hawalas</i>	77,4	86,8	107,4	123,5	123,3
FDI	4	14	39	22	108
Official development assistance (ODA)	90	79	59	76	117
GDP	592	624,97	663,8	702	765

Source: CAD [2006] World Bank [2007]

The result from a survey conducted between 2002 and 2006 in six agencies of informal funds transfer to Djibouti has shown that as part of GDP these transfers were respectively 13.1% in 2002, 13.9% in 2003, 16.2% in 2004, 17.6% in 2005, and 16.1% in 2006. As a % of FDI flows, despite their slight increase, they accounted for 0.68% in 2002, 2.24% in 2003, 5.88% in 2004, 3.13% in 2005, and 14.12% in 2006. *Hawala* flows are more important than the ODA for the years 2003, 2004 and 2005, respectively, which was

15.2% in 2002, 12.6% in 2003, 8.8% in 2004, 10.83% in 2005, and 15.29% of GDP in 2006.

However, because *hawala* transactions are not reflected in official statistics, remittances from one country to another are not accounted for as an increase in foreign assets in the recipient country, or as an increase in liabilities in the remitting country (see El Qorchi et al., 2003 for details). On the whole, by making a pool of cash available outside the banking system, which could alter the structure and volume of the money supply, while cross-border transactions generated are not reflected in official statistics in the balance of payments accounts, the *hawala* system can be considered an element of discretion disrupting the automatic mechanism of the Currency Board, i.e. the dynamics of the money supply is no longer determined only by the balance of payments dynamics.

In the next section, to better grasp the relationship between *hawala* transfers, balance of payments and money supply, we perform a simplified accounting representation of the equilibrating mechanism following bank withdrawals. Indeed, remittances that use the *hawala* channel are mostly in cash, even if financial intermediaries may use the banking system as a clearing house.

3. THEORETICAL MODEL AND ACCOUNTING REPRESENTATION

The Currency Board regime assumes an important role for the balance of payments when the sum of the current account and capital account determines the amount of money supply (M). The relationship between the changes in M and changes in foreign reserves (F) is strictly proportional provided two conditions are met: (i) from the supply side – the banks must maintain a constant reserves to deposits ratio, also called liquidity ratio (r), and (ii) from the money demand side – the public must maintain a stable currency in circulation to deposits ratio, also called preference for liquidity (c). It is extremely important to note that the long-run stability of these two ratios (r and c) is a basic condition for the Currency Board stability.

Total money supply, corresponding to the sum of currency in circulation held by the private sector (households and firms) and deposits of commercial banks, is also defined by the money multiplier formula which highlights the theoretical limit of money creation by commercial banks given the monetary base monopoly of central bank (H). H is the sum of currency in circulation (banknotes and coins) (C) and banks' reserves (R). Therefore, we can assert that the money supply of the economy governed by a Currency Board is

a function of the monetary base (H) which reflects the foreign reserves (F), which in turn are generated by the balance of payments dynamics.

Inspired partly by the Hanke and Schuler (1994) model, we present an accounting framework of transmission mechanism provided c and r are constant and given some other simplifying conditions⁵. Our goal is to illustrate the possible disturbances of the Currency Board automatic mechanism, i.e. a disturbance of two basic behavioural liquidity relations c and r . To talk about the existence of a Currency Board automatic mechanism means to prove that these ratios recover in the long run. We must also say that from an accounting perspective the Currency Board is always in equilibrium, but this accounting equilibrium tells us nothing about the true economic equilibrium or disequilibrium.

To link a long-run with a short-run ratio, we check the possible disturbance of a Currency Board in three periods. The first period is the initial situation, the second one is the period when liquidity shock occurs driven by some *hawala* operation, and the third period presents the long-run restoration of the initial equilibrium.

In the *initial situation* balance sheets is a situation where the current account is balanced (figures in bold, Table 2).

We assume that the financial intermediary in the country that benefits from *hawala* transfers makes a withdrawal from his bank account of 12 monetary units (country B in Figure 2). The banks' reserves and customer deposits fall by 12 monetary units, but the money supply does not change. This is the *intermediate stage* (figures in parentheses). In this intermediate phase, the commercial banks have a reserve ratio of about 1.8%, which is lower than their desired ratio (the initial ratio of 2%) and the public has a liquidity ratio of about 10, 3%, which is higher than the desired ratio (initial ratio of 10%) (see Table 3). Thus, the monetary system is out of balance. The inherent bank withdrawal *hawala* activity results in an increase of the currency in circulation and under-liquidity (illiquidity) of banks in the recipient country (since the reserves and bank deposits fall in the short term).

