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# Capital account liberalization and Moroccan macroeconomic performances

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## ABSTRACT

Moroccan economic policy was oriented since mid-1980s to open and liberalize the economy. The openness policy was reinforced with trade flows liberalization in 1993 with accession to article VIII of IMF status. In a new step, the opening of the economy is reached after accession to the GATT and WTO and the conclusion of many bilateral free trade agreements in the end of 1990s and the beginning of the new millennium. Recently, the openness is accelerated in the area of capital flows liberalization with the objective to eliminate the restrictions on capital inflows and then on capital outflows. Thus, the recent capital account dynamics lead us to attempt to evaluate their effects on main macroeconomic variables. For this, we start the discussion by recalling the theoretical debate around external financial liberalization and lessons obtained from the recent experience. After this, we discuss the opportunity for Morocco, as small and open economy, to integrate international financial markets. Methodologically, we use a *Structural Vector Auto-Regressive* (SVAR) model to explore the interaction between capital flows and macroeconomic variables. The period of study is from 1980 to 2012. The results allow us to conclude that capital account liberalization has a major effect on real effective exchange rate. Capital inflows lead to a temporary depreciation of the real effective exchange rate during the first year and, then, to an appreciation starting from the second year. Precisely, the results confirmed that the conduct of capital account liberalization policy under a fixed exchange rate regime is conducive to the risk of real appreciation.

**KEY WORDS:** Capital account liberalization, Capital flows, macroeconomic performance, SVAR, Morocco.

## 1. Introduction

Globalization is “widely used to describe a variety of economic, cultural, social, and political changes that shaped the world over the past 50-odd years” (Guttal, 2007, p. 523). Economically speaking, globalization is defined as a process of economic integration, it has “often been associated with neoliberal positions that welcome the emergence of truly open and free global markets in capital and goods” (Goldblatt and al. 1997, p. 296). The process of integration requests a removal of barriers on goods and services flows and of restrictions on capital flows. “Beginning in the 1970s developing and advanced industrial nations began to dismantle restrictions on capital account transactions, unleashing vast movements of capital across national borders...By the end of 1990s advanced industrial nations had achieved high levels of financial openness...Yet, as the advanced industrial nations threw open their borders to international capital flows, many developing nations that were long plagued by domestic capital scarcity remained substantially closed.” (Brooks, 2004, p. 389).

In this context, financial liberalization remains a strategic objective of many emerging and developing countries and the free capital movements are realized by capital account liberalization especially after the end of East Asian crisis and Latin America crisis. Morocco as a small and open economy is involved in this process of liberalizing and opening. The strategy of gradual and accompanied openness, as the stylized facts demonstrate, began to influence the macroeconomic performance. The transition to the full opened economy pushed us to question if the current degree of capital account liberalization is beneficial for Morocco.

This paper is organized as follows. Section 2 presents the theoretical debate on financial liberalization and the IMF positions. In section 3, we study the emerging and developing countries experiences with capital account liberalization. Section 4 examines the Stylized facts from Moroccan experience and the strategy used to integrate the international financial market. Using SVAR model and data covering the period from 1980 to 2012, section 5 explores the links between capital flows and Moroccan macroeconomic performance. The analysis of results is discussed in the section 6. The last section contains some concluding remarks.

## 2. Theoretical framework and financial liberalization approach

At the balance of payments level, financial liberalization indicates the liberalization of capital account liberalization. It is defined as a relaxation of restrictions on capital inflows and outflows. It is a removal of controls imposed by monetary authorities on various financial flows, including foreign direct investments, portfolio

investments, and foreign banks' loans to residents and domestic banks' loans to non-residents (**Prasad and al. 2003, pp.7-8**). Thus, the debate around the liberalization is centralized on the capital flow movement's effects on emerging and developing markets, and exactly on the benefits and advantages that the financial liberalization presents for those countries.

The concept of financial liberalization is rooted in neoliberal theory stating that the free movement of international capital allows economies that do not have sufficient financial resources (emerging and developing economies) to attract capital flows from developed countries that have abundant financial resources and therefore accelerate economic growth. In addition, the first appearance of this concept is in the works of **McKinnon (1973)** and **Shaw (1973)** and its theoretical justification states that restrictions and interventions in the financial system are the cause of insufficient savings and investment and credit rationing (**Arestis and Demetriades, 1999, p. 442**).

There are two opposite points of view concerning how financial liberalization affects economic performance. The *Allocative efficiency* view borrows heavily from theoretical predictions of neoclassical growth models, according to which capital inflows to developing countries reduces the cost of capital and increases investment and growth, and therefore, the standard of living. *"The alternative view regards allocative efficiency as fanciful attempts to extend the results on the gains to international trade in goods to international trade in assets. The prediction of allocative efficiency hold only when the economy suffers from non-distortions other than barriers to free capital flows"* (**Henry, 2007, pp. 887-888**). It is a debate about the empirical validity of financial liberalization theory, the central question is whether the opening of the capital account leads to economic growth.

The *Allocative efficiency* is widely adopted both by the International Monetary Fund and by the World Bank, as well as the other international institutions and academics. Empirically, studies on the effect of financial liberalization on economic growth, allow an understanding of why a developing countries adopt capital account liberalization. Using data of 94 countries over the period 1955-2004 and using a time series analysis, a cross-sectional analysis and estimates of the GMM system, **Quin and Toyoda (2008)** show that capital account liberalization has a positive effect on economic growth both in developed and in emerging economies. **Henry (2007)** states that the working papers that find positive effect of capital account liberalization on real variables of the economy *tell us nothing about the empirical validity of the theory because they do not really test it*. The author shows that capital account liberalization *has significant effects on economic growth through its effect on the cost of capital, investment and economic growth*.

At the institutional level, financial liberalization differs from trade liberalization by the fact that the trade liberalization is started when the General Agreement on Tariffs and Trade (GATT) is created in 1947 and the World Trade Organization WTO is established in 1994 in industrial and developing countries (IMF, 2001), while the financial liberalization appears only after the break down of the international monetary system of Bretton Woods and is not a mandate of any international institution. In 1997, the IMF sought to make the capital account liberalization one of his purposes; however, the arrival of the Asian financial crisis of 1997-1998 has prevented its adoption (Prasad and Rajan, 2008, p. 149).

The IMF's position on capital flows management has changed considerably since the advent of the financial crises in Asia and Latin America. See for example the Evaluation report of FMI (2005). Thus, the orthodox approach of financial liberalization, based on the guidelines of the advanced economies and attitudes of major international investors has gradually evolved towards the pragmatic approach influenced by the concerns of emerging and developing economies (Ramos-Tallada, 2013). The pragmatic approach recognizes four main points. First, not all countries are ready for capital account liberalization. Second, liberalizing capital flows and strengthening domestic institutions, when the economic situation is good and the external environment is relatively stable, is the only way to stimulate the institutional development of the economy. Third, the pragmatic approach should encourage greater international portfolio diversification by domestic investors, i.e. encourage domestic capital outflows. And fourthly, start outflows liberalization with sectors that are easily controlled to prevent capital flight (Prasad and Rajan, 2008, p. 166-167).

