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عنوان المقال

The Sterilized Intervention as a Half-Instrument to Infringe upon the Trilemma Mandatory Logic (Algerian Case during 2000-2014)

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Abstract

Unquestionably, there is no way to infringe upon the *trilemma* logic, and the inevitable trade-off will be driven by the necessity of the macroeconomic stability, i.e. the central bank should sacrifice at least one determinant for the sake of maintaining the other two. The study findings indicated that the Algerian economy was entirely subject to the *trilemma* imposed logic, and its choice has represented in both the monetary independence and the exchange rate stability. Trying to infringe upon the aforementioned logic, the Algerian bank has theoretically provided the required conditions since it practices the sterilized intervention in light of the foreign currency inflows (Petrodollars), but the latter policy task has only had a concentrated positive impact on the domestic stability determinants (inflation and interest rate). Regarding the exchange rate, the relationship was vague and statistically insignificant.

keywords: Sterilized Intervention Policy, Trilemma, Macroeconomic Stability, Bank of Algeria.

مستخلص:

لا يختلف اثنان بخصوص استحالة التوفيق المتزامن بين أضلاع الثلاثية المستحيلة، فضرورة تحقيق الاستقرار على المستوى الكلي تفرض منطق المفاضلة بين محددات هذا الأخير، واللجوء إلى التضحية بأحدها في سبيل تحقيق الآخرين ما هو إلا تحصيل حاصل. وعلى غرار الاقتصاديات الأخرى، فلقد بينت نتائج الدراسة أن الاقتصاد الجزائري هو الآخر خاضع تماما لمنطق نظرية الثالوث المستحيل، وقد وقع اختياره على ركني استقلالية السياسة النقدية واستقرار أسعار الصرف. وفي محاولة للتعدي على المنطق المفروض للنظرية، قام بنك الجزائر بتبني سياسة التدخل المعقم في ظل فائض عرض العملة الأجنبية الناتج عن تدفقات ريع البترول، ولكن نتائج نماذج متجهة الانحدار الذاتي بينت أن أثر السياسة كان ايجابيا ومقتصرا إلا على محددات الاستقرار الداخلي (سعر الفائدة والتضخم)، أما فيما يخص سعر الصرف فالعلاقة كانت غامضة وغير معنوية إحصائيا.

الكلمات المفتاحية: سياسة التدخل المعقم، الثلاثية المستحيلة، الاستقرار على المستوى الكلي، بنك الجزائر.

Introduction

Among the most important goals that dominate the central bank considerations at the macroeconomic level is the monetary equilibrium, but it must choose among the latter determinants, and the economic situation is responsible for determining those sacrifice aspects. In fact, this is what had been created by Mundell (1963) in his so-called "*trilemma*" theory *(Impossible trinity)*, that forced all economies to succumb to its own logic. The *Trilemma* states that a country simultaneously may choose any two, but not all, of the following three goals: monetary independence, exchange rate stability, and financial integration (i.e. it's impossible to achieve them at the same time). However, in the late 1990s and early 2000s, the emerging economies, especially Asian ones, infringed on that logic, after adopting the so-called sterilized intervention coinciding with a relatively considerable financial integration, this policy can contain the monetary fluctuations, as well as contributes to maintaining the external value of the local currency in the foreign exchange market. Even if the aforementioned conditions have been provided, the policy stays temporary because it depends on the limited size of the official reserves using for the currency-defensive purposes only in the capital inflow case, in addition to the central bank's inability to continuously mop up the excessive liquidity and to contain the increased costs that engendered from the operation.

