

The Determinants of the Expansion of the Exchange Rate on The Black Market in The Maghreb

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Abstract

The shadow economy has recently grown significantly in the overall national economy. In the Maghreb countries (Morocco, Algeria, Tunisia, Libya, Mauritania), the informal economy is the result of the introduction of a managed economy, which gradually forms the prerequisites for the emergence of a monetary deficit in these countries. Since the early 1990s, after the institutional changes in the market economy, a black currency exchange has taken a significant turn, which was accompanied by a large gap between the black market and official currency exchange. The relevance of this study is to determine the leverage of the exchange rate on the black market, which will determine the causes and factors of the expansion of this market. The purpose of the paper is to analyze the key determinants of determining the nature and dynamics of the black market exchange rate, as exemplified by the Maghreb countries in the context of long-term relations. The methodological support of the study includes the grouped mean group method and the Granger causality test. The author substantiates the following determinants of the shadow market exchange rate: the official exchange rate, the official real exchange rate, the differential expected rate of return, money supply, the level of reserves and prices. The study empirically confirms that the official exchange rate is the most significant variable that most influences the exchange rate in the shadow market, the official real exchange rate plays a secondary role in determining the black market exchange rate. These results are confirmed in the Granger causality test, which revealed the existence of unidirectional causality between the dependent black market exchange rate and the independent variables - the official rate, the official real currency rate, and the differential expected rate of return. Based on the conducted research, the author has identified the following recommendations for public authorities: 1) managing the shadow currency exchange market is possible in the context of adopting a complex of measures to diversify the sources of currency and implementing a monetary policy on the interest rate based on external rates; 2) the formation of a price control mechanism that will help reduce dependence on the international market. The paper focuses on the further use of the currency hedging instrument in the financial practice of the Maghreb banking system. The author emphasizes the need for the Central Bank to establish appropriate instructions for commercial banks on the organization and functioning of the interbank foreign exchange market in foreign trade operations.

Keywords: currency exchange; the black market; Granger causality; heterogeneity; money supply; official course.

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Introduction

Illicit or black markets are an important part of the economy of various developing countries. The restrictions imposed by the government on the free exchange of currencies, create a dual system of exchange rate (black and official). The resulting differentiation between the official and the black market exchange rates leads to diverting export earnings from the official market to the black market (Kutan 1998). Many countries have established a legal or tolerated black market.

This is complemented by the creation of a legal or semi-legal parallel market and allowing it to operate strongly with the official market. Under this type of parallel market regime, current account transactions are settled in the official government-controlled rate and the parallel rate are used for capital transactions (Kutan 1998).

The choice of an exchange rate regime is always a subject of debate that has a direct impact on the flowering of the black market exchange. A foreign exchange regime defines the way in which the value of the national currency is determined in relation to a foreign currency. In reality, there are two extreme regimes and anchoring regimes, that is to say intermediate. The monetary authorities are interested in the issue of the optimal exchange rate policy in a perspective of openness to capital movements. A regime that is not adapted to the economic and financial reality leads to an imbalance of macroeconomic indicators. Several studies have addressed the issue of adoption of a particular plan. In a fixed exchange rate regime the probability that exchange rates become overvalued is much higher than that of floating regimes. Overvaluation can have a negative impact on economic performance and reduce the profitability of goods for export (Dornbusch et al 1984). The Maghreb countries were based on a fixed rate, although the traditional models of the choice of exchange rate rates explain that this fixed regime is not adapted to economic development which favors the development of the informal exchange market. Maghreb countries are encouraged to favor this regime because of two factors. The first argument is the rapid inflation recorded in the late 1980s and the 1990s. The fixed exchange rate is then adopted as the most effective strategy to counter inflation. The second argument emphasizes that the fixed rate regime has helped to preserve macroeconomic balances at critical moments. Several studies indicate that anchoring regimes are more subject to crisis as extreme regimes (Klein et al 1997), as well as Bubula and Ökter et al (2003), Rogoff et al (2004).

Aizemman and Hausmann (2001) included other variables such as the responsiveness of prices to changes in the official exchange rate and the financing of activity in domestic and foreign currency debt in order to analyze the particularly significant determinants of choice of a foreign exchange regime for emerging countries. Modalities based on intervention indices.