To restore liquidity equilibrium, the commercial banks should reduce their loans and the public its cash holdings to recover the ratios from the initial phase. They do this in the *final phase* (figures in italics), and the Currency Board moves to a new equilibrium with a money supply decreased by 588 units less compared to the initial phase while the liquid assets do not fall.

⁵ Bank deposits are convertible in Currency Board banknotes at a fixed exchange rate (set at 1/1); the net asset value of the Currency Board and commercial banks' capital is assumed to be zero for simplification. We also assume that the agents do not hold stocks of reserve currency but use it in their transactions.

Table 2: Accounting records of hawalas transfers

<i>Currency Board</i>	
Assets	Liabilities
Foreign assets 600	Monetary base Currency in circulation: banknotes and coins 500 (512) 512
	Commercial banks' reserves 100 (88) 88
Commercial banks	
Assets	Liabilities
Commercial banks' reserves 100 (88) 88	Private sector deposits 5000 (4988) 4400
Loans and Investments 4900 (4900) 4312	
Households and Firms	
Assets	Liabilities
Deposits 5000 (4988) 4400	Loans and Investments 4900 (4900) 4312
Currency in circulation: banknotes and coins issued by the Currency Board 500 (512) 512	Net Value of the Currency Board 600 (600) 600

Source: Authors

Table 3: Monetary behaviour relations

Indicator /Situation	Initial	Intermediary	Final
Reserves to deposits ratio	100/5000 = 2%	88/4988 = 1,8% (Underliquidity or banking crisis)	88/4400 = 2%
Currency in circulation to deposits ratio	500/5000 =10%	512/4988 = 10,3% (Overliquidity)	512/4400 = 11,6% (Overliquidity rises further)
Money multiplier	9,16	9,12	8,21
Money supply	5500	5500	4912
Monetary base	600	600	600

Source: Authors

The close link between the *hawala* transfers and currency in circulation has been repeatedly emphasized by the few studies on the *hawala*. Thus, El-Qorchi (2002) suggests that *hawala* transfers only change the composition of the money supply by increasing the cash in circulation and reducing deposits while keeping the volume of the money supply unchanged. We do not share this view. Indeed, although it is possible that the volume of money supply does not change instantaneously, the basic principles of money creation through the coefficient of the money multiplier leave no doubt as to the volume change of money supply. As a result of *hawala* transfers, the multiplier changes (decline in this particular case) and without any doubt modifies the volume of money in the longer run (see Table 3).

The monetary effect of these informal transactions, in comparison with official transfers, would be reflected in a decline in deposit accounts (possibly savings and time deposits) in favour of an increase of cash in circulation. *Hawala* funds, which are not intended to become time or saving deposits, change the structure and volume of the money supply.

However, the Djibouti reality is much more complex. Half of the money supply is in the form of foreign currency deposits and also in dollar cash. As at the end of 2011 the liquidity accounts for more than 60% of total assets. This is mainly due first to the weakness of the Somali banking system: traders of this country hold deposit accounts in Djibouti on which Djibouti traders can make a payment (in dollars) when they are importing from Somalia. And secondly, Ethiopian traders, who seek to evade exchange restric-

tions in their country, place their cash dollars obtained from the Ethiopian black market on deposit accounts with commercial banks in Djibouti⁶.

Thus, *hawala* funds increase Djibouti deposits (in dollars). They are concentrated in the two largest banks in the country, accounting for more than 80% of total deposits, and place a significant portion of their assets abroad. The foreign currency assets of commercial banks are 2.5-fold higher than the official reserves of the Central Bank (IMF, 2013). As a result, these deposits in connection with *hawala* transfers remain transitory and liquid, and are most often directed externally: either to finance the Ethiopian imports or to major financial centres engaged in the *hawala* system such as Britain, Switzerland and Dubai. Outflows of capital do not require arbitration of exchange rates not only because the flows are basically in banknotes, but also because capital outflows are partially offset by the foreign liabilities of the government and public enterprises (i.e. external public debt). Besides, this raises interest rates thus contributing to the stabilization of the currency.

For all these reasons, changes in the monetary base are not automatically equal to the inputs and outputs of foreign reserves. Therefore, the Currency Board can continue to ensure the respect of the backing rule (sometimes by external borrowing) without being disturbed from an accounting point of view by the increase of transitory and liquid deposits. The inputs and outputs of foreign reserves in connection with *hawala* transfers have no automatic link with the monetary base, but we cannot claim the same for the dynamics of liquidity: by raising bank deposits, thereby altering the structure and volume of money supply in the longer term, the *hawala* transfers can be considered as an element of discretion questioning the automatic mechanism of the Currency Board.