### 3. Emerging and developing markets experiences

According to Bernanke (2005, p. 1), *“global capital flows have attained record highs relative to global income, reflecting both the powerful tendency of capital to seek the highest return and a concerted international effort to dismantle political and regulatory barriers to capital mobility”*. The motivation of many emerging and developing economies, from Chile to South Korea, to adopt capital account liberalization is the benefits of the theoretical predictions of *Allocative efficiency*, (Henry, 2007, p. 888).

In South Korea, the capital account liberalization was carried out in three stages (Kim et al., 2003, pp. 3-7). The first stage begins in the 1980s with the liberalization of capital inflows in order to finance current account deficits; this measure has recorded significant inflows of capital flows. However, liberalization under fixity of

exchange rates has led monetary authorities to reestablish restrictions on capital inflows to maintain export competitiveness. The second stage starts from 1990s and to the beginning of the Asian financial crisis, where the South-Korean authorities start with new measures of liberalization such as the accession to Article VIII of the IMF statutes and the adoption of a managed floating exchange rate regime. During this stage, the current account begins to deteriorate because of inflation, the real appreciation of the exchange rate and the international economic recession. This has pushed the Korean authorities to remove restrictions on capital outflows, to reform exchange rate regime and regulate the domestic financial market. In 1997, the arrival of the Asian financial crisis led to massive capital flight and capital account deficits; however, the monetary authorities haven't stopped restrictions removing on the capital movements, which it comes from the third stage of the post financial crisis where South Korea accelerates the capital account liberalization and adopts the freely floating exchange rate regime under the IMF program.

In their study, **Kim et al. (2003)** examine the macroeconomic effects of South Korean capital account liberalization. Using a VAR model and time series of three periods: from 1980 to 1989, 1990 to 1999 (including the period of the crisis) and 1990-1997 (without the period of the crisis). The authors arrive at four conclusions. The first is that after liberalization, capital flows become less dependent on current account imbalances. The second is that capital account liberalization has significantly modified the effect of capital flows on macroeconomic variables such as that after 1990 they have positively influenced economic growth. The third is that capital inflows under a fixed exchange rate regime appreciate the exchange rate in nominal and real terms and then deteriorate the current account. The last is the importance of sterilized interventions on the foreign exchange market in order to moderate the effect of capital flows on the real appreciation of the exchange rate and macroeconomic variables.

In Turkey, the monetary authorities have changed their strategy towards liberalization and openness since the 1980s (**Dinçer and al. 2011, p. 3-5**). They have implemented reforms of the local financial sector by "*removing interest rate ceilings and freeing bank lending and borrowing*". The full financial liberalization plan have removed all restrictions on capital, allowing residents and non-residents to make freely all financial transactions and allowed the Turkish economy to accumulate significant capital inflows and to finance the current account deficit. In addition, short-term external debt is also liberalized which increased the vulnerability of debt because of its speculative character; this is responsible for the reversal of capital inflows and triggering of the financial crisis of 1994. After restoring macroeconomic balances by stabilizing intervention on the exchange rate market and

adoption of disinflation programs under the IMF interventions, Turkey adopt structural reforms since 2001, namely adoption of a floating exchange rate regime, rehabilitation of the banking sector, promotion of foreign direct investment, etc. These reforms lead Turkey to achieve high growth rates, low levels of inflation and of external debt, and increase of economic confidence.

In their study on capital flows and Turkish macroeconomic performance **Dincer and al. (2011)** use quarterly data for the periods 1989:01 -2001:01 and 2001:02 -2009:03 and show through a SVAR model that efficient capital flows mobility requires a healthy financial system to provide sufficient resources for economic activity, better management of public finances and vigilant monetary policy to avoid the risk of a real appreciation of the exchange rate. The analysis of impulse responses shows that real GDP responds positively to a capital flows shock either before or after the 2001 crisis. However, before the crisis the response to capital flows shock cancels over time from the second quarter and disappears from the fourth quarter. After the crisis, the response to the shock cancels from the second quarter, but becomes negative after the fifth quarter. This allows us to conclude that during crisis period, the monetary authorities should adopt adjustment policies to strengthen economic fundamentals and support growth.

**Ozguzer (2012)** develops a dynamic stochastic general equilibrium model DSGE representing the Turkish economy by a small and open economy produces two types of goods: non-tradable goods and tradable goods. To study the welfare under capital flows liberalization, the author models the objective-functions of two economic agents: households and firms. The steady state of the economy is a closed economy corresponding to the year of 1989 and the start of liberalization and openness to capital flows is 1990. Thus, the simulation of the general equilibrium model shows that capital inflows and borrowing from international markets boosted the Turkish economy and shows that liberalization provides a higher welfare for households in comparison with a situation where the economy was closed.

The experience of developing countries shows that the openness must go through a gradual removal of restrictions on capital flows mobility, either at the entering level regarding foreign savings, or at the exit level regarding domestic savings. Thus, the capital account liberalization is a part of a gradual approach widely adopted by emerging countries, where the goal is to eliminate gradually the restrictions as the economy grows, the banking sector develops and the institutional framework becomes mature (**Daly, 2007, p. 6**). The risk is related to the capital flows behavior which changes across regions and countries and depends on several factors, among them,

the efficiency of the internal financial system (Edwards, 2001, pp. 15-26). To avoid its adverse effects, emerging economies have adopted a prudent openness policy and a gradual removal of controls on capital inflows and capital outflows.

For example, in MENA region, Kchir and Mensi (2009) confirm that successful liberalization requires prior macro-economic stability, domestic financial sector development and advanced trade openness. The authors use the GMM estimator on panel data from the Middle East and North Africa countries over the period from 1993 to 2007. The founded results allow developing an optimal scheduling of economic and financial reforms. As a first step, a developing country should liberalize trade five years before the liberalization of the capital account. Then, support the banking sector and control inflation at the same time, with sustenance of the economic growth. Finally, develop the exchange stock market by increasing its performance and its capitalization.

The lessons of these experiences is that the adoption of the financial openness by developing countries is justified; as predicted by the theory of *allocative efficiency*, by its positive effects on economic growth in the long term. According to Warner, A. and Sachs, J. (1990)<sup>1</sup>, the average growth rate of opened developing economies is 4.5% per year, while the average growth rate of closed developing countries is at 0.7 %. The positive effect of openness on economic growth can explain empirically the developing countries orientation toward the accelerating of liberalization plans and, as a result, huge capital inflows to these countries. These flows are increasingly linked to interbank (e.g. bank loans between domestic banks and foreign banks) and portfolio flows which are short-term flows (Berthaud and al. 2011, p. 2), which could explain their unstable character during the crisis periods. In addition, the lack of structural reforms in the economy and an optimal sequential liberalization policy is likely to cause a financial crisis like the Asian and Latin American crises.