In Algeria, the exchange rate regime is a floating regime (anchoring on several currencies) directed since the beginning of the 90s. The Moroccan dirham fluctuates in a fixed parity, 40% of the dollar and 60% of the euro, in a 2.5% band. The monetary authorities hope full liberalization that is to say that the price of the dirham is set by supply and demand in the market and not in an administered way. Mauritania is under the de facto exchange rate regime and is considered to be a mobile exchange rate regime. Since 2014, Ouguiya gradually depreciated against the dollar in a margin of less than 2%. The exchange rate regime in Libya is a managed float, meaning that the Libyan central bank intervenes to keep margins of fluctuation. Since May 2016, Tunisia has been under a floating exchange rate means that the value of the dinar is determined by the market.

The purpose of this paper is to establish the determinants of the black market exchange rate for the five Maghreb countries selected during the period 1970-1998. The motivation behind the selection of these countries can be explained as follows: These countries have a well-developed black market and are characterized by different exchange rate regimes. We will then analyze and compare the determinants in order to be able to characterize the behavior of the exchange rate on the black market for each country.

The following questions are of particular interest to us:

What is the most significant determinant that contributes most to the dynamics of the exchange rate on the black market?

Is official and black market exchange rates linked in the long run?

Is there homogeneity from one country to another or difference in the speed of adjustment?

We present the theoretical framework and the method of analysis based on econometric panel modeling. The results of the modeling are exposed and we finish in a last point to approach the conclusion.

Literature review

Findings on the determinants of the exchange rate in the market differ across studies and countries (Siddiki 1999). Some argue that trade restrictions surely lead to the emergence of the black market exchange. Evidence shows that there is a negative correlation between foreign exchange reserves and the black market rate. In the past, the government had imposed more restrictive trade policies when foreign exchange reserves were down (Joshi et al 1984). Ghatak et Siddiki (2001) also reveals that official rates and foreign exchange reserves are

determinants of the real exchange rate on the black market in India. Thus, import capacity should be included as a determinant of the black market exchange rate.

Whereas a second current thinks that the excess of the money supply on a given territory leads to the development of the black market exchange. Several studies have examined the monetary approach of the black market exchange rate in India (Biswas et al 1986) and Gupta (1980). Moreover, Baghestani et al (1993) generally explores the relationship between the financial rates and the black market rate and find that the rates are co-integrated is that there is a short and long-term relationship between them. The impact of the existence of the black exchange market was still controversial. The difference between the official and the black market exchange rates makes it difficult to divert export earnings from the official market to the black market (Kutan (1998). The work of Barro and Lee (1993) shows that black markets, with large premiums measured by the difference between black and official rates, significantly reduce economic growth. They find that a 10% premium reduces the growth of gross domestic product by about half a percentage point. It is in this context that many countries have established a legal or tolerated black market because such a black market allows traders who are not allowed access to currencies because of restrictions imposed by central banks. Odekun (1996) studied the behavior of the black exchange rate of eighteen African countries and found that national interest rates led to a depreciation of the national currency on the black market, while global inflation was anticipated. The real gross domestic product and the availability of foreign exchange reserves have opposite effects. Agénor and Taylor (1993) addressed the causal link between official and parallel exchange rates in nineteen developing countries, using a methodological approach based on the statistical theory of co-integration and Granger causality tests. They showed that co-integration was present in fourteen out of nineteen developing countries.

Moore and Phylaktis (2000) examined the relationship between black and official exchange rates for seven countries in two categories by examining short and long-run dynamics. Although it has been noted that the short-term dynamic is not modified for the countries of the first group (Korea, Malaysia, Singapore and Thailand), the drift is observed for the short-term dynamics of the countries of the second group (Philippines, Indonesia and Taiwan). The recovery speed after a shock is slow. Bahmani-Oskooe et al (2002) analyzed the long-term link between the official exchange rate and the black market exchange rate over the period 1973-1990 in 49 countries using unit root tests and co-integration. They conclude that any exchange control has only a short-term impact which leads to the deviation of the black market rate and the official rate. Diamndis and Drakos (2000) dealt with the official market and the black foreign exchange market in four Latin American countries (Argentina, Brazil, Chile and Mexico). They concluded that there is a stable and statistically significant long-term relationship between the two exchange rates with the coefficient of unity, thus implying a constant black market premium for each country and have shown that the black market premium is approaching its long-term equilibrium in a term of 2 to 5 months depending on the country.