4. ECONOMETRIC MODEL

In econometric terms, the presence of an automatic mechanism of the Currency Board would mean that a long-term cointegration relationship must exist between the monetary base (i.e. the money supply) and the foreign reserves (i.e. balance of payments). Moreover, a mechanism of error correction in the short term (the error shows the deviations from equilibrium) must also exist (Nenovsky and Hristov, 2002). The absence of cointegration can be inter-

⁶ Purchases of dollar cash on the black market are considered as part of *hawala* funds. The Colombian black market peso works with similar methods of *hawala* to circumvent currency restrictions and launder drug money (Passas, 1999).

puted as evidence that the automatic mechanism is broken somewhere and some discretion exists (whether public or private, formal or informal).

Our main hypothesis is built upon the assumption that the *hawala* transfers act as such a discretionary variable. If this configuration is right, we would not be surprised if, introducing the variable *hawala* into the VEC short-term dynamics, we find cointegration between the monetary base and the foreign reserves (NFA of the Currency Board). In this case, we could speak of an informal and decentralized monetary discretion coming from the population using *hawala*.

However, to test our model, one preliminary and difficult obstacle should be tackled. We need to find a proxy variable of *hawala* transfers, which will afterwards be introduced in the VEC dynamics.

4.1. Measuring *hawala* transfers

Knowing the informal nature of *hawala* transfers, any direct measures are virtually impossible (Mahamoud, 2008). The only measurements that could be used in this case would be approximate, indirect and obviously imperfect.

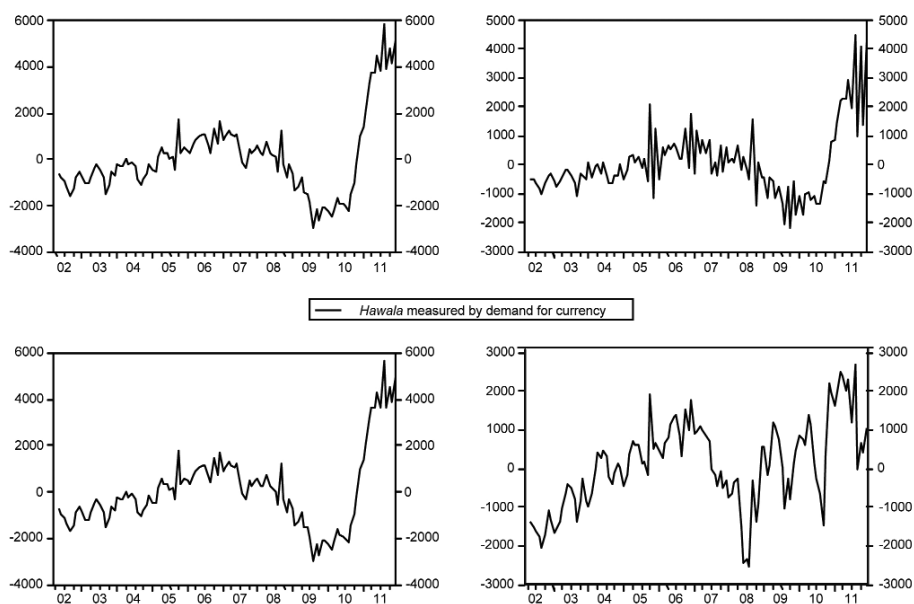
One of them is inspired by the Vito Tanzi's model in which Tanzi (1999) attempted to measure the shadow economy through the demand for currency. As we have already mentioned, the dynamics of *hawala* transfers is closely linked to the dynamics of the currency in circulation. Since demand for currency in circulation in the case of Djibouti largely depends on transaction purposes (the financial instruments are underdeveloped), one might assume that this demand is basically a function of two variables: the real activity and transfers for *hawala*. Thus, to find the component of *hawala* transfers, we can proceed as follows:

At the beginning we estimate the demand for currency (c^d) as a function of port activity, in particular its turnover (y_p), which practically coincides with all real activities (see Central Bank of Djibouti, 2011) (Equation [1]). Having obtained this estimated series, we generate a forecasted series for currency in circulation denoted (c^f), determined only by the transaction variable. Then we subtract this forecasted series from the observed one (c^*) and the difference thus obtained (Δc) could be interpreted as being linked to activities and motives other than the port activity, above all to the transfer of *hawala* and other informal activities (Equation [2], all variables are expressed in logarithms). We would call this variable *hw1*.

$$c^d = c(y_p) \quad [1]$$

$$\Delta c = c^* - c^f \approx hw1 \quad [2]$$

The results are presented on Figure 2.

Figure 2: Hawala transfers measured by demand for currency (2002-2011)

Note: Index of *hawala* transfers measured through currency demand (*hw1*), different specifications of the demand for currency (2002-2011). The simulation results are given in Table 6 of the Annex.