Theoretically, the Algerian bank may provide the necessary conditions to infringe on the *trilemma* logic because it has been practising the sterilized intervention policy. On the one hand, isolating the impact of monetization of the foreign currency surplus (derived from the oil's price scaling up) in the monetary arena, and then maintaining the internal balances (inflation and interest rate). On the other hand, using official reserves resulted from the purchase operations of foreign currency surplus for defensive purposes that concern the currency value in the exchange market, i.e. maintaining the external balances. However, the size of policy practicing, as well as its impact on the aforementioned levels, both of them determine to what extent the Algerian bank has actually succeeded to infringe on the *trilemma* imposed logic, and thus, the lack of need for the trade-off among these objectives at the same time. Based on the above, it could be formulated the problematic in the following main question:

Under which trilemma configuration has the Algerian bank operated? And has the sterilized intervention policy enabled it to achieve the impossible combination?

In this working paper, we try to estimate the *trilemma* corners model, as well as its dual combination models to investigate which one has been focused by the Algerian bank within the rest, then we estimate the three models related the sterilized intervention contribution to simultaneously control the selected combination, both the monetary policy (internal stability), and the exchange rates stability (external stability).

In order to investigate all parts of this topic, the working paper is organized as follows: Section 1 discusses the *trilemma* mandatory logic, Section 2 analyzes the Sterilized intervention and the *trilemma* imposed logic, Section 3 illustrates the theoretical framework of the Algerian economy position within the trilemma, Section 4 answers the question "Under which *trilemma* configuration has the Algerian bank operated?", Section 5 Estimates the sterilized intervention impact on both of the monetary policy and the exchange rate corners, and give a conclusion in Section 6.

1. Discussion about the Trilemma Mandatory Logic

The *trilemma* theory had been created by Mundell (1963), and it is recognized as a basic reference for the crises interpretation that engulfed the march of the international monetary system since its inception (1870) until present, it is also considered a benchmark for each country to choose the right combination of policies at the macroeconomic level. According to theory hypothesis - a country may not

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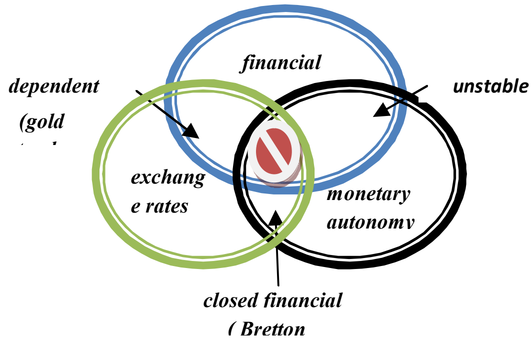
simultaneously attain monetary independence, exchange rate stability, and financial openness (Das, 2010, p.74). Because the attempt to achieve the three choices at the same time leads to a conflict among macroeconomic policies, under this circumstance, the crisis will be inevitable, and it must sacrifice one option for the sake of maintaining the other two.

1-1. The Trilemma Unified Configuration (1870-1971): Two forms were being adopted during this period as an international monetary system, the first represented in the gold standard (1870-1914), and the second in the Bretton Woods system (1945- 71), the latter disagreed with the former on the taken action regarding the *trilemma*, but the trend was uniformed according to their term, i.e. there was not any variation during the same period of each system. Returning to the historical background of the gold standard system, we find that it had preferred the exchange rate stability and the capital movement liberty, at the expense of the monetary autonomy. The latter trend had been violated by the Bretton Woods system, which had chosen the monetary autonomy at the expense of the financial openness with an exchange rates stability (Das, 2010, pp.75-76). as shown in the following shape:

Figure (01): The trilemma configurations



Source: (Das, 2010, pp.74-76).

It is noticeable that the former regimes had considered the fixed exchange rate system as a very sacred thing, and it is too difficult to undo or change it, except in the unusual cases, and it therefore represented the common element in both systems.

1-2. The Various Trilemma Configurations: After the collapse of the Bretton Woods system in 1971 (dollar base), a trend towards floating appeared, and it gradually passed through the intermediate systems. In order to explain the previous trend, several views have emerged, such what has been concluded by Stanley Fischer (2001) study, which supports the *"Bi-polar theory"* or the so-called *"hollowing-out the center"*, in this study, Fischer took the *trilemma* concepts as a base, and he clarified that the trend of the exchange rate systems is only toward two poles, either fully rigid or free-floating, and in order to adapt to the *trilemma* logic, it must sacrifice the independence of monetary policy (for the sake of stabilizing the exchange rate) or float the currency (for the benefit of the monetary independence), in light of the explicit trend toward global financial integration.

