The role of statistics in monetary policy decision making in Morocco: The case of real estate price index

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Abstract

This paper shows how important are of statistics in evidence based decision making in monetary policy by giving the example of the real estate price index (REPI), a measure that became a center of interest of policy decision makers after the financial crisis of 2008. This paper describes the experience of the BANK AL-MAGHRIB (Centrale Bank of Morocco) in constructing the REPI with the repeat sales method and review the importance of real estate price in the monetary policy framework and macro prudential policy. An empirical work show that there is a significant causality between real estate price and the economic cycle through the wealth effect and the tobin q in the asset price channel.

Keywords: monetary policy; central bank; tobin q, real estate price index (REPI).

1- Introduction:

The real estate price plays an important role in the analytical framework in monetary policy and financial stability. In fact, after the financial crisis of 2008 it becomes a center of the attention due to the fact that the origins the subprime mortgage crisis came from real estate. In Morocco, given its importance and due to the absence of national indicator of the evolution of real estate prices in the country, the Centrale Bank of Morocco has launched in 2010 a project of construction of real estate price index (REPI) in cooperation with the Land Registry Office. This project was a good example of cooperation between institutions. In fact, in the one hand the Central bank has the technical expertise to construct such index due to the fact that its economists have statistic and econometric background, and in the other hand the Land Registry Office has an exhaustive database, which contains detailed information on all property transactions registered at the national level. The first part will show how after the crisis of 2008 the real estate price become at the center of interest for policy decision maker, then the second part will deal with the methodology of construction of REPI in Morocco. A third part of the paper will expose how the assets price in general and the real estate price specifically are important in the monetary and macroprudential policy framework in the Centrale Bank of Morocco. Finally, the fourth part will conclude.

2- The Great financial crisis and the real estate price

The emergence of the 2008 financial crisis brought prices of real estate to the center of interest of policy decision makers especially in monetary policy and macro prudential policy. In fact, the collapse of the US real estate market, was the trigger of the crisis. Ideed, after the saturation of the demand for real estate assets the financial intermediaries turned to low-income households by granting mortgages "subprime mortgage" to many unreliable borrowers, credit institutions relied on a significant increase in the value of the property of disadvantaged households, which would have enabled them to repay interest and principal on mortgage debt. However, the increase of the housing price will impact positively the household wealth will allow increased access to borrowing using the leverage, which will eventually lead to an increasingly fragile financial situation for these households, exacerbate real estate cycle and result in a speculative bubble. Hense, the 2008 financial crisis is due on the one hand, to the lack of regulation of banking operations, and on the other hand to the lack of diversification of the banks' assets which have led to a high systemic risk. Indeed, the snowball effect of the financial crisis is mainly dependent on the rise in asset prices including real estate price that is maintained by bank credit. It is the channel through which financial intermediaries contribute to intensifying financial shocks, accentuating their consequences on real economic magnitudes and amplifying their pro-cyclicality. In addition, the fact that American bank of used securitization based on these mortgages has contributed to spread the crisis worldwide.

3- The construction of the real estate price index (REPI)

After the financial crisis, and aware of the importance of the real estate price in the monetary policy and financial stability, the Centrale bank of Morocco has lanched a project of construction of real estate price index (REPI) in cooperation with the Land Registry Office in 2010, which was a first experience at the national level. It was also a good example of cooperation between institutions of improve the statistical framework in the country. However, the construction of such index was challenging mainly due to the nature of this asset. Indeed, the housing market shows great heterogeneity, hence the adoption of a uniformed approach extremely challenging since prices of different properties are influenced by intrinsic characteristics (surface area, number of rooms, age, geographical location…). In addition, a property represents a durable asset that rarely changes its owner, making the assessment of prices fluctuations difficult. And finally, the estimation of transaction price contains a significant discrepancy due to the existence of "black" which is the amount that is not declared in the transaction due to Tax evasion.

