

Monetary sterilization to net capital inflow « evidence from Algeria»

Houssam Eddine ABOURA - Doctoral student-University of chlef - Laboratory of financial and banking System and macro economic policy*

Pr. benali BELAZOUZ -University of chlef - Laboratory of financial and banking System and macroeconomic policy

ملخص: يعتمد الاقتصاد الجزائري على عوائد النفط بشكل كبير في تحقيق أداء اقتصادي موجب، و مع حدوث طفرة في أسعار النفط فقد ترتب عن ذلك تدفق معتبر لرؤوس الأموال الداخلة التي مصدرها فوائض الحساب الجاري، تعتبر هذه التراكمات للأموال مؤشر ايجابي للاقتصاد إذ تساهم في تحفيز الطلب الكلي، كما لها تكاليف كثيرة نذكر منها التدفق العكسي أو التوقف المفاجئ لتدفق رؤوس الأموال بالإضافة إلى الضغوط التضخمية التي تفرضها هذه المداخيل على الأسعار المحلية.

تسعى السلطات النقدية إلى الحد من اثر التدفقات الداخلة لرؤوس الأموال على مستويات التضخم من خلال تعقيم هذا الأثر ، انطلاقا من سياسة السوق المفتوحة و الاحتياطي الإجباري و تحويل الودائع الحكومية إلى البنك المركزي بالإضافة إلى أدوات أخرى كالقيود على رأس المال و توسيع نطاق تقلب سعر الصرف ، أما بنك الجزائر فقد قام بتعقيم هذه المداخيل من خلال سياسة السوق المفتوحة و التسهيلات الائتمانية بالإضافة إلى الودائع الحكومية التي بجوزة البنك المركزي على شكل صندوق استقرار اقتصادي سمي صندوق ضبط الموارد ، تشير النتائج وفقا لإحصاءات البنك المركزي إن سياسة التعقيم كانت نشطة من خلال التدخل بعمليات السوق المفتوحة او تسهيلات الودائع و كذا نمو حجم الودائع الحكومية لدى البنك المركزي

الكلمات المفتاحية : سياسة التعقيم، التدفقات الدولية لرؤوس الأموال ، عرض النقود ، التضخم ، صندوق ضبط الموارد.

* Houssameddine2005@hotmail.com

Introduction:

Algeria is a net oil exporter that gains from the balance of payment surplus from decades except period of slow down in oil prices; the domestic economy is strongly related to oil revenues, which represent the most important source of revenues to the government over time (41% in 2018ⁱ). As a result, government expenditure and economic growth are highly related to the oil revenue inflows. International capital inflow is a key element for economic development especially the case of Algeria with an important degree of economic openness 59% in 2016.

The increase in international capital inflows despite the temporary contraction during the global crisis of oil price decline for oil exporter countries, or countries with strong financial openness has motivated policy discussions on the associated benefits and costs of capital mobility across countries.

The most common benefits of inflows is that outside revenues boost domestic demand (either for consumption or investment)than consequently stimulate economic growth , this should lead to lower rate of unemployment (non full capacity of production), finance public sector debt.

The surge of inflows can be costly to the economy, through the concentration of capital flows and lack of access (for small countries), domestic misallocation of capital flows, herding contagion and volatility of capital flows. The large capital inflows induced by financial openness can have undesirable macroeconomic effects including rapid monetary expansion (due to the difficulty and cost of pursuing sterilization policies); inflation pressures (resulting from the effect of capital inflows on domestic spending).

Policy makers are facing a big challenge to benefit from net capital inflows and keep low inflation rates, as the surge of inflows and central bank intervention at foreign exchange market lead to an important increase to money supply, monetary authorities may sterilize the accumulation of foreign exchange reserve to maintain low inflation rates.

This paper aims to analyze central bank response to capital inflow surges, considering that money supply is strongly related to general price level (quantitative theory of money), through the indirect channel of money and income as a channel by which imported inflation is transmitted to the domestic one, central bank attempts to limit this channel by their instruments. This paper discuss; how bank of Algeria sterilize the net capital inflows? To answer this question we suggest the following hypothesis:

Hypothesis 01: Algerian financial system is not opened on the world financial system (capital mobility), as a result domestic financial assets and foreign assets are not perfect substitute.