However, the findings of Calvo and Reinhart (2000) study led to ask many questions about the credibility and matching the *hollowing-out* theory to the reality, especially since the certified data in Fischer study is descriptive and taken from the international monetary fund rankings, and based on the advance official declaration by the countries concerned, but the data does not reflect the reality of the *de facto* system. The authors have concluded that most of the actually existing systems are completely unlike what they already declared, especially when it concerns the developing countries, and this phenomenon had been termed *"the fear of floating"*, which occurs due to the fear or the reticence about leaving the currency actually float, and its perverse consequences, especially in the case of depreciation (higher external debt). The false declarations aim to avoid the pressures imposed by the international monetary fund, which often urges them to float their currencies. Practically, after the Bretton Woods system collapse, the trend toward the poles had existed, but it was not absolutely, and has confined only either the developed countries that can absorb the fluctuations taking place in their floating exchange rates, or that tended to be a party within an agglomeration such as the European monetary union.

All the above raises a problematic of the emerging markets and the developing countries position within the *trilemma* framework. If they did not operate under a rigid or floating corner, have they found another corner that missed the theoretical foundation of the trilogy? If yes, what supports them to get out from theory framework although it is a difficult matter even as for the developed countries?

In a related study by Aizenman, Chinn, and Ito (2008), during the period (1970-2006), and included 179 countries divided into four main groups, namely, the developed countries (industrial), the developed countries non-members in the Eurozone, and the developing countries with and without emerging markets. This study answeres the previous question after estimating the three *trilemma* indicators and then put them onto the Diamond chart (conical) with the fourth dimension that concerns the official exchange reserves, to know the positioning of each group within the overall *trilemma* framework.

It was clear from the reached findings that all developed countries have explicitly moved to the financial openness at an accelerated pace since the beginning of 1980, with very low and steady levels of the international reserves, around 4% (relative to GDP) during the period (1980-2006), but they differed about the other corner, the Eurozone has preferred the exchange rate stability at the expense of the monetary policy independence, but the other developed countries have had a different opinion, and the orientation was relatively toward the floating, and therefore, many questions have been raised about the realism of absolute free-floating system, even if it is related to developed countries, which declare that they already adopted this direction. As for developing countries without emerging markets (African countries, and some of the Asian and Latin American countries), the trend toward financial liberalization was very bashful, and their choice has embodied in both the monetary policy independence and the exchange rates stability.

So far, and according to the previous cases characteristics, there is no deviation from the specified framework of the *trilemma* theory, which requires choosing only two out of three corners. However, the developing countries with emerging markets, especially the Asian ones they found an exceptional solution that enabled them to take the intermediate position, and relatively gathering all corners at the same time, and the huge size of the International reserves has played the substantial role in that process, where its percentage to GDP rose from 5% to 37% over the period (1980-2006), the most dramatic changes occurred in China, increasing its ratio from about 1% in 1980 to 41% in 2006 (Aizenman, et al; 2008, pp. 01-02). These countries were able to relax the trilemma, i.e. achieve all three goals at the same time, and confronting its imposed logic *(leaning against the trilemma)*.

2. The Sterilized Intervention and the Trilemma Imposed Logic:

2-1. Criticisms of Mundell's Theory: In fact, this criticism stems originally from countries' experiences that were not subject to the logic of *impossible trinity*. Also, they did not get out from its scope, but they worked in some unprecedented place within it.