Several approaches are adopted in the construction of the REPI Simple techniques (simple or weighted average and median price) and econometric techniques (hedonic method and the repeat sales). For the simple method, this method measures the simple average, weighted average or median of real estate prices. However, monitoring such indexes does not allow to distinct between price and quality changes, the change in quality of properties between one period and another can bias the evolution of real estate price change. The hedonic method came to face the disadvantage of the simple method due to the fact that it takes into account the change in the quality of the property. Indeed, only changes in property prices with

similar characteristics from one period to another reflecting the changes in the conditions of supply and demand in the property market. This method requires the estimation of the effect of a number of characteristics on property price, through econometric equations specified for each elementary area relatively homogeneous and for each type of property. It needs also a detailed database with sufficient history to be able to do the estimation of the equations. In Morocco, and despite the importance of the database collected from the Land Registry Office, it is insufficient for estimating the effect of quality, which is the starting point for applying the hedonic method. Finally, the repeat sales method which is the method adopted to calculate the REPI, overcomes also the problem of heterogeneity of real estate; It consists of constructing a price index based on properties which have been sold more than once during the period under study assimilating price fluctuations to the average changes observed on repeat sales.

4. How the REPI is used in the analytical framework of the central bank

There are generally three channels of transmission of monetary policy: the interest rate channel, the exchange rate channel, the asset price channel, the credit channel and the expectation channel. Although these channels are generally studied separately, the impact of a monetary policy shock on production and inflation will depend on the combined effects of these three channels (see Bernanke and Blinder (1992)). Moreover, the interactions between the three channels constitute a powerful transmission mechanism through them the effects of shocks persist, amplify and spread.

Figure 1: Synthetic diagram of the channels of transmission of monetary policy
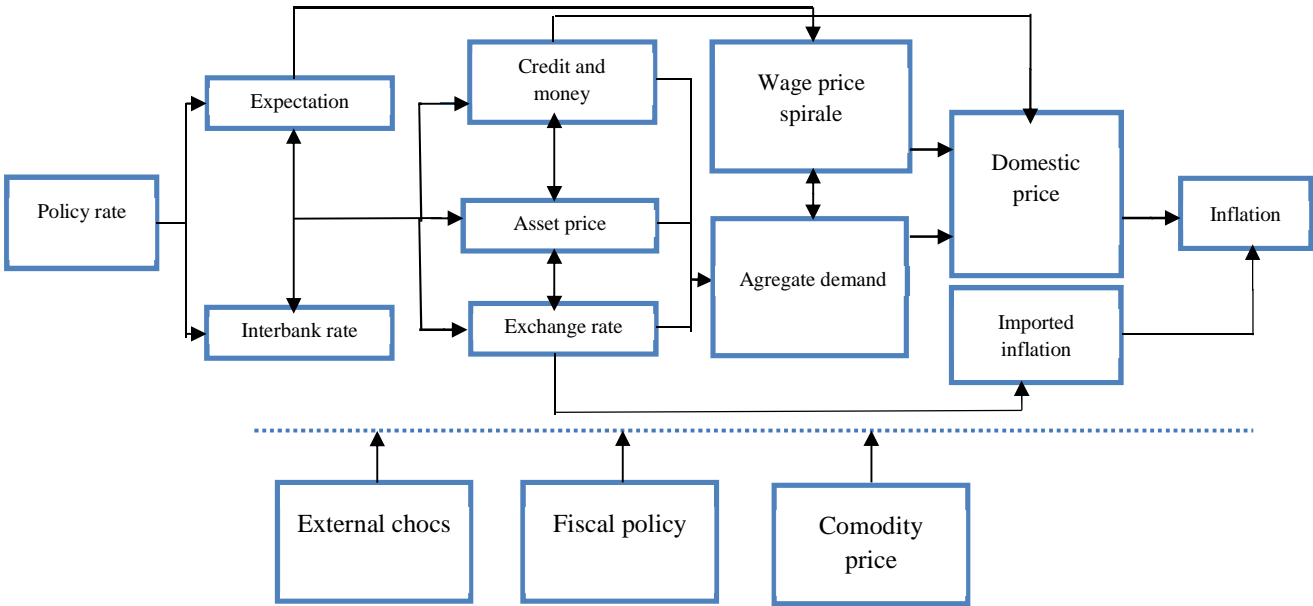
In terms of asset prices, there are two channels through which they influence the transmission of monetary policy, namely the Tobin q theory on investment (coefficient q) and the wealth effects on consumption. According to the Tobin q theory, monetary policy affects the real economy through its effects on the

valuation of stocks. Tobin defines the coefficient q as the ratio between the market value of the firms and the cost of renewing the capital. If q is high, the stock market value of firms is high relative to the cost of capital renewal and new productive investments are less expensive compared to the stock market value of companies. As a result, companies are encouraged to issue more shares, and invest more. For the second channel which is the wealth effect on consumption. This channel was highlighted by Franco Modigliani in his model of the life cycle; consumer spending is determined by consumers resources throughout their life. Assets are a major component of wealth and when asset prices rise, the value of this wealth increases and, consequently, the overall resources of consumers increase and subsequently their consumption. An empirical investigation shows that there is a significant causality between the REPI and the economic cycle measured by output gap[1].