Hypothesis 02: international capital flows in Algeria depend on current account surplus or deficits.

So the paper is presented as follows: section one presents a brief literature on sterilization policy and their instruments. Section tow presents bank of Algeria actions in the light of massive inflows due to current account surplus.

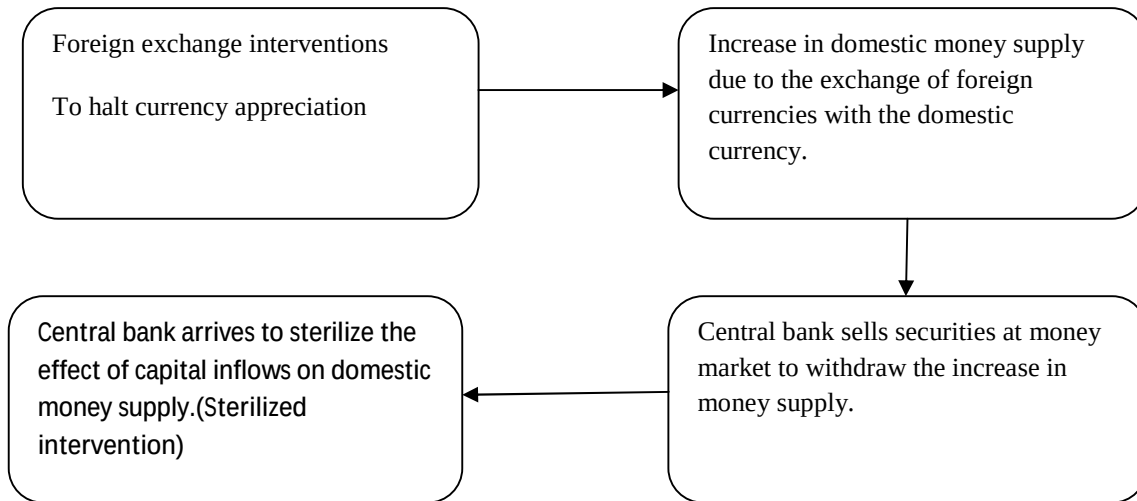
I - Theoretical literature:

Capital inflows result in a buildup of foreign exchange reserves, as these reserves are used to buy domestic currency, the domestic monetary base expands without a corresponding increase in production “ to much money begins to chase too few goods and services”.

To ease the threat of currency appreciation or inflation, central bank often attempt what is known as the “sterilization” of capital flows. In a successful sterilization operation, the domestic component of the monetary base (bank reserves plus currency) is reduced to offset the reserve inflow; otherwise sterilization is the process by which monetary authorities ensure that foreign exchange interventions do not affect domestic monetary base, which is one component of overall money supply. Many governments try to influence the value of their currency on the foreign exchange market by selling or purchasing domestic currency in exchange for a foreign currency.

Foreign exchange intervention for the potential excess inflows prevents the exchange rate from appreciating, sales of domestic currency by the central bank increase the money supply, countries then have to decide whether or not to sterilize the monetary impact of intervention through the sale of securities. Sterilized intervention can insulate the economy from price surges(chart 01).

Chart 01: the process of sterilized interventions.



Source: prepared by authors.

The most common tool that the government has is adjusting their interest rates in response to capital inflows, or with little discount rates, the table 01 show how the impact of sterilized intervention on the rate of interest depend on the reason behind the increase in capital inflows.

It shows that interest rate increase in a response to a surge in reserve money supply (central bank action), the reason is to restore internal balance; the result at short time is effective, but in long term with persisting inflows, sterilization becomes costly. It is better to use alternative instruments like permitting the exchange rate appreciation or applying capital controls.

Table 01: Effect of sterilization on interest rate with fixed exchange rate.