- Bofinger and Wollmershäuser (2001, pp. 15-16) criticism clarified that Mundell analysis only restricted on two pillars of exchange rate systems, either purely floating or completely fixed exchange rates (the so-called corner solutions), and ignored the intermediate systems, exactly the managed float (oriented); neither fixed, since it is targeted along an unannounced exchange path, nor flexible in the sense of a market-determined rate, since the central bank intervenes in order to keep the exchange rate close to the target path. This means that market forces are responsible for determining the path of the currency value (up and down) as long as it does not go beyond its pre-assigned range (not path).

-Second criticism explained by Frenkel (2007, p.03) and illustrated the fact that the theory had not been discussed in light of the excess supply in foreign currencies side (capital inflows), and the most literature that has contributed to enrich the topic after its creation, they have taken the monetary policy independence and exchange rate stability only in the case of a deficit in the balance of payments (capital outflows). But there is no symmetry between the deficit and the surplus because in one case the *trilemma* is valid, while in the other it is not

2-2. The Simultaneous Conciliation among Trilemma Corners: The Sterilized intervention mechanism avoids the aforementioned criticism, so it offers an opportunity to simultaneously reconcile among the *impossible trinity* corners, and it can be carried out in two steps. In the first step, the central bank intervention in the foreign exchange market expands the monetary base. The resulting situation would entail an increased monetary base stock and a lower domestic interest rate than the initial one. In the second step, the central bank intervenes in the monetary market, in order to sterilize the impact of pre-intervention in the exchange market, so it absorbs the increase in the monetary base and sells financial assets by exactly the same amount as the initial excess demand for domestic assets (i.e. the excess supply of foreign currency), thus restoring the interest rate to its original level (Kubelec, 2005, p.63).

However, this depends on the degree of sterilization policy practice, if it was partial; the interest rate may rise, but would not go back to its original level because the size of the liquidity which absorbed in the second step is less than its issuances in the first one. Even if the interest rates returned to the initial level, this does not necessarily mean that the monetary supply will shrink to its previous level because this may require a higher interest rate to satisfy the counterparties (commercial Banks) that want to invest in sterilization bonds. Accordingly, the central bank would be responsible for determining the optimal combination of the liquidity size that must be retrieved and the desired level of interest rates, in order to avoid the potential inflationary in conjunction with the tight control over the domestic currency, (i.e. the dual control on both the internal and external variables of the monetary stability at the same time).

2-3. The Terms of the Infringement Success on the Trilemma mandatory logic: The ability to evade the *impossible trinity* in the case of a foreign currency surplus is completely different from the opposite one (shortage), because the central bank in the first case can offer what it wants of the local currency to prevent the currency from appreciating, which could last as long as its desire to acquire international reserves could continue, in addition to its success in neutralizing the effects of the operation locally (curbing inflation), while in the opposite case, even powerful central banks, they have an intervention capacity that is ultimately limited by the availability of foreign reserves, and they will not be able to offer what they want of the foreign currency to prevent the local one from depreciating since it constrained by a limited stock that already acquired. For this reason, Fischer describes the sterilized intervention mechanism as a *half-instrument* (Obstfeld, 2014, pp. 670-671) because its limited effectiveness in the case of capital outflow (deficit in the balance of payments). Therefore, the success in simultaneous conciliation among the corners of the *impossible trinity* can be possible only in the case of capital inflow (surplus in the balance of payments) while the opposite case is very limited and it is only a matter of time if and only if the monetary authorities accepted to deplete all or part of its official reserves.

The former analytic indicates that the aforementioned conditions that have been provided by developing countries with emerging markets (in order to create an exceptional solution to infringe on the *trilemma* logic) are represented in two essential elements; the first is the surplus of the offered foreign currencies (i.e. the surplus demand for the local currency), in other words, the case of the capital inflow. While the second represents the ability to sterilize the impact of targeting the managed exchange rate within its flexible scope under those circumstances.