#### 4. Capital account liberalization and capital flows in Morocco

Economic openness in Morocco is marked by the liberalization of current transactions i.e. imports and exports of goods and services, transport, insurance, etc. This was conducted according to article 8 of IMF statute since 1993. Moroccan authorities impose tight restrictions on inward and outward capital flows. These restrictions are generally imposed on capital outflows, such as foreign investment of domestic firms, foreign investment of domestic banks, etc. The Moroccan authorities imposes also restrictions on capital inflows that mainly affect

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<sup>1</sup> Cited by Gregory Mankiw (2010) in « Macroeconomics »



foreign investment in administered domestic goods (foreign direct investment), limits on portfolio investment (e.g. less than 50% of the capital) and the exclusion to borrow from foreign banks for households (foreign bank loans).

The analysis of agreements signed by Morocco, namely accession to **GATT**, accession to the IMF status, accession to the **WTO**, the Association Agreement with the European Union, free-trade agreements with several countries, etc. show clearly two aspects characterizing the Moroccan strategy of liberalization. First, there is a gradual approach to achieve a successful integration into the global economy. Second, openness is accompanied by Moroccan authorities so as to avoid macroeconomic imbalances associated with liberalization and to ensure the competitiveness of the national economy to face international competition. Moreover, economic openness encompasses the liberalization of capital account transactions<sup>2</sup> i.e. foreign direct investment, foreign loans, hedging against financial risks (currency, price and interest rates), loans to non-resident individuals, etc.

The *office de change* is Moroccan authorities responsible for regulating all financial transactions between Morocco and the rest of the world, he published periodically in its reports the new steps taken to liberalize the capital account. The measures undertaken by the Moroccan authorities to reduce restrictions on capital account transactions have produced significant inflows. Figures 1 and 2 give an idea about the financial inflows and outflows.

Morocco's efforts to achieve capital account liberalization induced important foreign direct investment inflows (Figure 1) and a relatively less important of portfolio investments (Figure 2). Indeed, in Morocco, the capital account is almost totally free for non-residents (total liberalization of capital inflows) and relatively liberalized for residents (partial liberalization of capital outflows). The analysis of these stylized facts allows us to confirm the gradual strategy of Moroccan capital account liberalization and its effects on capital account. In this analysis, it is necessary to study the effect of capital flows on macroeconomic variables, especially on key economic variables: economic growth, inflation, real effective exchange rate and the real interest rate. The following section is an econometric essay to model the links between capital account liberalization and macroeconomic performance in Morocco using a Structural Vector Auto-Regressive model (SVAR).

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<sup>2</sup> Office de change

## 5. Modeling the capital flows and macroeconomic variables

The choice of SVAR model is dictated by two reasons. The first is to quantify the economic effects of financial liberalization and study its interaction with macroeconomic variables. The second reason is econometric, if there is no cointegration relationship between used variables (Table 1 and Figure 3), so we use autoregressive models.

In order to linearize variables, we use logarithm for all variables but real interest rate because it's a percentage and comport a negative values (see table 2). Thus, we test the stationarity of variables to apply the VAR model. Using Eviews package the *Augmented Dickey-Fuller* test (Table 3) shows that variables are not all stationary in level. So, we differentiate the variables as follow: ***DLLCK<sub>t</sub>***, ***DLPIBR<sub>t</sub>***, ***DLIPC<sub>t</sub>***, ***DTIR<sub>t</sub>***, ***DLM<sub>t</sub>***, ***DLTCER<sub>t</sub>***.

### Canonical VAR model

A *Vector Auto Regressive* VAR model (p,q) is presented as system of *Auto Regressive* AR(q) models, with p is the variables number and q is the optimal lag order. For our example, Table 4 indicates that the lag of 0 is selected by one information criterion and the lags 1 and 2 are selected by two information criterions respectively. Since the value of **logL** associated with the first lag is less than the value of **logL** associated with the third lag, then the lag 1 is the optimal lag for our VAR model. Thus, the model of **VAR(6,1)** can be presented under linear form as follow :

$$\begin{cases} DLLCK_t = \alpha_{11}DLLCK_{t-1} + \alpha_{12}DLTCER_{t-1} + \alpha_{13}DLPIBR_{t-1} + \alpha_{14}DLM_{t-1} + \alpha_{15}DTIR_{t-1} + \alpha_{16}DLIPC_{t-1} + \varepsilon_{1t} \\ DLTCER_t = \alpha_{21}DLLCK_{t-1} + \alpha_{22}DLTCER_{t-1} + \alpha_{23}DLPIBR_{t-1} + \alpha_{24}DLM_{t-1} + \alpha_{25}DTIR_{t-1} + \alpha_{26}DLIPC_{t-1} + \varepsilon_{2t} \\ DLPIBR_t = \alpha_{31}DLLCK_{t-1} + \alpha_{32}DLTCER_{t-1} + \alpha_{33}DLPIBR_{t-1} + \alpha_{34}DLM_{t-1} + \alpha_{35}DTIR_{t-1} + \alpha_{36}DLIPC_{t-1} + \varepsilon_{3t} \\ DLM_t = \alpha_{41}DLLCK_{t-1} + \alpha_{42}DLTCER_{t-1} + \alpha_{43}DLPIBR_{t-1} + \alpha_{44}DLM_{t-1} + \alpha_{45}DTIR_{t-1} + \alpha_{46}DLIPC_{t-1} + \varepsilon_{4t} \\ DTIR_t = \alpha_{51}DLLCK_{t-1} + \alpha_{52}DLTCER_{t-1} + \alpha_{53}DLPIBR_{t-1} + \alpha_{54}DLM_{t-1} + \alpha_{55}DTIR_{t-1} + \alpha_{56}DLIPC_{t-1} + \varepsilon_{5t} \\ DLIPC_t = \alpha_{61}DLLCK_{t-1} + \alpha_{62}DLTCER_{t-1} + \alpha_{63}DLPIBR_{t-1} + \alpha_{64}DLM_{t-1} + \alpha_{65}DTIR_{t-1} + \alpha_{66}DLIPC_{t-1} + \varepsilon_{6t} \end{cases}$$