The negative part of the curve (below zero line) does not mean that the *hawala* transfers were negative, but only that the Currency Board restricts the need for currency for the operation of port activities (i.e. the real economy). Indeed, since the informal sector, which is mainly financed by *hawala* transfers, supplies a large part of the port activity (Mahamoud and Adair, 2006), we can assume that these “negative zones” of *hawala* transfers were repressed by inadequate supplies of currency.

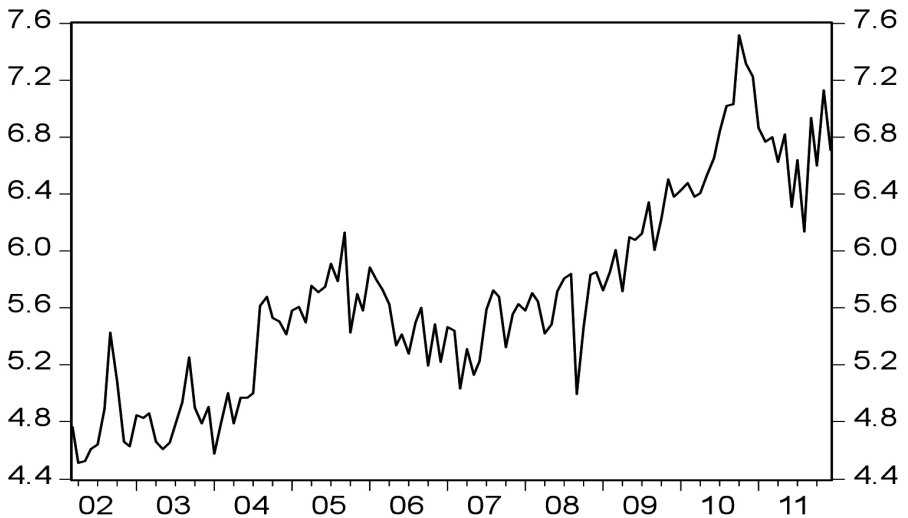
A second way to approximate the *hawala* is to refer to the monetary ratio: “currency in circulation / (sight deposits + foreign currency deposits)”⁷. As remittances which use the *hawala* channel do not aim to become deposits and

⁷ We can also use the ratios: “currency in circulation/total deposits”, “currency in circulation/ deposits in national currency”, or simply the variation of money multiplier. All these variables, one way or another, are directly related to the currency in circulation dynamics and to the change in the composition of money supply following the *hawala* transfers.

occur mostly in cash, we could consider as *hawala* approximation the sight deposits in national currency and foreign currency deposits, i.e. the funds that may be partially or completely removed at any moment (transformed in *hawala*). The sum of sight deposits in national currency and foreign currency deposits which we could call “deposits in order to make potential *hawala* transfers” tell us about the dynamics of banknotes and the change in the composition of money supply as a result of *hawala* transfers. We note *hw2* variable “currency in circulation / (sight deposits in national currency+ foreign currency deposits)”.

Thus, in total, having two approximations for transfers and *hawala* (*hw1* and *hw2*), our next step is to proceed to cointegration tests.

Figure 3: *Hawala* transfers measured by the monetary ratio (2002-2011)



Note: Index of *hawala* transfers, *hw2*, (2002-2011).

Figure 4: Currency in circulation and monetary base (2002-2011)