Last but not least, the monetary sterilization implementation in conjunction with managed exchange rate reinforce the central bank to transfer the absolutely irreconcilable *trilemma*, to the relatively reconcilable *trilemma*, on the condition that the growing desire of the international reserves possession must be accompanied by its ability to neutralize the local effects, but all this only in the case of capital inflow. On this basis, the failure to fully achieve the monetary independence with exchange rate stability at the same time, in light of the trend toward financial liberalization, does not negate the possibility to relatively achieve them in the same circumstances, and without the need for a trade-off among them.

3. The Theoretical Framework of the Algerian Economy Position within the *Trilemma*

The transformation from the centrally planned economy to a market economy system after adopting the reforms stipulated by the money and credit law 90-10 represents the prominent step toward financial openness, especially when the total liberalization of the foreign trade operations had begun in early 1994 in conjunction with the implementation of structural adjustment program (SAPs), as well as the Algerian economy freely received the foreign direct investment inflows under Legislative Decree 93-12 (Décret législatif relatif à la promotion de l'investissement, octobre 1993), and some subsequent amendments such as those mentioned in the decree 01-03 (Ordonnance relative au développement de l'investissement, août 2001). However, the openness operation remained relatively for several considerations, like the petroleum dominance on the export sector, flows of foreign investment mostly moved toward the oil sector, not to mention the absence of actual performance of the stock market.

Regarding the monetary policy independence, this can be translated in the ability of Algerian bank to self-determine the local goals (interest rate and inflation). In order to strengthen the latter operation, the sterilization policy has been adopted as a mechanism to neutralize the impact of the oil rents monetization on money market, which in turn has led to domestic liquidity superabundance, and the commercial banks have not been resorting to the Algerian bank for refinancing since 2001 (La Banque d'Algérie, Mai 2012, p.116). Thus, it adopted an arsenal of developed monetary instruments to mitigate the phenomenon impact on the inflation rate including the repurchase facility for seven-day (Instruction relative à la Reprise de Liquditié sur le Marché Monétaire, Avril 2002), three and six-month, the permanent deposit facility (Instruction Relative à la Facilité de Dépôt Rémunéré, Juin 2005), and the compulsory reserves (La Banque d'Algérie, Le Règlement fixant les Conditions de Constitution des Réserves Minimales Obligatoires, 2004), in addition to the stabilization fund *(Le Fond de Regulation des Recettes)* (Ministère des finances, Avril 2011) as a financial instrument, which confiscates the fiscal amounts resulting from the difference between the real and the reference price of the oil barrel. These amounts are not included in M2 structure, and they contribute to alleviating the net domestic assets of the Algerian bank (debit items) as a mechanism to offset the evolution of its foreign assets.

As for the exchange rate policy, the Algerian bank declares that it applies the so-called managed exchange rate system, i.e. a managed floating without the pre-announcement of the targeted path since the beginning of 1996 (La Banque d'Algérie, Juillet 2004, p. 55). The Algerian bank seriously focuses on this variable to maintain its equilibrium level, and this is very clear throughout the frequent statements in its annual reports.

Based on the former analysis, it is clear that the Algerian bank operates in an environment has theoretically provided it the same reasons that had given the opportunity

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to the emerging economies to infringe on the *trilemma* logic, namely:

- A surplus in the foreign currency offer (the dollar) resulting from the recurrent inflows of the oil rents, which led automatically to an increased demand for the local currency

- Secondly, the exchange rate system (the managed float) is one of the two major conditions to temporarily dodge the trilemma.

The aforementioned conditions have been neglected in the theory background as indicated above, and the Algerian bank has been forced to adopt a monetary sterilization policy to deal with the first circumstance, while the second has led it to intervene in the exchange market in order to smooth out short- term exchange rate volatility within its band, and without a pre-announced path. The two conditions are the implicit meaning of the sterilized intervention mechanism, which can give the opportunity to simultaneously reconcile among *trilemma* corners. As for the extent of its success in that task or not, it will be clear below.