Under matrix form:

$$\begin{bmatrix} DLLCK_t \\ DLTCER_t \\ DLPIBR_t \\ DLM_t \\ DTIR_t \\ DLIPC_t \end{bmatrix} = \begin{bmatrix} \alpha_{11} & \alpha_{12} & \alpha_{13} & \alpha_{14} & \alpha_{15} & \alpha_{16} \\ \alpha_{21} & \alpha_{22} & \alpha_{23} & \alpha_{24} & \alpha_{25} & \alpha_{26} \\ \alpha_{31} & \alpha_{32} & \alpha_{33} & \alpha_{34} & \alpha_{35} & \alpha_{36} \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & \alpha_{44} & \alpha_{45} & \alpha_{46} \\ \alpha_{51} & \alpha_{52} & \alpha_{53} & \alpha_{54} & \alpha_{55} & \alpha_{56} \\ \alpha_{61} & \alpha_{62} & \alpha_{63} & \alpha_{64} & \alpha_{65} & \alpha_{66} \end{bmatrix} \times \begin{bmatrix} DLLCK_{t-1} \\ DLTCER_{t-1} \\ DLPIBR_{t-1} \\ DLM_{t-1} \\ DTIR_{t-1} \\ DLIPC_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \\ \varepsilon_{6t} \end{bmatrix}$$

Equivalent to:

$$V_t = \alpha V_{t-1} + E_t$$

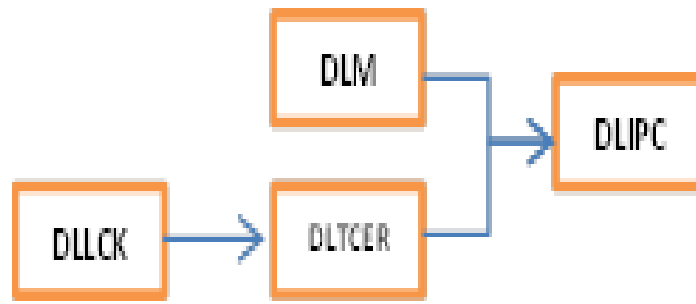
The canonical form of the model is presented as follow;

$$V_t - \alpha V_{t-1} = E_t \text{ and } V_t - \alpha L V_t = E_t \text{ with } L \text{ is a lag operator of degree 1.}$$

$$(I - \alpha \cdot L) \cdot V_t = E_t \text{ ou } (I - \alpha \cdot L) = A(L)$$

$$A(L) \cdot V_t = E_t \text{ with } A(L) \text{ is a polynomial function of degree 1.}$$

Before estimating the VAR model, we test the Granger causality to determine the direction of causality between used variables. The objective is to improve the reading of the results of estimated VAR model (6.1). Table 5 indicate that the variables DLM and DLTCER cause the variable DLIPC and that the variable DLLCK causes the variable DLTCER under the following order:



### Structural VAR model

The transition to the SVAR model is dictated by the need to integrate economic assumptions in the model. Thus, the economic interactions are formulated as a variables classification from the most exogenous variable to the most endogenous. In this model, the variable of capital account liberalization (DLLCK) could influence all macroeconomic variables; it is exogenous and should be classified first. The effect of capital flows is transmitted to the DLTCER variable representing the economic competitiveness, it is classified second. The DLPIBR variable is classified third because it reflects the real effect of capital and external competitiveness. The capital influx has the effect of increasing the money supply (DLM) circulating in the economy and influences the evolution of DTIR; they are respectively classified fourth and fifth. The last variable DLIPC is considered the most endogenous, it is classified last.

We define the structural shocks  $W_t = [w_{1t}, w_{2t}, w_{3t}, w_{4t}, w_{5t}, w_{6t}]'$  of the canonical VAR model via the model errors no explained  $E_t = [\varepsilon_{1t}, \varepsilon_{2t}, \varepsilon_{3t}, \varepsilon_{4t}, \varepsilon_{5t}, \varepsilon_{6t}]'$  by  $A(L) \cdot V_t = E_t$  :

- $W_{1t}$  : capital flows shocks ;
- $W_{2t}$  : real effective exchange rate shocks ;
- $W_{3t}$  : real output shocks ;
- $W_{4t}$  : money supply shocks ;
- $W_{5t}$  : interest shocks;
- $W_{5t}$  : Inflationary shocks.

To identify these shocks, we estimate the model errors  $E_t$  via the following VAR presentation:  $V_t = \alpha V_{t-1} + E_t$ . The matrix elements of  $E_t$  are estimated by Eviews using data from 1980 to 2012, these errors are a residuals resulting from regressions corresponding to the estimation, equation by equation, of the following model:  $\hat{E}_t = V_t - \alpha V_{t-1}$ . After estimating the model errors, we explain it as a linear combination of structural shocks:  $E_t = P * W_t$ . The matrix P is a change of basis matrix carrying the following condition:

$$P = A^{-1} * B \text{ Where } A * E_t = B * W_t$$

At the last, we calculate the structural shocks as follow:

$$\hat{W}_t = P^{-1} * \hat{E}_t \text{ avec } P^{-1} = A * B^{-1}$$

To view the responses of macroeconomic variables to structural shocks, we define the impulse responses functions of the model. Thus, we convert the canonical VAR model to a VMA model (Vector Mean Average) by reversing the model  $A(L)V_t = E_t$ . Reversing the polynomial  $A(L)$  - according to the Wold theorem - provides Mean Average form:

$$V_t = B(L)E_t \text{ with } B(L) = A^{-1}(L)$$

We have  $E_t = P * W_t$ , from where  $V_t = B(L) * P * W_t$ . We put :  $\Phi(L) = B(L) * P$  or  $\Phi_j$  and we obtain :

$$V_t = \Phi(L) * W_t = \sum_{j=0}^{\infty} \Phi_j W_{t-j}$$

With  $\Phi_j$  is the response function of  $V_t$  variables to  $W_t$  structural shocks.

## Estimation

To estimate SVAR model we valid the VAR model in terms of stationarity, stability, autocorrelation, and homoscedasticity. Thus, the *Augmented Dickey-Fuller* test shows that all model VAR residuals (figure 4) are stationary at level. Figure 5 shows that all root inverses of characteristic polynomial are less than 1 and inside the unit circle, so we conclude that the estimated VAR model is stable. The LM test of autocorrelation (table 6) indicate that the probability associated with the LM statistic at the lag 1 (optimal lag) are greater than the 5%, from where the non-auto-correlation of residuals. The White test shows that the residuals are not heteroskedastic, because the probability of Chi-sq statistic (table 7) is higher than 5%, from where the VAR model residuals are homoscedastic. Finally, the VAR model is valid, so we estimate SVAR model and we calculate the impulse responses, the Figure 6 presents variables response to capital flows shock.

## 6. Results discussion

### 6.1. Capital flows effect on macroeconomic variables

Figure 6 shows macroeconomic variables response to a capital account liberalization shock over a period of 10 years. The first impulse response represents the behavior of DLLCK variable over his past; it means a capital influx resulting from a capital account "shock" determined from 1980 to 2012. The impulse analysis allows us to study the effect on the real exchange rate, real output, money supply, real interest rate and the general price level.