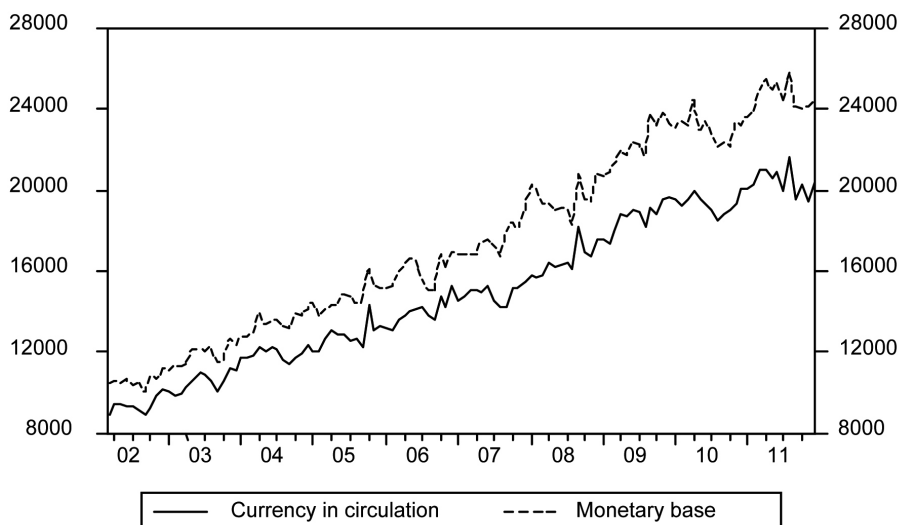
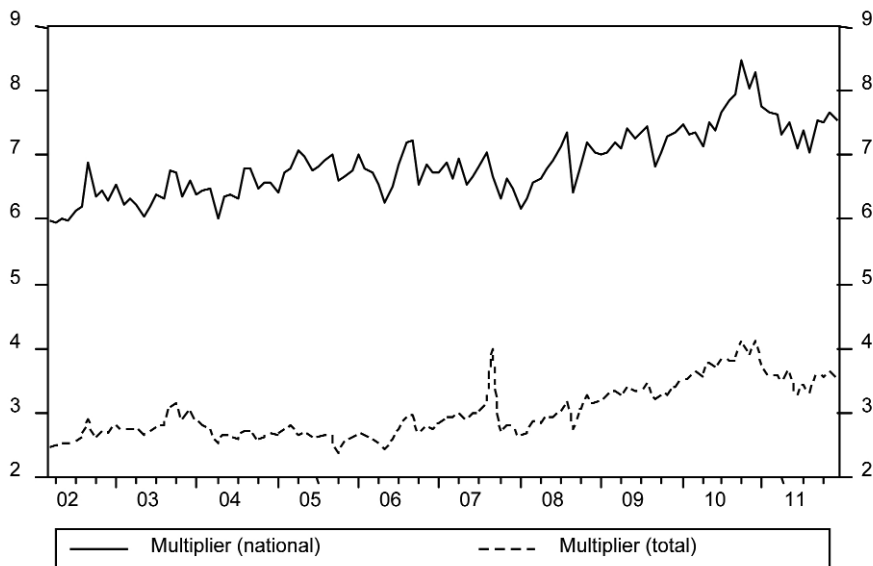
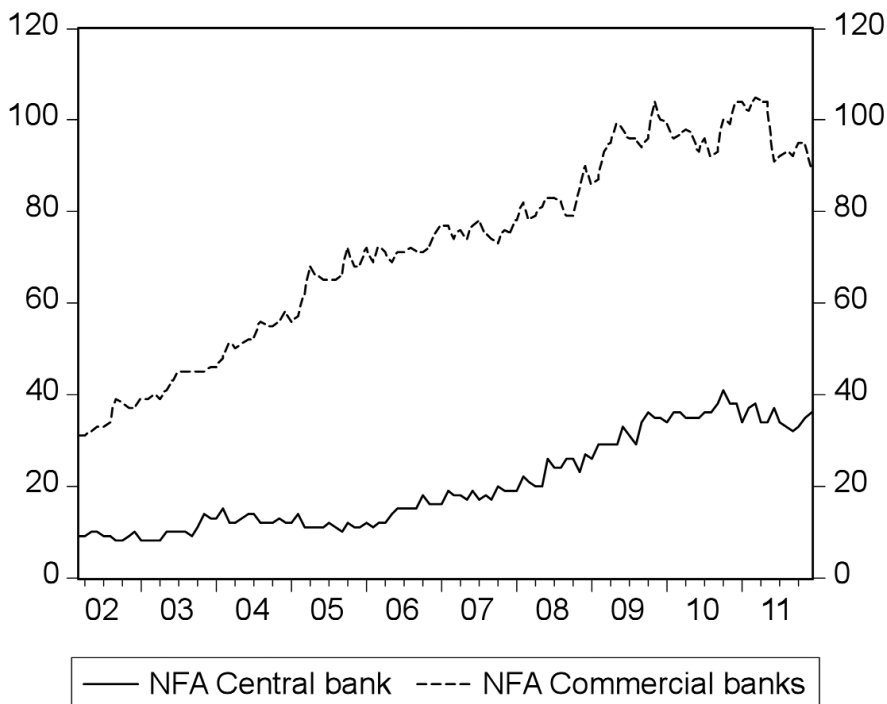


Figure 5: Money multipliers (2002-2011)



Note: National money multiplier (only deposits in the national currency) and total money multiplier (all deposits) (2002-2011).