4. Under Which Trilemma Configuration Has the Algerian Bank Operated?

This section aims to investigate the Algerian economy position within the general framework of trilemma, and the extent of its focus on it, in addition to the most important part, which represents the testing of sterilized intervention effect on each of the stability determinants (the inflation, the interest rate, and the exchange rate) during 2000-2014 as expressive variables of the internal and external stability, which have been included under the *trilemma* corners framework.

4-1. Data Description: The first part of this study relies on three variables, each one of them expresses one of the *trilemma* corners. Regarding the second part, two variables will be added, namely, the sterilization coefficient (the ratio of the net domestic assets to its foreign counterpart), and the interest rate as one of internal stability factors besides inflation rate.

Our data was collected from “CEICDATA”, and the period of time spanning from January 2000 to December 2014 (180 monthly observations).

- The Real Effective Exchange Rate (REER): Which expresses the index of the external stability, i.e. the corner that related to the exchange rate stability, it is calculated based on exchange rate evolution against a foreign currency basket, which is weighted depending on the relative prices indices.

- Inflation Rate (INFL): Used as an indicator of the monetary policy independence, which cannot be without focusing on the inflation rate adjusting. It is measured depending on the consumer price index, (the annual percentage change of the consumer cost average to get a basket of goods and services). *Laspeyres* index is generally used.

- The Net Balance of the Capital Account (CA): Demonstrates the financial liberalization degree of the Algerian economy because each inflow or outflow capital is already registered at the level of this balance.

- Money Market Rate (Inter): Is the rate that has been set in the inter-banks market as the latter becomes the place where the banks can refinance its short-term needs after full reluctance to resort to the Algerian bank for the refinancing purposes since 2001.

- **The Sterilized Intervention Coefficient (SC):** We can count on several simple indicators such what have been identified in Lavigne (2008) study, where he has relied on the ratio of the domestic assets to its foreign counterpart (ΔNDA/ ΔNFA), because this indicator has the ability to demonstrate the practice size of the sterilization policy in the monetary market through an offsetting size between the aforementioned assets, as well as its ability to give an idea about the volume of intervention that could be made on the exchange market to maintain the currency value as it includes the foreign assets, which are dominated by the official exchange reserves (roughly 98 to 99%) (Bulletin Statistique, Juin 2012).

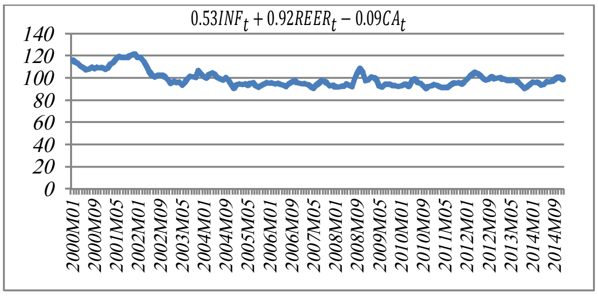
4-2: Estimation and Analysis the Model of the Weighted Trilemma Corners: It is possible to use a linear form in order to test the weighted *trilemma* corners, where the sum of the three variables multiplied by their coefficients plus the error term equal to a fixed number "100" according to the following form:

$$100 = a.INF_t + b.REER_t + c.CA_t + \varepsilon_t$$

The previous equation expresses the extent of the Algerian bank focus on *trilemma* corners together. After estimating the model we get the following results (Appendix 01):

Depending on the estimated model, the error term values can be extracted during the study period, as well as the value of the equation $a.INFt + b.REERt + c.CAt$ as shown in the following figure:

Figure (02) : The focus extent of the Algerian bank on the trilemma corners (2000-2014)

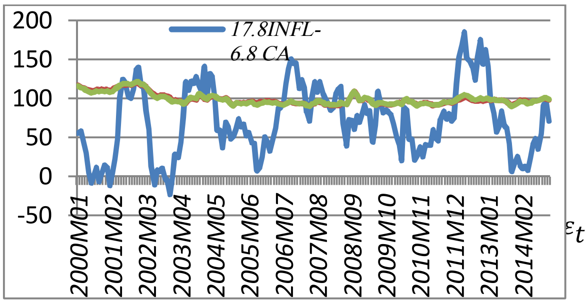


Source: eviews output.