Methodology adopted

To establish the determinants of the black market exchange rate and the causal links, an econometric model was specified. For this, we selected six independent variables, which proved to be robust determinants of the black market exchange rate. These variables are cited in at least one of the previous empirical studies.

The study uses monthly data for the period 1970-1998. We limit ourselves to this period because of the difficulty of having reliable black market exchange rates. Throughout our analysis, we used the Eviews 10 software.

The model is written as follows:

$$LBOEX_{it} = \beta_0 + \beta_1 LOEX_{it} + \beta_2 DREP_{it} + \beta_3 LMOEX_{it} + \beta_4 LROEX_{it} + \beta_5 LR_{it} + \beta_6 LP_{it} + \varepsilon_t \quad (1)$$

Table 1. The determinants of the black market exchange rate and the causal links

Variable	Definitions	Data sources
LBOEX _{it}	- Logarithm of the black market exchange rate for country i of month t.	- Carmen M.Reinhart
LOEX _{it}	- Logarithm of the official exchange rate country i of the month t.	- World Development Indicators (WDI).
DREP _{it}	- Differential rate of expected benefits (DREP) of country i of month t, proposed by Fishelson (1988) in his empirical test of the Dornbusch et al. (1983) on 19 episodes of the black market;	- WDI, Federal Reserve of the United States.
LMOEX _{it}	- Logarithm of the M2 ratio at the official exchange rate country i of the month t.	- WDI, Central bank

Table 1. The determinants of the black market exchange rate and the causal links

Variable	Definitions	Data sources
LROEX _{it}	- Logarithm of the real official exchange rate (the official exchange rate multiplied by the ratio of US and national price indices) of country i of month t;	- WDI, Federal Reserve of the United States.
LR _{it}	- Logarithm of international reserves of country i of month t;	- WDI, Central bank
LP _{it}	Logarithm of the commodity price index of country i of month t;	- WDI, United Nations Statistical Basis on Commodity Trade
ε _t	- Error term.	

Source : by author.

The DREP variable measures the difference from the unhedged interest rate parity and calculated using the formula:

$$DREP_t = (1 + i_t^*)(1 + d_t) - (1 + i_t) \tag{2}$$

- i_t^* : is the interest rate of the national currency

- i_t : is the interest rate of the foreign currency (the dollar)

$d_t = \frac{OEX_t}{OEX_{t-1}} - 1$: is the rate of the depreciation of the national currency against the US dollar And and OEX_t et OEX_{t-1} is the official exchange rate in t and t-1.

Empirical results and discussions

The Granger causality test is used to investigate the existence of a causal relationship between the variables involved. However, before this is done, the data used for the study are subjected to a root test, and then we estimate the error correction coefficient.

Unit root test

In the empirical analysis, we perform the IPS unit root test (Im et al., 2003). This unit root test for each variable (Table 1), in terms of level and difference, shows that with the exception of the variable DREP, the black market exchange rate and the six other explanatory variables in the level present solid evidence. a first-rate integration. Thus, an error correction model with a co-integration equation could be a more efficient way to estimate our model.

Table 2. Unit Root Test

Variable	LOEX		LBOEX		LROEX		DREP		LR		LP		LMOEX	
	Level	Difference	Level	Difference	Level	Difference	Level	Difference	Level	Difference	Level	Difference	Level	Difference
Method: Im, Pesaran et Shin		First		First		First		First		First		First		First
Without trend	5.257 (1.000)	-15.804 (0.000)	2.72 (0.996)	-19.224 (0.000)	-0.359 (0.359)	-16.086 (0.000)	-0.342 (0.366)	-5.66731 (0.000)	-1.402 (0.080)	-18.964 (0.000)	2.75 (0.997)	-18.286 (0.000)	-2.19 (0.014)	-22.248 (0.000)
with trend	2.021 (0.978)	-16.755 (0.000)	-1.302 (0.096)	-19.227 (0.000)	0.237 (0.594)	-21.130 (0.000)	1.045 (0.852)	-4.353 (0.000)	-0.720 (0.235)	-19.264 (0.000)	0.517 (0.697)	-19.277 (0.000)	1.664 (0.952)	-23.856 (0.000)

Source : by author.