A shock of capital account liberalization leads to a real effective exchange rate depreciation of the Moroccan Dirham during the first year. However, the real effective exchange rate begins to appreciate from the same year and reached a maximum level in the second year. The effect of shock cancels over time and returns to its pre-shock period after the eighth year. Thus, the results show that financial without taking into consideration a flexible exchange rate regime leads to a real exchange rate appreciation. Thus, a capital inflow will increase the money demand, which means an increase in Dirham nominal value and as the exchange rate is fixed, and then the adjustment will be done in real terms.

Real output responds positively to a capital flows shock during the first year. This result confirms the predictions of the theory, however, the real output decreases from the second year and cancels over following years. Thus, the result allows us to conclude that the positive effect of financial liberalization on growth in the current context is weak and of short duration. For money supply, capital inflows increase liquidity circulating in the economy. A positive response of money supply decreases over time and it returns to its pre-shock level in the

fourth year. Therefore, no effect is recorded at the impulse response of real interest rates. The result could be explained by the fact that the monetary authorities have not removed all controls on interest rates. However, the liberalization of interest rates is an indication of a free financial market where capital price is determined by the free supply and demand.

The response of the last variable, which is the general price level is minimal, it increases slightly during the second and third year and decreases thereafter during all years. A no response of prices is explained by price stability in Morocco. Indeed, the average annual rate of inflation did not exceed 2% in the last two decades because of fiscal policy based on subsidies system (Compensation Fund), which has eased inflationary pressures in Morocco.

### *6.2. Variance decomposition analysis*

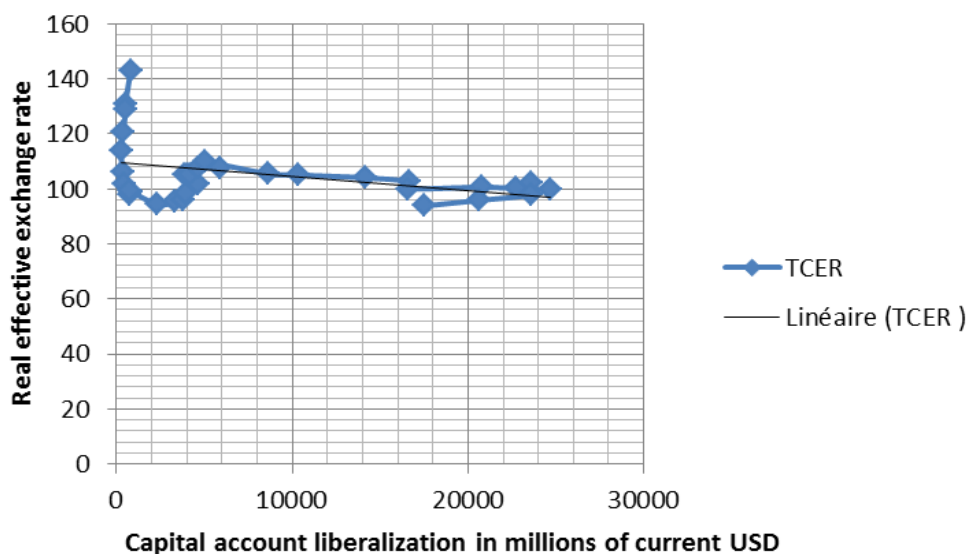
The variance decomposition objective is to quantify the contribution of shocks in explanation of variables changes. Table 8 shows the percentage of each contribution, it allows us to determine contributions of capital flows in explaining variations of macroeconomic variables:

- The contribution of capital account liberalization shock DLLCK in explaining of real effective exchange rate variations DLTCER is 20% from the third year;
- The contribution of capital account liberalization shock DLLCK in explaining of real output DLPIBR variations is 8% in the first year and almost 5% over years;
- The contribution of capital account liberalization shock DLLCK in explaining of money supply DLM variations is almost 16% over years;
- The contribution of capital account liberalization shock DLLCK in explaining of real interest rates DTIR variations is weak, it does not exceed 0.09% over years;
- Finally, the contribution of capital account liberalization shock DLLCK in explaining of consumer prices index variations (general price level) DLIPC does not exceed 1% over years.

### *6.3. Results comparison*

It appears clearly that variables interacting with capital flows are the real effective exchange rate and money supply growth. These results are similar in comparison with South Korean experience (**Kim and al., 2003**)

and Turkish experience (Dinçer and al. 2011). The following scatter plot shows a negative link between capital flows and real effective exchange rate:



The same remark was observed in Latin America where there were “a clear empirical association between the availability of international capital and the real exchange rate” (Hausmann and al, 1997, p.11). The real appreciation produces the risk of reducing competitiveness under a fixed exchange rate regime and “can make a country more vulnerable to a crisis when it opens its capital markets” (Prasad and Rajan, 2008, p. 154). Josifidis et al. (2013) find, using SBVAR model, that the common international financial shocks lead to different monetary policy responses and that the responses of real effective exchange rate to capital inflows’ shocks depends on the exchange rate regime adopted by an economy.

## 7. Conclusion and recommendation

The theoretical debate around the effect of capital flows liberalization on economic growth and developing countries experiences has influenced financial liberalization policies and programs. Thus, developing countries preoccupations adopted a gradual and sequential liberalization policy as the economy grows and internal financial sector strengthens. In this study, we have treated Moroccan experience and its strategy of integration into international capital market. To study its effect on macroeconomic performance in Morocco, we used a structural auto regression SVAR model which helps to detect the interaction between capital flows and macroeconomic variables. Transition from a canonical VAR model to a structural VAR model is dictated by the need to integrate economic assumptions in the model.

The results indicate that capital flows liberalization affects primarily the real effective exchange rate. The capital inflows lead to a temporary real depreciation in first year and to a real appreciation from second year to a long term. More specifically, the results confirm that the conduct of capital account liberalization policy under a fixed exchange rate regime may lead to an appreciation of real exchange rate. In addition, the effect on growth remains weak and cancels over years; this result could be explained theoretically by incomplete capital account liberalization and the need for structural reforms for the economy. Furthermore, the effect on other variables is weak with the exception the effect on money supply growth that responds positively to capital flows shock.

The absence of a risk on Moroccan macroeconomic performance allows us to recommend a gradual acceleration of capital account liberalization and to take into consideration a partial flexibilization of its exchange rate regime in order to avoid external competitiveness loss. However, the appropriate degree of flexibility coinciding with a current openness degree poses another problem of the optimal choice of exchange rate regime. The flexible exchange rate regime, in a current context, is it an optimal choice for Morocco?