According to the estimated path, the focus was upper in the beginning of the period, where it equalled 120% in 2001, regarding the rest of the period (2002-2014), exactly in June 2002, the Algerian bank had begun to stabilize its focus within 100%, except the peak in 2008 and 2012. Also, the net balance of the capital account (financial openness indicator) is statistically insignificant in the former model, unlike the coefficients of exchange rate stability and the monetary independence, which strongly suggest the concentration of them.

Because the principle of the *trilemma* had been built on the sacrifice idea, i.e. the trade-off among their corners, trying in this part to know, which configuration does the Algerian bank focus? by estimating the three combinations models, as shown in the following figure:

Figure (03): The dual combinations of the trilemma corners (2000-2014)



Source: eviews output.

The above-estimated models support the former analysis because the most sustainable configurations (along the equilibrium level 100%) are the (*REER*, *INFL*) and (*CA*, *REER*), but the latter includes unstable and statistically insignificant variable, namely CA. However, it becomes significant (at 5%) in the third combination, which represents the lower focused combination by the Algerian bank comparing with others. Therefore, we can say that the combination (*INFL*, *REER*) has the sustainable focus by the Algerian bank during this period.

5. Estimating the Sterilized Intervention Impact on Both the Monetary Policy and the Exchange Rate:

The bank of Algeria clearly sets its priorities on the monetary stability factors (both internal and external). Therefore, this Section aims to estimate the sterilized intervention contribution to achieving those priorities and to know if it was able to simultaneously control the aforementioned determinants. This can be done through three models, the first of them related to the exchange rate stability, as for the second is related to the monetary policy independence, which is explained by its ability to target the local objectives (inflation and interest rate).

5-1. **Test of Stationarity:** Depending on Augmented Dickey-Fuller test, *SC*, *INFL* and *INTER* are stationary at 5% level *I(0),* while the *REER* series is stationary after taking the first difference *I(1)*.

Because the stationarity degree of the variables has differed and the study period is long, as well as those variables theoretically are endogenous with a lagging effect, thus, we will run a model based on the vector autoregressive method (VAR).

5-2. Determination of the Model Lag Length VAR (P): Depending on the Akaike Information Criterion (AIC) that has been described in Appendix 02, the suitable lag is "2", and therefore, the VAR (2) will be estimated as an appropriate model in this case.

5-3. The Models: The estimation results have been organized as follows (Appendix 03):

monetary independence (Internal

$$\begin{cases} INTER = -\ 0.02*SC(-1) - 0.005*SC(-2) + 0.69*INTER(-1) + 0.20*INTER(-2) - 0.10*INFL(- \\ INFL = -\ 0.008*SC(-1) + 0.04*SC(-2) + 0.02*INTER(-1) - 0.04*INTER(-2) + 1.07*INFL(- \end{cases}$$

Exchange rate stability (External stability)

$$\{\ DREER = -\ 0.007*SC(-1) - 0.012*SC(-2) + 0.01*INTER(-1) - 0.01*INTER(-2) + 0.23*INFL(-$$

- Regarding the monetary policy independence models, there is a reverse impact of the sterilized intervention coefficient (lagged 1 period) on both the inflation (insignificant) and the interest rate (significant at 10%), which indicates that the rise of the sterilized intervention in this period reduces the volatility at the inflation and interest rates level, which in turn strengthens the monetary independence.

- There is a reverse impact statistically insignificant of the sterilized intervention (lagged 2 periods) on the interest rate, in contrast to the inflation rate (positive and significant at 5%). This indicates that the policy succeeds to curb the inflation, but only in the short-term, because in the longer-term it may contribute to engendering it (through monetizing its local debt resulted from the mopping up liquidity).