Estimation of the results by Pooled mean group:

The pooled mean group (PMG) estimator is developed by Pesaran, Shin and Smith (1998) are part of the class of dynamic panel models in which it is accepted that the number of observations is as large as that of individuals. He considers that a constant of the model, as well as the short-term coefficients and the variances of the errors can differ according to the individuals. The long-term coefficients being constrained to be identical for all the units, in particular because of the long-term catch-up or the absence of arbitrage. The pooled mean group (PMG) estimator involves the ARDL model and its representation of the error correction of long-term relationships. Applying this PMG estimation framework to the specification of our model that does not require any prior restrictions, as suggested by Bahmani-Oskooee and Goswami (2005). We use co-integration techniques for estimation purposes. We will conduct residue-based tests under the null hypothesis of no co-integration developed by Pedroni (1999). Table 2 presents the results of co-integration tests. As can be seen, the test statistics clearly indicate co-integration, which implies that there is a long-term relationship between official and black market exchange rates.

Table 2. Co-integration test result

Panel co-integration	Statistics	Co-integration, Pooled Mean Group	Statistics
Panel v-Statistic	2,377902 (0.0087)		
Panel rho-Statistic	-5,622103 (0.000)	Group rho-Statistic	-6,814161 (0.000)
Panel ADF-Statistic	-5,486477 (0.000)	Group PP-Statistic	-5,967272 (0.000)
Panel ADF-Statistic	-4,391548 (0.000)	Group ADF-Statistic	-5,246386 (0.000)

Source : by author.

We recall that we can also use the estimate mean group (MG). As the results of Pearsaran and All (1999) state, the average group (MG) estimator assumes that each country has different long-run coefficients that seem to be relevant to the estimation of the ARDL model. However, if the heterogeneity of the long-term coefficient is not respected, MG will produce an inefficient estimate. Since the results of our co-integration test showed that all the variables are co-integrated, we used the pooled mean estimation method. This is used to determine the short-term adjustment process in the long-run equilibrium state. The estimate indicates the speed of adjustment from the equilibrium state in the short term to the long term equilibrium. A higher coefficient on the parameters means that the speed of adjustment of the model from the short term to the long term is higher. The results of the model (Table 3) show that the coefficient of co-integration (CE) is statistically significant at 5%. This implies that there is a long-term dynamic short-term adjustment, the co-integration coefficient is 0.111868 indicating that 11.19% of short-term errors are corrected in the long term. In general, the term CE in the model shows the speed of adjustment of the short-term equilibrium to the long-term state. According to this same table, the assumption of a long-term coefficient equal to unity is not rejected. Since the CE coefficient is statistically significant, we conclude the existence of a long-term causality ranging from independent variables to the dependent variable of our model. With regard to the behavior of the independent variables lagged with respect to the dependent variable, We find a confirmation of the negative relationship, a priori, the expectation, the fluctuation of the log of the official exchange rate, the foreign exchange reserves, the real exchange rate, the price level and the differential rate of expected profits have a negative impact. We note that as long as the Hausman test statistics indicate that the restriction of the long-term homogeneity of all long-term coefficients can not be rejected in our estimates.

Table 3. PMG Estimation Results

Long-term coefficient		
	Coefficients	P-value
LOEX	0.852934	0.0000
LP	0.01075	0.3757
LROEX	0.306795	0.0146
DREP	-0.207339	0.331
LR	0.007988	0.3692
LMOEX	-0.038512	0.0098
Short-term coefficient		
Error correction coefficient	-0.111868	0.0013
	Khi(2) statistic	Proba
Hausman Test	1.291739	0.7311

Source: by author.