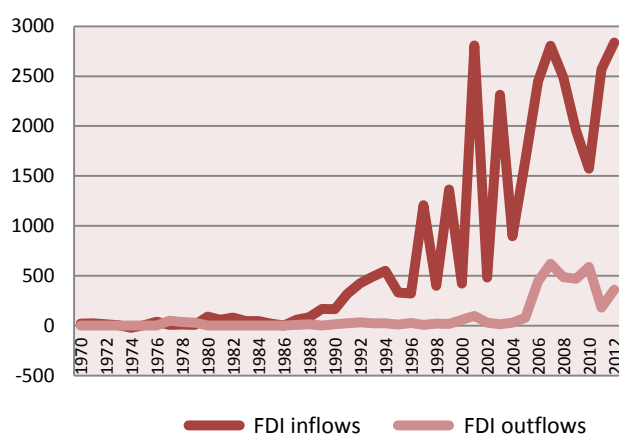
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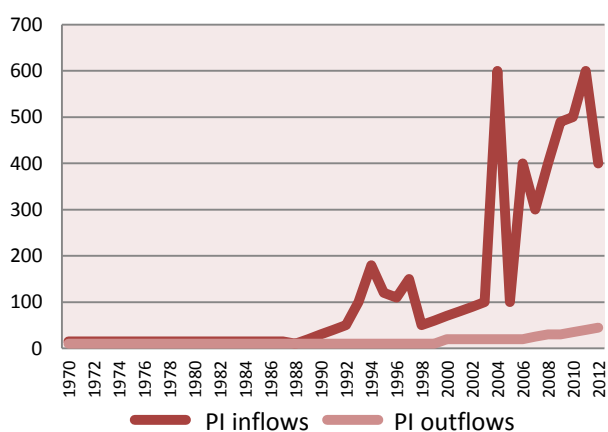
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Figure 1: FDI inflows and outflows (in millions of USD)



Source: UNCTAD; calculation: authors.

Figure 2: Portfolio investment inflows and outflows (in millions of USD)



Source: UNCTAD; calculation: authors.

Table 1: capital flows and macroeconomic variables

Variables	Designation	Unit
LCK	Capital account liberalization	In millions of current USD (measured by international reserves)
PIBR	Real Gross domestic product	In millions of constant USD 2000
IPC	Consumer price index	Base 100 in 2005
TIR	Real interest rate	In percentages
M	Money supply	In millions of MAD
TCER	Real effective exchange rate	Base 100 in 2005

Source: World Bank data completed by IMF data, BAM data and HCP data.

Figure 3: graphic presentation of used variables

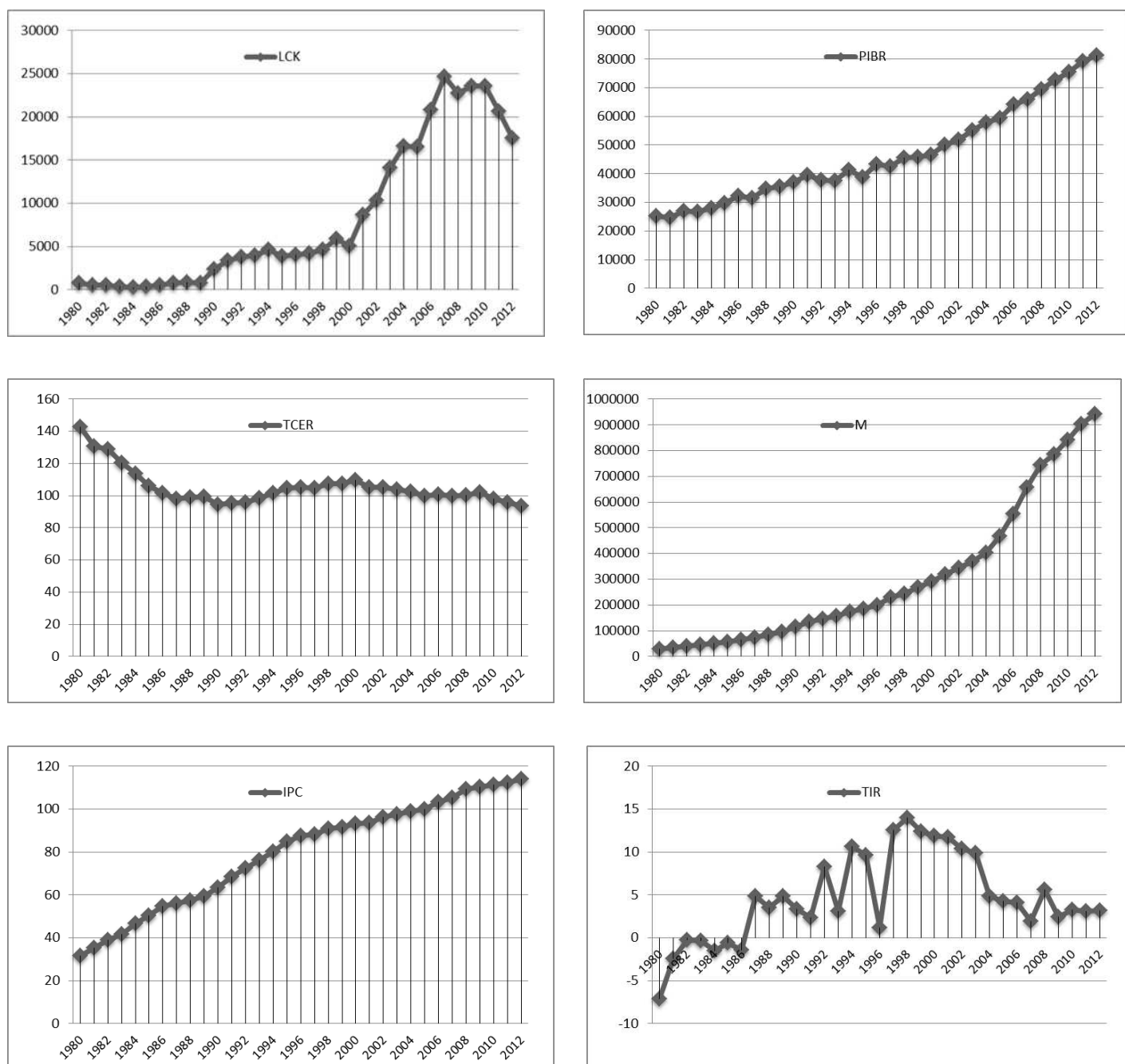


Table 2: Linearization of variables

Variable	Log-linearization	designation
LCK	Log(LCK)	LLCK
PIBR	Log(PIBR)	LPIBR
IPC	Log(IPC)	LIPC
M	Log(M)	LM
TCER	Log(TCER)	LTCER