Figure 6: Net Foreign Assets of the Currency Board and Commercial banks (2002-2011)



4.2. Econometric investigations

Practically we perform the following steps. First, we test the presence of the unit root into the following variables:

$h_t = \log(H_t)$ - logarithm of the monetary base

$m_t = \log(M_t)$ - logarithm of the money supply

$f_t = \log(F_t)$ - logarithm of foreign reserves

$hw_t = \log(Hw_t)$ - logarithm of *hawala* transfers
(approximated by *Hw1* and *Hw2*)

Next, we measure the presence of the long-term relationship between the monetary base⁸ and the foreign reserves, the deviation from the long-term

⁸ It is possible to test for cointegration between the money supply and the balance of payments, but in this case the economic motivation is slightly different.

equilibrium as well as the speed of adjustment. In our case, the cointegration relationship (the long-term relationship) can be presented as follows:

$$h_t = \alpha_0 + \alpha_1 f_t + \varepsilon_t \quad [3]$$

The mechanism of error correction (the dynamics of short-term adjustment) is:

$$\begin{aligned} \Delta h_t = & A(L)\Delta h_{t-1} + B(L)\Delta f_{t-1} + C(L)\Delta hw_{t-1} \\ & + \delta(h_{t-1} - \alpha_1 f_{t-1} - \alpha_0) + \beta_0 + v_t \end{aligned} \quad [4]$$

$A(L)$, $B(L)$ and $C(L)$ are polynomial distributed lags and δ is the error correction coefficient that should be negative ($\delta < 0$) in order to restore the long-term equilibrium.

In the case of perfect functioning of the Currency Board mechanism, the coefficient α_1 should be close to unity ($\alpha_1 = 1$) which would mean an increase or decrease in the monetary base is followed by an increase or a reduction in foreign reserves. If this is not the case, then we have a situation with an incomplete adjustment, slow and unstable, and we could look for other mechanisms that could potentially overcome these deviations. According to the definition of the automatic mechanism, we introduce the dynamics of *hawala* transfers in the short-term dynamics as an exogenous variable.

We cover the period from 2002 to 2011 using monthly data. All data are obtained from official or internal publications of the Central Bank of Djibouti, as well as from the port of Djibouti⁹.

4.3 Discussion of results

Since the cointegration analysis can be applied only in the case of non-stationary series in levels, we test the variables (h , m , f , $hw1$, $hw2$) for the unit root. The results are presented in Table 5 in the Annexes. Variables are integrated of order one I (1). This allows us to apply the cointegration between the monetary base (h) and the foreign reserve (f) for the two scenarios.

⁹ In previous studies on Currency Boards (for example in the case of Bulgaria, Nenovsky and Hristov, 2002) the flows of the balance of payments are transformed, accumulated in stock (accumulated balances of payments). This method in fact encompasses all net foreign assets, those of the central bank and of the commercial banks. Unlike Bulgaria, the net foreign assets of the commercial banks in Djibouti are larger, and even much larger than those of the Currency Board itself (see figure 6).

First, without the *hawala* (in this case we look for the presence of a pure adjustment mechanism). Second, by including *hawala* into the VEC (we use two measures of *hawala* transfers already mentioned, *hw1* and *hw2*). In this second case we can speak of discretion, or rather of adjustment mechanism that resorts to some informal practices (the *hawala* transfers). In the latter configuration we can test and reason about a possible adjustment speed through the dynamics of *hawala* transfers. The results are shown in Table 5. Without going into details the results of the models are as follows:

When checking the automatic mechanism in its pure and ideal form, i.e. without the presence of the exogenous variables, we find no equilibrating cointegration relationship, i.e. the coefficient of correction is weak and statistically insignificant [-0.02 (-0.45)], the R^2 is low. Therefore, a stable long-term relationship between the monetary base and the foreign reserves does not exist (Model 1).

Then, represented in Model 2 and Model 3, we introduce *hawala* transfers variables (*hw1* and *hw2* obtained by using two approximating approaches) into the VEC. In this case we detect cointegration relationships, sure enough, with some statistical imperfections but generally correct and acceptable. As in other studies of Currency Boards (Nenovsky and Hristov, 2002), these results can be interpreted as the existence of an automatic mechanism when taking into account this additionally included variable, i.e. *hawala* funds.