	Temporary or Permanent Flow	Unsterilized Intervention	Sterilized Intervention
Increase in reserve money supply	Temporary (e g, some types of speculation)	Interest rates fall	Interest rates increase to restore internal balance, impact of inflows can be resisted, sterilization effective.
	Long term (e g,	Interest rates fall	Interest rates increase to

	most changes in foreign interest rates)		restore internal but not external balance, inflows persist, sterilization become costly.
Increase in reserve money demand	Temporary or permanent	Interest rates increase (unless perfect capital mobility)	Interest rates rise further still, since inflows were merely a response to higher domestic demand, more inflows likely – sterilization misjudged and costly.

Source : Glenn Hoggarth and Gabriel Sterne, capital flows : causes, consequences, and policy responses. Handbooks in central banking: No.14, issued by the center of central banking studies, bank of England, December 1997.

I – 1 Instruments of sterilization:

Sterilization of reserve money creation is usually done with open market sales of securities; increase in reserve requirements or by transferring government deposits from commercial banks to the central bankⁱⁱ.

I – 1 – 1 Open market securities sales:

In the open market operations, the central bank offsets the monetary impact of selling domestic currency by selling securities usually issued by the government. In some situations, the central bank possesses insufficient government securities and the government may be unwilling to incur the cost of new security issuanceⁱⁱⁱ. A number of central banks have therefore sterilized by issuing their own securities (e g Korea in the late of 1980s, Indonesia I the early 1990s) since the commercial banks receive a market interest rate in return of surrendering liquidity . Sterilization through security sales is more appropriate to an economy than raising reserve requirements (which are generally unremunerated).

Many central banks have used sterilization at some stage or other . in the early 1990s , chile, Columbia, Indonesia , Malaysia, attempted to offset fully the expansionary monetary impact of accumulating international reserve ; Korea, the Philippine and Thailand attempted to a partial offset, however this measures were not completely successful and were usually abandoned in the case of persisting inflows, there are two main disadvantages of using open market operations for sterilization purpose :

- It is costly, the government or the central bank has to pay higher interest rates on the securities, than the return it receive on foreign denominated assets^{iv} (opportunity costs that central bank losses)
- The higher interest rates offered on government or central bank securities will lead to short –run inflows. Sterilization was not effective (e g Chile, Indonesia, Malaysia) because higher domestic interest rates were attracting more short-term capital inflow

I -1 -2 Reserve requirements:

Reserve requirement were considered as a tool that reduce the ability of commercial banks to provide credit and therefore broad money (reduce the scriptural monetary creation through money multiplier);reserve requirement reduce the yield on

domestic deposits of commercial banks and deter capital inflows. Furthermore, the increase in monetary base does not result in as large an expansion in broad money because the commercial banks are compelled to hold more deposits instead at the central bank. Reserve requirements were an important instrument, for example, in reducing the money multiplier in Taiwan, Malaysia and Korea, in Korea the reserve requirement ratio was doubled in the late 1980s and in Malaysia, it rose in steps from 3.5% in 1989 to 11.5% in 1994. Some countries also introduced or increased reserve requirements on foreign currency deposits, example include Chile, Peru and Sri Lanka at the beginning of 1990s.

I -1 -3 Switching government deposits:

Another way to absorb reserves is to transfer public sector deposits from commercial banks to the central bank, where public sector deposit account represents an important share of deposits at the banking system. As in Malaysia, Thailand and net oil exporters like Algeria, the use of this method has been highly effective in sterilizing capital inflows^v, unless the interest paid on government deposits is higher at central bank than commercial banks, there is no fiscal or quasi fiscal cost.

I -1 -4 Other instruments:

In addition to the classical methods of that may be costly for central bank as the coefficient of sterilization should be equal to the difference between domestic interest rates than central bank apply and foreign interest rates if there are no change exchange rates^{vi}, policy makers attempt to other policy instruments that include^{vii}:

- **Easing restrictions on capital outflows:** it includes easing surrender requirements on foreign exchange revenues. Allowing local institutions to invest abroad, or allowing non-domestic entities to issue foreign bonds at the domestic market.
- **Variable deposit requirement:** to halt capital inflows, numbers of countries introduce deposit requirements, as a certain percentage of foreign currency borrowed by domestic residents must be placed with the central bank in interest free. This serve as a tax; for foreign borrowing.
- **Wider exchange rate bonds:** in response to a massive and persistent capital inflows, countries have extended the exchange rate bands for their currencies, as a result exchange rate appreciate, import price tend to fall, getting a twin effect; first on the pass through of import prices on domestic prices and the equilibrium of balance of payments through import increases.