**Table 3: Stationarity tests of variables**

		Level with trend and constant	Level with trend	Level without trend and constant	First difference with trend and constant	First difference with constant	First difference without trend and constant
		[1]	[2]	[3]	[4]	[5]	[6]
LLCK	Stationnarity	No stat	No Stat	No stat	Stat	Stat	stat
	constant	Sig	Non Sig		No sig	No sig	
	Trend	No sig			No sig		
LPIBR	Stationnarity	No stat	No stat	No stat	Stat	Stat	
	constant	No sig	No sig		sig	Sig	
	Trend	No sig			No Sig		
LIPC	Stationnarity	No stat	Stat				
	constant	No sig	Sig				
	Trend	No sig					
TIR	Stationnarity	No stat	Stat				
	constant	No sig	Sig				
	Trend	No sig					
LM	Stationnarity	No stat	No stat	No stat	Stat	Stat	
	constante	Sig	Sig		sig	sig	
	Trend	Sig			No sig		
LTCER	Stationnarity	No stat	Stat				
	constant	Sig	Sig				
	Trend	Sig					

**Table 4 : VAR lag order selection criteria**

**VAR Lag Order Selection Criteria**

Endogenous variables: DLLCK DLT CER DLPIBR DLM DTIR DLIPC

Exogenous variables: C

Date: 04/15/14 Time: 21:29

Sample: 1980 2012

Included observations: 29

Lag	LogL	LR	FPE	AIC	SC	HQ
0	156.2357	NA	1.27E-12	-10.36108	-10.07819*	-10.27248
1	211.2135	83.41457*	3.65E-13*	-11.66989	-9.689672	-11.04971
2	246.8024	39.27058	5.34E-13	-11.64155	-7.963992	-10.48978
3	301.6824	37.84827	4.54E-13	-12.94361*	-7.568727	-11.26027*

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

**Table 5: Granger causality test**

Pairwise Granger Causality Tests

Date: 04/16/14 Time: 19:27

Sample: 1980 2012

Lags: 1

NullHypothesis:	Obs	F-Statistic	Probability
DLLCK does not Granger Cause DLIPC	31	0.01027	0.91999
DLIPC does not Granger Cause DLLCK		0.05693	0.81315
DLM does not Granger Cause DLIPC	31	6.18585	<b>0.01911</b>
DLIPC does not Granger Cause DLM		0.23874	0.62892
DLPIBR does not Granger Cause DLIPC	31	1.68508	0.20484
DLIPC does not Granger Cause DLPIBR		0.27856	0.60181
DLTCER does not Granger Cause DLIPC	31	4.94637	<b>0.03439</b>
DLIPC does not Granger Cause DLTCER		1.00836	0.32390
DTIR does not Granger Cause DLIPC	31	0.80708	0.37665
DLIPC does not Granger Cause DTIR		1.14977	0.29275
DLM does not Granger Cause DLLCK	31	0.03284	0.85750
DLLCK does not Granger Cause DLM		0.42586	0.51935
DLPIBR does not Granger Cause DLLCK	31	0.20750	0.65225
DLLCK does not Granger Cause DLPIBR		0.00030	0.98629
DLTCER does not Granger Cause DLLCK	31	0.01601	0.90022
DLLCK does not Granger Cause DLTCER		4.75001	<b>0.03787</b>
DTIR does not Granger Cause DLLCK	31	0.05190	0.82144
DLLCK does not Granger Cause DTIR		0.01782	0.89476
DLPIBR does not Granger Cause DLM	31	1.74559	0.19713
DLM does not Granger Cause DLPIBR		0.01833	0.89326
DLTCER does not Granger Cause DLM	31	0.37851	0.54337
DLM does not Granger Cause DLTCER		2.10320	0.15810
DTIR does not Granger Cause DLM	31	3.37811	0.07670
DLM does not Granger Cause DTIR		1.82232	0.18785
DLTCER does not Granger Cause DLPIBR	31	2.57529	0.11977
DLPIBR does not Granger Cause DLTCER		1.97089	0.17135
DTIR does not Granger Cause DLPIBR	31	2.01639	0.16665
DLPIBR does not Granger Cause DTIR		2.10539	0.15789
DTIR does not Granger Cause DLTCER	31	2.88300	0.10061
DLTCER does not Granger Cause DTIR		0.27460	0.60438

Figure 4: residuals stationarity



Figure 5: Test AR of stability

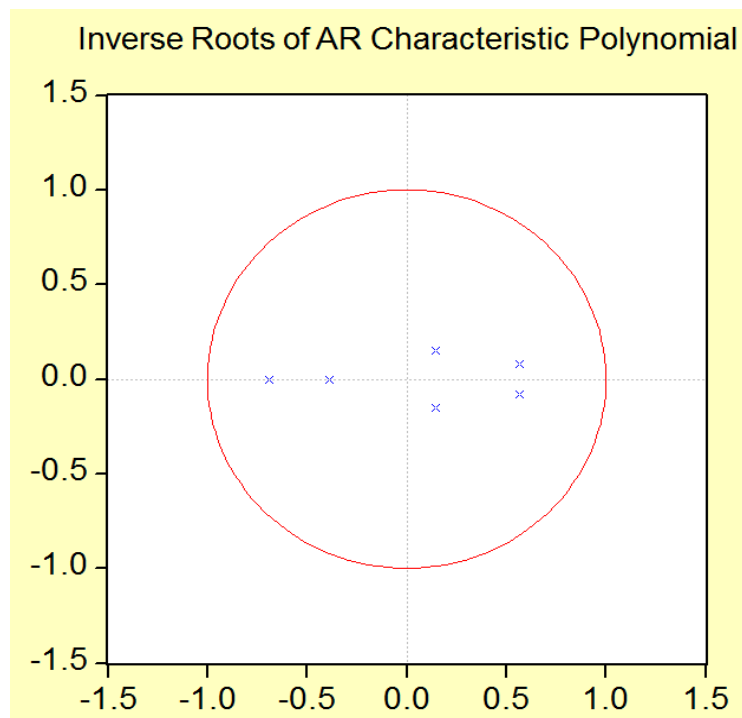


Table 6: LM test of autocorrelation

VAR Residual Serial Correlation LM ...  
H0: no serial correlation at lag order h  
Date: 04/16/14 Time: 22:27  
Sample: 1980 2012  
Included observations: 31

Lags	LM-Stat	Prob
1	38.86847	0.3418
2	26.97202	0.8618
3	37.28033	0.4100
4	70.61519	0.0005
5	38.17221	0.3710
6	36.42278	0.4490
7	45.84431	0.1260
8	34.93960	0.5189
9	34.03071	0.5625
10	19.22031	0.9901
11	39.11402	0.3318
12	28.62102	0.8043

Probs from chi-square with 36 df.