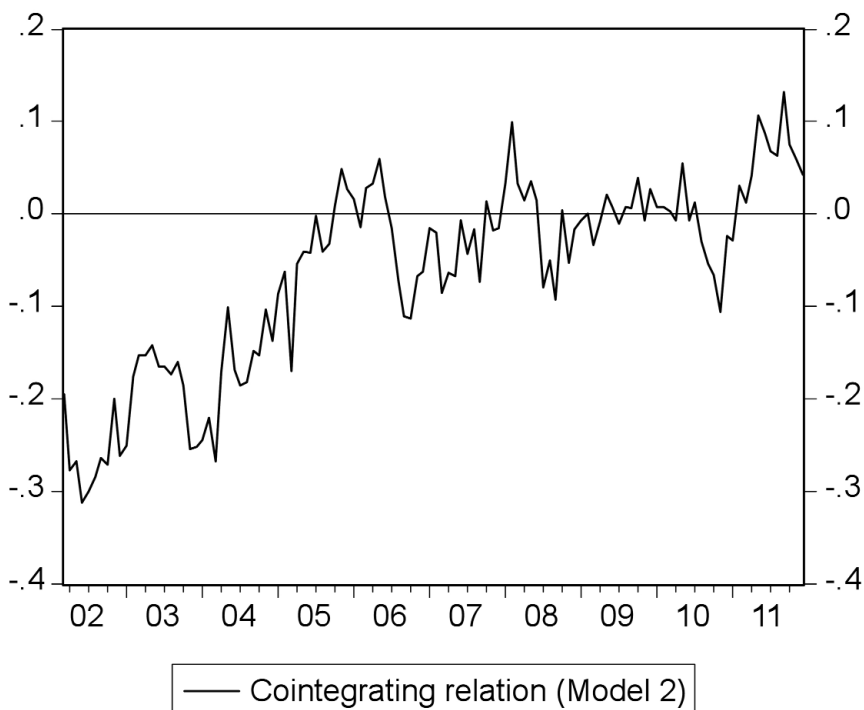
The coefficients of error correction in both models, albeit moderate [- 0.40 (-3.90) and - 0.20 (-2.48)], that is to say with a slow adjustment, are statistically significant. Especially when the first proxy for *hawala* is used we have a very good result (see the co-integrating relation in Figure 7). Still, they show that the dynamics of *hawala* transfers helps to maintain the link between the monetary base and the balance of payments, and thus plays the balancing role in the Currency Board mechanism.

In Model 4, instead of the monetary base as the independent variable we put the broader monetary aggregate, money supply, which already includes in its composition the dynamics of *hawalas*. In this case also, we obtain a long-term balance between the balance of payments and money supply, although less important. Nevertheless, this confirms once again, and intuitively, that *hawala* transfers have rather a stabilizing and balancing role.

Table 4: Cointegration and Error Correction (VEC)

	Model 1 Without <i>hawala</i>	Model 2 (with <i>hawala</i> /hw1/ in the VEC)	Model 3 (with <i>hawala</i> /hw2/ in the VEC)	Model 4 (with <i>hawala</i> /hw2/ in the VEC)
Variables*	Dependent Variable Monetary base (h)	Dependent Variable Monetary base (h)	Dependent Variable Monetary base (h)	Dependent Variable Money supply (m)
Cointegration equation (long-term relationship)				
Constant	8.87	8.69	8.50	9.85
Foreign Reserves (f)	0.54 (9.50)	0.38 (7.58)	0.42 (5.53)	0.64 (6.12)
VEC equation (short-term relation)				
Coefficient of correction	-0.02 (-0.45)	-0.40 (-3.90)	-0.20 (-2.48)	-0.09 (-1.90)
d(h (-1))	-0.37 (-3.62)	-0.35 (-2.4)	-0.19 (-1.95)	
d(h (-2))	-0.18 (-1.6)	-0.25 (-1.35)	-0.14 (-1.34)	
d(h (-3))	-0.17 (-1.72)	-0.39 (-2.17)	-0.09 (-2.32)	
d(h (-4))	-0.14 (-1.58)	-0.09 (-0.43)	0.01 (1.33)	
d(m (-1))				-0.49 (-2.62)
d(m (-2))				-0.12 (0.45)
d(m (-3))				-0.02 (-2.48)
d(m (-4))				-0.00 (-1.12)
d(f (-1))	-0.06 (-1.44)	-0.22 (-2.66)	0.83 (8.78)	-0.04 (-1.02)
d(f (-2))	-0.05 (-1.29)	-0.34 (-3.70)	-0.11 (-1.97)	-0.03 (0.64)
d(f (-3))	-0.01 (-0.17)	-0.25 (-2.70)	-0.01 (-1.66)	0.00 (1.73)
d(f (-4))	-0.03 (-0.87)	-0.22 (-2.45)	-0.01 (-1.01)	0.00 (1.73)
d(hw)		0.04(4.65)	0.04 (7.04)	-0.12 (8.85)
d(hw(-1))		-0.12 (-1.86)	0.03 (5.53)	0.02 (1.92)
d(hw(-2))		-0.14 (-1.77)	-0.01 (-1.86)	-0.00 (-1.37)
d(hw(-3))		-0.02 (-1.62)	-0.00 (-1.17)	-0.00 (-0.10)
d(hw(-4))		-0.02 (-1.92)	-0.01 (-0.62)	-0.00 (-0.16)
Constant	0.01 (3.97)	0.10 (-1.90)	-0.02 (-1.92)	0.06 (1.95)
R ²	0.19	0.82	0.42	0.46
R ² adjusted	0.13	0.64	0.37	0.24
log likelihood	232.31	85.63	250.79	100.31
F statistics	3.03	4.31	11.22	2.12

* T statistics in parentheses.