II- Bank of Algeria action:

Monetary authorities face a big challenge to keep low inflation rates under a persistent accumulation of foreign exchange reserves (until 2014) due to current account surplus. Usually central bank offset money supply as a response to foreign exchange intervention, by classical methods that draw liquidity from money market.

II – 1 Open market operations

It's the most effective instrument that central bank have to control liquidity, but on from the practical limits of OMOs is that the ability to sterilize has an inverse relationship with the degree of international capital mobility; if capital is highly mobile, attempts at

sterilization may prove futile, because they can be rapidly **overwhelmed** by renewed inflows. But this evidence doesn't work in the case of Algeria; because domestic financial system is not integrated to the world financial system (except the settlement of bills for international trade), with this fact open market operations is effective to achieve the target.

According to table 02; that summarizes the important items in central bank balance sheet to the analysis, monetary authority intervenes at money market. Liquidity draining operation was important until the beginning of 2015, it fall from 1818.60 billion of dinars in December 2014, to 996.90 billion of dinars in June 2015^{viii}. These operations include liquidity recovery for 7 days, 3 months, 6 months, one year and deposit facilities. As well as a sharp increase in foreign exchange reserve; this need more interventions on the market to sterilize this accumulations.

In the end of 2016, liquidity-draining operation disappears from the balance sheet, as a result to oil revenue decline to liquidity shortage at money market. In September 2016 central bank in a reverse circumstance; finance commercial banks through discount window by rediscounting securities with a reduced rate from 4% of 3.5%^{ix}, or by introducing loans to banks for a maturity of 7 days, 3 months, 6 months, one year. Table 03 shows that total lending by central bank; to commercial banks was with the average of 432 billion of dinars in December 2016. The liquidity recovery was zero with in important stop of capital inflows.

The result on general price level was positive, noting that inflation rate fall from 8.89 in 2012 to 3.26 in 2013 and 2.92 in 2014^x. This reflects the effectiveness of sterilization policy applied, by bank of Algeria during this period of strong inflows. Arguing that inflation is generally pull demand inflation before 2015. It's not the case from the start of 2015 to the present, with a shortage of oil revenue inflows; government attempts to depreciate their nominal exchange rate to halt outflows of foreign currencies. Than implementing more taxes on the economic activity, which lead to a cost-push inflation, as it, rise sharply to 4.78 in 2015 and 5.59 in December 2017^{xi}.

Table 02: balance sheet of bank of Algeria by semester (billion of dinars)

Period	Jun2012	Dec2012	Jun1013	Dec2013	Jun2014	Dec2014
Assets						
Gold	1.13	1.13	1.13	1.14	1.14	1.14
Foreign currencies	954.36	975.80	947.08	1098.15	1259.79	1656.27
SDR	128.55	128.95	128.44	129.35	131.68	136.87
Investments	13643.48	13829.69	14113.17	13985.15	13973.66	13971.89
Total assets	14967.49	15267.77	15442.39	15531.06	15622.94	16056.79
Liabilities						
Money paper and coins in circulation	2857.95	2997.20	3043.76	3247.64	3503.28	3734.63
Current account of treasury	5888.60	5713.46	6002.04	5643.22	5235.64	4488.17
Bank reserves	843.63	699.29	1044.75	880.69	875.55	922.43
Liquidity operations	1906.24	2188.07	1513.98	1829.90	1894.46	1818.60
Total liabilities	14967.49	15267.77	15442.39	15531.06	15622.94	16056.79
Period	Jun2015	Dec2015	Jun2016	Dec2016	Jun2017	nov2017
Assets						
Gold	1.14	1.14	/	1.14	1.14	1.14

Foreign currencies	1651.66	1064.61	/	891.62	978.23	1121.44
SDR	149.67	159.56	/	133.50	134.66	146.18
Investments	14007.34	14240.77	/	11641.80	10437.13	10140.82
Total assets	16066.68	15772.87	/	13492.22	12638.76	14321.94
Liabilities			/			
Money paper and coins in circulation	3925.49	4183.77	/	4566.88	4749.00	4882.94
Current account of treasury	3521.04	2151.60	/	864.16	589.66	988.56
Bank reserves	1121.59	1033.99	/	826.81	789.25	947.54
Liquidity operations	996.90	812.70	/	0	0	0
Total liabilities	16066.68	15772.87	/	13492.22	12638.76	14321.94

Source : bank of Algeria statistics .