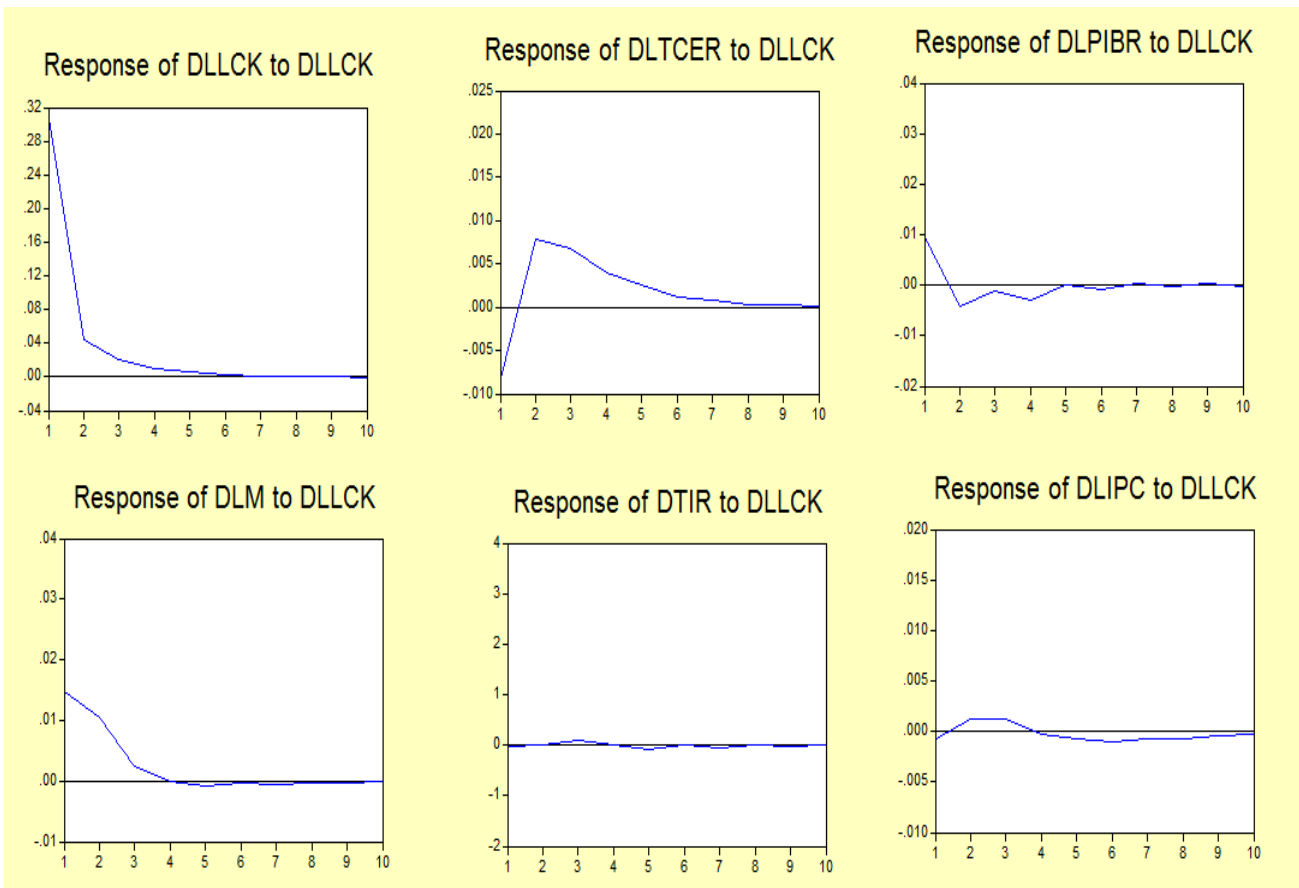
Table 7: VAR residual heteroskedasticity tests

VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)  
Date: 04/16/14 Time: 22:32  
Sample: 1980 2012  
Included observations: 31

Joint test:

Chi-sq	df	Prob.
269.0486	252	0.2199

Figure 6: Impulse responses of variables to capital flows shocks





**Table 8: Variance decomposition**

Variance Decomposition of DLTCER			Variance Decomposition of DLPIBR			Variance Decomposition of DLM			Variance Decomposition of DTIR			Variance Decomposition of DLIPC:		
Period	S.E.	DLLCK	Period	S.E.	DLLCK	Period	S.E.	DLLCK	Period	S.E.	DLLCK	Period	S.E.	DLLCK
1	0.023032	12.55995	1	0.032545	8.423870	1	0.038809	14.61963	1	3.568452	0.003809	1	0.019080	0.134485
		(12.1498)			(10.3411)			(11.8381)			(6.40109)			(4.38411)
2	0.027876	16.59680	2	0.040419	6.562913	2	0.044581	16.72856	2	4.060382	0.003018	2	0.023970	0.323038
		(11.0690)			(10.9285)			(12.3388)			(8.61371)			(5.90547)
3	0.029602	20.03761	3	0.043686	5.675904	3	0.045107	16.64614	3	4.136712	0.050145	3	0.026399	0.500930
		(10.9743)			(10.8022)			(12.1346)			(9.42244)			(6.18540)
4	0.030144	21.13377	4	0.045141	5.718495	4	0.045235	16.55251	4	4.177759	0.049220	4	0.027402	0.471277
		(11.5065)			(11.1907)			(12.0592)			(9.84792)			(6.20673)
5	0.030391	21.51871	5	0.045869	5.539763	5	0.045332	16.51871	5	4.204318	0.081406	5	0.027695	0.529353
		(11.7698)			(11.4785)			(12.0475)			(9.99651)			(6.39403)
6	0.030464	21.56152	6	0.046185	5.502393	6	0.045358	16.50851	6	4.216534	0.080976	6	0.027867	0.675815
		(12.0121)			(11.7082)			(12.1005)			(10.1405)			(6.73716)
7	0.030500	21.58633	7	0.046350	5.469325	7	0.045380	16.50628	7	4.223693	0.092203	7	0.027914	0.749189
		(12.0227)			(11.9255)			(12.1299)			(10.2245)			(7.24982)
8	0.030513	21.57786	8	0.046421	5.456777	8	0.045386	16.50403	8	4.226840	0.092241	8	0.027945	0.807251
		(12.0571)			(12.0207)			(12.1811)			(10.3176)			(7.57196)
9	0.030519	21.57670	9	0.046459	5.450554	9	0.045390	16.50375	9	4.228533	0.094704	9	0.027953	0.827099
		(12.0332)			(12.1126)			(12.2225)			(10.3972)			(7.87256)
10	0.030521	21.57335	10	0.046475	5.447343	10	0.045392	16.50310	10	4.229287	0.094775	10	0.027958	0.839480
		(12.0628)			(12.1372)			(12.2496)			(10.4882)			(8.02307)