Figure 2: Granger Causality Tests between REPI and output gap

Pairwise Granger Causality Tests
Date: 05/24/17   Time: 00:03
Sample: 2007Q1 2016Q2
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
OUTPUT_GAP does not Granger Cause REPI	37	0.30513	0.5843
REPI does not Granger Cause OUTPUT_GAP		5.84749	0.0211

Figure 3: Real Estate Price Index (REPI) and output gap
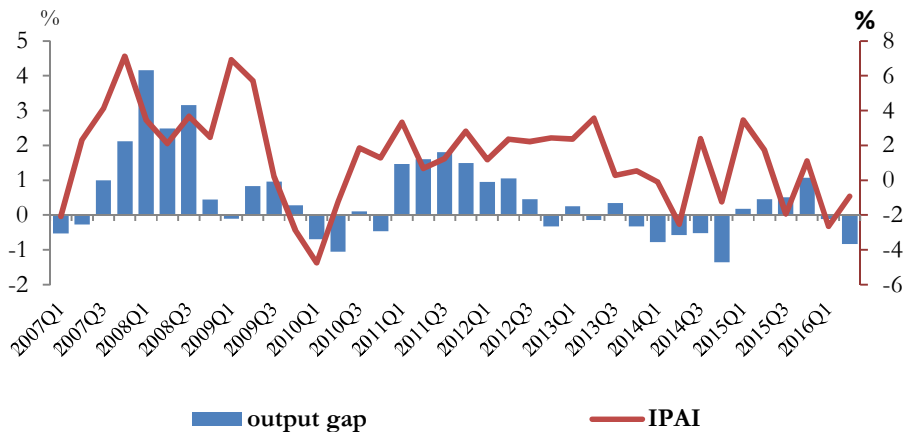
Hence, because they are important in the monetary policy transmission mechanisms, asset price and especially real estate price are monitored closely by the Central Bank of Morocco. For instance, the asset

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[1] The output gap is estimated from the Moroccan Quarterly Projection Model (MQPM) for more information

price is included in the part dedicated to the asset price in the monetary policy report. Moreover, it is used in Forecasting and Policy Analysis System (FPAS) as the tobin q is integrated the IS curve of the Moroccan Quarterly Projection Model (MQPM) which is the core model of the Forecast and Policy Analysis System (FPAS)[2].

- **Investment equation in the IS curve in the MQPM :**

$$\widehat{\text{inv}}_t = \lambda_1 \widehat{\text{inv}}_{t-1} + \lambda_2\, E_t(\widehat{\text{inv}}_{t+1}) + \lambda_3\{E_t(\hat{y}_{t+1}) - E_t(\widehat{\text{inv}}_{t+1})\} + \lambda_4 q_t + \lambda_5\, \hat{y}_t^{agr} + \varepsilon_{t,inv}$$

where $\widehat{\text{inv}}_t$ is the gap of private and public investment, $E_t(\hat{y}_{t+1})$ is the expected business cycle position of the economy, q_t stands for the real value of capital which is a kind of Tobin's Q measure, and $\hat{y}_t^{agr}$ is representing the agricultural production gap.

Using the Impulse Response Functions from the MQPM which is calibrated the fit data of Moroccan economy, it was found that a one percent shock on tobin q lead to increase of the an improve in the economic activity, the output gap increases and then inflation is higher because inflationary pressures coming from the increase in the aggregate demand.