II – 2 Regulation fund of revenues^{xii} :

One from the useful instrument of sterilization is to switch government deposits from commercial banks to central bank; the reason is to halt the expansion in government spending, as well as preventing turbulence in government revenues.

The amount of government deposits were in growth since the creation of regulation funds of revenue to June2013(6002.04 billion of dinars^{xiii}) this accumulation is the result of oil price boom. However, in 2014 oil revenues fall and government budget or government expenditure depend on these revenues, this situation lead to consume or draw deposits at the central bank (947.54 billion of dinars in November 2017^{xiv}).

Beside classical methods, there are alternative tools to reduce the impact of inflows on domestic inflation like wider exchange rate bands, variable required reserves for international capital mobility, or capital controls. but Algerian authorities do not use this instruments; because domestic financial system is not opened on the world wide financial system except international trade transaction , under this circumstance central bank sustain an important costs for persistent sterilization , and government debt increase over time to withdraw liquidity from the market.

Table 03: Money market operations (end of period in millions of dinars)

	March 2016	June 2016	Sept 2016	Dec 2016	March 2017	June 2017
Rediscount	0	0	235326	432638	324382	0
Rediscount rate	4%	4%	3.5%	3.5%	3.5%	3.75%
Open market	0	0	0	0	58000	386222
7 days	0	0	0	0	58000	0
Rate of interest	/	/	/	/	3.5 %	3.5%
3 months	0	0	0	0	0	205782
Rate of interest	/	/	/	/	/	3.5%
6 months	0	0	0	0	0	92337
Rate of interest	/	/	/	/	/	3.5%
One year	0	0	0	0	0	88103
Rate of interest	/	/	/	/	/	3.5%
Total lending by bank of Algeria	0	0	235326	432638	382382	386222
Liquidity recovery						

7 days	200000	200000	0	0	0	0
Rate of interest	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%
3 months	65000	39000	0	0	0	0
Rate of interest	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%
6 months	45000	45000	0	0	0	0
Rate of interest	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Deposit facilities	561421	236400	246100	0	0	0
Rate of interest	0.3%	0.3%	0.3%	0.0	0.0	0.0
Total of liquidity recovery	871421	520400	246100	0	0	0

Source: monetary and financial tendency in first semester of 2017, page 16, bank of Algeria.

Table 03 shows the reverse situation in economic circumstance of Algeria in term of revenues, represented by a shortage of liquidity in money market. Through the introduction of rediscounting with reduced interest rate, than lending for banks and financial institutions with different maturities from 7 days to one year.

Conclusion

The result show that the policy of sterilization was effective to achieve the target, by offsetting money supply and reducing inflation pressures due to capital inflows until the end of 2014, according to lowering inflation rate over years. But persisting sterilization may be costly for monetary authorities.

Years that come after is characterized by a new type of inflation with a new determinant of inflation. In 2016 bank of Algeria stopped the sterilization and began injecting liquidity at the market with a significant increase in inflation but due to exchange rate depreciation in this period, and imposing more taxes on the economy .as a result costs of imported goods and taxes push inflation.

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- ^{ix} Source: monetary and financial tendency in first semester of 2017, page 16, bank of Algeria.
- ^x Bank of algeria report 2015; page 107.
- ^{xi} Monetary and financial tendency in second semester of 2017, bank of Algeria; page 10.
- ^{xii} Regulation fund of revenues is considered as a sovereign wealth fund, their type is stabilization fund, It was created to protect the budget from a slowdown of commodity prices(generally oil).
- ^{xiii} Balance sheet to bank of Algeria published on web site www.bank-of-algeria.dz