Figure 7: Graphical presentation of cointegration relationship

5. CONCLUDING REMARKS

The role of informal institutions and their relationship with the formal sector have always attracted the attention of economists. In this paper, by adopting a macro-monetary perspective, we are interested in the relationship between the monetary regime and informal monetary practices, both being within the framework of a monetary system in Djibouti. In this context, the experience of Djibouti is interesting, although little studied. The country has one of the longest Currency Board practices (since 1949). Djibouti has a widespread informal economy, including remittances with *hawala* transfers as a major component.

As a result of our empirical, macro-accounting and finally econometric study we have reached the following conclusions:

First, *hawala* transfers concurrently modify the composition of the monetary supply and its volume modifying the liquidity behaviour ratios.

Second, without the *hawala* transfers, there is no unambiguous relationship between the long-term dynamics of the balance of payments and the monetary base. Without this advantage, among those which are often cited for the adoption of Currency Board, the alleged pure automatic mechanism does not work at all.

Third, the results improve significantly when including *hawala* transfers in the adjustment mechanism. In this case, we clearly see the presence of a relationship of long-term equilibrium between the external sector and the monetary sector. The *hawala* transfers take place spontaneously and without their action there is no long-term relationship between the balance of payments and the monetary base. In this logic, we can assume that under the Currency Board regime in Djibouti the *hawala* help the adjustment of the balance of payments. Thus, informal monetary practices develop in harmony with the formal and extremely rigid monetary regime. The interaction of formal and informal sector provides a macro-monetary equilibrium thereby maintaining the Currency Board.

Another topic of interest might be to demonstrate whether the macro-monetary stability in Djibouti is favourable to real economy growth and to social balances. Obviously, on empirical grounds the *hawala* transfers are difficult to measure. Their approximation and measurement need to be improved and revised, and possibly new approaches developed and tested.

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Résumé

Nous proposons une étude empirique analysant le lien entre un régime monétaire et les pratiques monétaires informelles, tous deux se situant dans le cadre du système monétaire d'un pays, celui du Currency Board à Djibouti. Les résultats économétriques, de différents tests de cointégration entre la balance des paiements, la base monétaire et le système informel des transferts de fonds (hawala) pour la période 2002-2011, montrent que ces pratiques informelles se développent en harmonie avec le régime monétaire, extrêmement rigide. L'interaction du secteur formel et informel permet d'obtenir un équilibre macro-monnaire et fait perdurer le régime de Currency Board.

Mots clés : Currency Board, hawala, mécanisme automatique.

JEL : C01, E 41, F24.

Appendix

Table 5: Unit root test

Variable	Augmented Dickey-Fuller Test		McKinnon critical values (ADF)*			Order of Integration and lags	
	Level	First difference	1%	5%	10%	Integration	Lags
<i>H</i>	-0.09	-6.07	-3.48	-2.88	-2.57	I(1)	4
<i>F</i>	0.04	-5.37	-3.48	-2.88	-2.57	I(1)	4
<i>w 1</i>	-0.61	-4.57	-3.48	-2.88	-2.57	I(1)	4
<i>hw2</i>	-0.84	-6.34	-3.48	-2.88	-2.57	I(1)	4
<i>M</i>	0.14	-4.75	-3.48	-2.88	-2.57	I(1)	3

* Critical values based on the presence of a constant without trend.

Table 6: Different specifications of demand for currency in circulation

	Model 1	Model 2	Model 3	Model 4
Constant	9.33 (19.62)	7.32 (2.64)	0.33 (2.64)	4.5 (63.18)
<i>y</i>	-0.14 (-1.92)	1.01 (1.71)	1.00 (1.81)	
<i>y</i> (-1)	0.12 (1.97)	10.14 (1.89)	0.91 (1.73)	
<i>y</i> (-2)	0.09 (1.87)	5.14 (1.91)	0.01 (3.43)	
<i>y</i> (-3)			-0.11 (-1.56)	
<i>y</i> (-4)			-0.13 (-1.98)	
<i>y</i> (-5)			-0.02 (-1.34)	
<i>y</i> (-6)			-0.01 (-1.78)	
<i>y/p</i>				-5.52 (-6.10)
<i>y/p</i> (-1)				4.94 (3.4)
<i>y/p</i> (-2)				0.65 (1.91)
π				0.64 (8.16)
<i>c</i> (-1)		0.95 (39.19)		
R ²	0.67	0.91	0.71	0.86
R ² adjusted	0.66	0.90	0.70	0.85
DW	1.82	2.03	1.84	1.75
Observations	116	115	116	116

Note: Dependent variable currency in circulation (*c*) (all the variables in logarithms). *y* denotes the port activity, *p* – price index for consumption, based on 2000:01, and π – inflation (always measured through the consumption index).