Error coefficient (EC) of each country:

As shown in Table 4, the adjustment coefficients meet the expectation of being negative for all countries, with the exception of Algeria, for which the coefficient is insignificant. However, the pace of adjustment is relatively fast in Tunisia, Morocco and Libya, while it is relatively slow in Algeria and Mauritania.

Table 4. Country estimates of adjustment coefficients

Country	Error correction coefficient	Standard deviation
Tunisia	-0.311211	0.0020
Morocco	-0.219666	0.0010
Algeria	-0.000146	0.00004
Lybia	-0.023631	0.00017
Mauritania	-0.005298	0.00006

Source: by author.

Granger causality test:

To determine the nature of the causal relationship between the variables included in the model, the variables are subjected to a Granger causality test (Table 5).

Table 5. Wald-Granger causality test

	F-Fisher	Proba	Decision
LOEX does not granger LBOEX	0.74621	0.4743	H0 accepted
LBOEX does not granger LOEX	13.5113	0.000	H0 rejected
LMOEX does not granger LBOEX	6.704317	0.0013	H0 rejected
LBOEX does not granger LMOEX	1.42725	0.2403	H0 accepted
LROEX does not granger LBOEX	0.78233	0.4575	H0 accepted
LBOEX does not granger LROEX	2.40731	0.0904	H0 rejected at the treshold of 10%
LP does not granger LBOEX	0.53023	0.5886	H0 accepted
LBOEX does not granger LP	0.45528	0.6343	H0 accepted
LR does not granger LBOEX	1.45078	0.2347	H0 accepted
LBOEX does not granger LR	1.81757	0.1627	H0 accepted
DREP does not granger LBOEX	2.19174	0.112	H0 accepted
LBOEX does not granger DREP	3.5393	0.0292	H0 rejected at the threshold of 1%

Source: by author.

The result of Granger's causality test reveals that there is a unidirectional causality between the independent variable: the black market exchange rate (LBOEX) and the independent variables: the official exchange rate (LOEX), the exchange rate Real Official (LROEX), and Differential Expected Profit Rate (DREP). The granger causality test also shows that there is no causal relationship between the black market exchange rate (LBOEX) and the variables: money supply (LMOEX), the level of reserves (LR) and prices. (LP). Indeed, the dependent variable does not cause any of the independent variables, while some independent variables cause the dependent variable.

Conclusion

This study examined the determinants of the black market exchange rate. We have observed that our data is co-integrated of order one. Consequently, we establish a long-term dynamic relationship between the fluctuation of the exchange rate on the black market and the independent variables namely the and the variables: broad money supply (ratio M2 / official exchange rate: LMOEX), the level of dollar reserves (LR), consumer prices (LP), The official exchange rate (LOEX), the official real exchange rate (LROEX) and the differential expected profit rate (DREP). The coefficient for adjusting the short term to a long term equilibrium is random and heterogeneous from one country to another. Our results also showed that the official exchange rate is the most significant variable that most determines the exchange rate on the black market. The official real exchange rate plays a secondary role in determining the exchange rate on the black market. These results were confirmed by the granger causality test which revealed the existence of a unidirectional causality between the dependent variable the black market exchange rate and the independent variables: The official exchange rate (LOEX), the official real exchange rate (LROEX) and differential expected profit rate (DREP) and that the other independent variables neither cause nor caused by the dependent variable. To master the grip of the black exchange market, political decision-makers must adopt stabilization policies by adopting measures that allow the diversification of currency sources and a monetary policy of the interest rate based on external rates. The establishment of a mechanism to control prices leading to a reduction in dependence on the international market. In order to combat the black currency exchange market, several measures are recommended. Among the most topical, we cite the currency hedging device and the creation and operation of exchange offices for manual exchange. The central banks of the Maghreb countries must establish the instructions to the banks relating to the organization and functioning of the interbank exchange market in foreign trade operations. Futures contracts and options are presented as instruments enabling the purchaser to hedge against an unfavorable change in the exchange rate, by fixing a price, called the forward price as soon as the contract is concluded. This work opens up new areas of research that highlight new factors that are beyond the control of the monetary authorities. It is therefore a question of rethinking the current exchange management models which are still lagging behind the development of electronic currencies.

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