- For the explanatory power of models was robust, and the lagging observations directly influence the variables (whether themselves or related to other variables), and this is clear through the adjusted correlation coefficient (R) which respectively reached 90% and 83% for both interest rate and inflation.

- With respect to exchange rate stability model, there is no statistical significant of the inverse relationship between the sterilized intervention (neither in lagged 1 period nor 2) and the exchange rate.

- The exchange rate stability model has been interpreted by itself (at 5%) and the inflation rate (at 10%) in both periods, but this is not enough to give a robust explanatory model, which is very clear according to its low correlation (R=13%).

- The VAR (2) is a stationary model and does not suffer neither from serial correlation nor from heteroskedasticity problem because all the roots were less than one, i.e. they are located inside the circle (inverse roots of AR). Thus, we can say that the model is statistically accepted (Appendix 04).

5-4. Impulse-Response Functions Analysis (Appendix 05): The inflation impulse function inversely responds to early changes in the sterilized intervention coefficient until only the second period, and then the response function is almost non-existent, and this is compatible with the theoretical background of policy that provided for the possibility to control the inflation, but only in the short or medium term.

Also, the interest rate inversely responds to the sterilized intervention with throughout the period with its tendency toward stability over time, this indicates that the high coefficient of the sterilized intervention leads to the lower interest rate, which is related to the structural liquidity surpluses on the interbank market.

The exchange rate response function does not differ much from that related to the inflation rate because it also suggests the inverse relationship in the beginning of the period, and then tends to stabilize, especially after the fifth period.

In sum, the response functions mean that the active practice of the sterilized intervention will inevitably lead to alleviate the negative impact of the determinants related to the monetary stability concept, but this will only be possible in the short or medium term.

5-5. Variance Decomposition: Depending on the Appendix (06), the interest rate error variance in the short-term mostly related to itself, but in the long run fell to 77%, the remaining percentages resulted from both inflation and sterilization errors, which equalled to 13.8% and 8.5%, respectively.

As for the inflation error variance, it mainly engendered from its errors per se in the short-term, as well as in the long-term, those ratios had ranged between 97 to 98%, while the sterilized intervention errors were the responsible for the remaining percentage.

The exchange rate errors were the determinant of its error variance in the first period at 87% and fixed later at 83%. The interest rate was the responsible for the remaining percentage, which amounted to 15%, and a lesser degree related to the sterilized intervention at 1.5%.

6. Conclusion:

undoubtedly, the Algerian bank has been adopted the sterilized intervention policy to keep inflationary pressures in check and to maintain the external balances, although the latter did not seem clear. Finally, on the basis of the above, it could be extracted the following results:

- Like many other economies, the Algerian economy was entirely subject to the *trilemma* logic, and its choice has represented in two corners, the monetary independence, and the exchange rate stability, while the financial liberalization corner has entirely excluded from the combination, due to several reasons, one of the most important of which is a little capital inflows and outflows that were mostly caused by the complete absence of the stock market, the lack of Algerian economy attractiveness as a destination for the foreign direct investment, et cetera.

- The adoption of the sterilized intervention policy was only a necessity imposed by the need for local monetary equilibrium (inflation and interest rate), and it has been able to contain it, but the operation success lasts only in short or medium term in the best cases because in the long run its effect will not only be absent, but it may take an inverse trend.

- Unlike some States which profusely hold the exchange reserves, the sterilized intervention did not allow the Algerian bank to infringe on the imposed *trilemma* logic, and it has only contributed to set the local goals, while its relationship with the exchange rate was statistically insignificant, although the reserves provided by the sterilization policy after buying a foreign supply surplus has been used for maintaining the currency value since the swings of the real effective exchange rate have centered around its equilibrium level during the whole period.

- In fact, it is not better to permanently rely on the monetary sterilization policy because it is not a panacea per se, but it is a painkiller which gives the Algerian bank an ample time. Meanwhile, it is useful to make the necessary adjustments in the medium and long-term.

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