*Figure 4: Impulse response to a one percent shock of Tobin q*
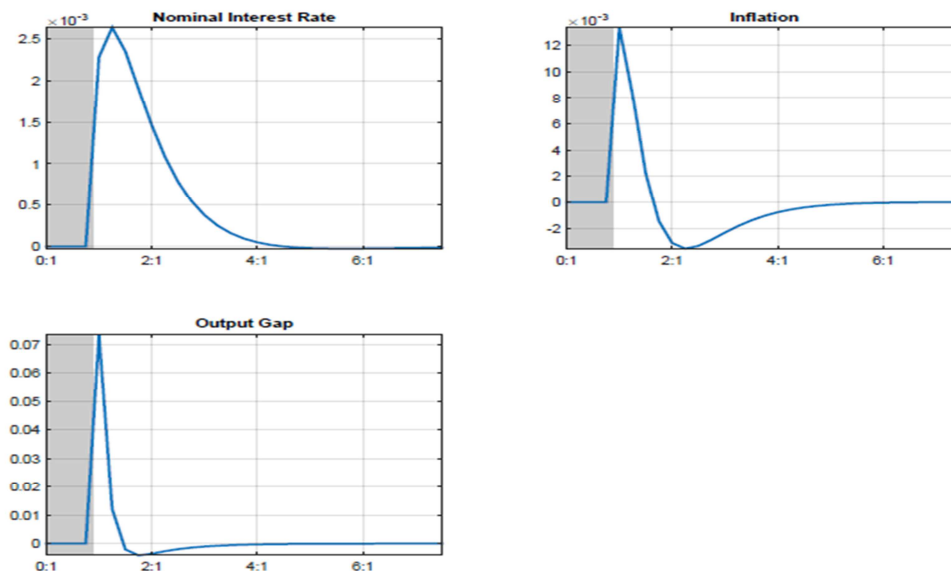
The channels analysed in the previous section have worked in the United States after the dot-com collapse after 2002 and the monetary easing of the FED has helped the American economy to recover through the

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[2] See http://www.bkam.ma/en/content/view/full/353037

transmission monetary through the channel cited before including the asset price channel. However, the lack of macro prudential framework that can cope with the global build-up of financial imbalances whose sudden unwinding turned out to have severe macroeconomic consequences. That is why after the financial crisis of 2008, central banks have built up a macro prudential framework to preserve the financial stability. In this context, real estate price are an important indicator to monitor in the macro prudential policy. Indeed, in the absence of such policy a spiral can begin between the volume of credit distributed and the prices of assets through the mechanism of the financial accelerator, hence it can result in the formation of speculative bubbles as what happened during the subprime crisis.

Figure 5: *The asset price channel in the financial stability framework*
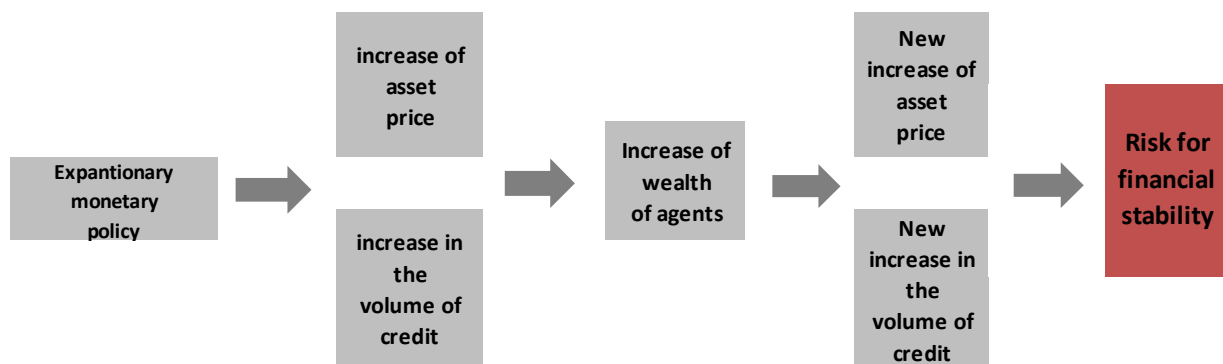
5. Conclusion

The construction of Real Estate Price Index in Morocco, result of the cooperation between the Central Bank of Morocco and the Land Registry Office, was a useful measure to monitor the evolution on asset prices in Morocco which is very important in the analytical framework of Monetary Policy. It was found through empirical work using this index that there is a significant impact of real estate price movement on the economic cycle and inflation in Morocco. This effect is done through the effect of Tobin q on investment and the wealth effects on consumption.

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