

السياسة النقدية العراقية: من المجملات النقدية باتجاه معدل الفائدة 2011-2004

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المستخلص :

على الرغم من أهمية التأثير في المجملات النقدية (بمكوناتها وسيولتها المختلفة) في إطار السياسة النقدية، إلا أنه تم عملياً ومنذ عقد الثمانينات من القرن المنصرم التحول نحو استخدام معدل الفائدة قصير الأمد متغيراً وسيطاً بديلاً للمجملات النقدية في معظم الدول المتقدمة والناشئة لأسباب ترتبط بصعوبات القياس والتنبؤ، فضلاً عن مشاركة المؤسسات المالية الوسيطة للبنك المركزي في التأثير المتزايد للمجملات (عرض النقود).

تضمنت بعض وثائق البنك المركزي العراقي إشارة واضحة لإنشاء معدل السياسة عده معدل الفائدة الذي تستخدمه السلطة النقدية في التأثير بمناسيب السيولة وقيادة حزمة معدلات الفائدة المصرفية وبالتالي دوره مثبتاً اسمياً.

لكن طبيعة الاقتصاد العراقي الريعية وتخلف القطاع الحقيقي المستوعب لانتقالات تأثير السياسة النقدية، فضلاً عن تخلف الجهاز المصرفي حال دون أن يمارس معدل السياسة دوره، وكان لسعر الصرف عبر المزادات اليومية الدور الأكبر في التأثير، ومثل دور المثبت الاسمي للسياسة النقدية والهدف الوسيط باتجاه الوصول للاهداف النهائية.

حاولت الدراسة قياس تأثير معدل السياسة عبر معادلة تايلر من خلال ربطه بفجوتي الناتج والتضخم وتوصلت الى انفصال العلاقة بين تغيرات القطاع النقدي والحقيقي في العراق.

المصطلحات الرئيسية: المجملات النقدية- المثبت الاسمي- الهدف الوسيط- قاعدة تايلر- سعر الصرف.

Iraqi Monetary Policy: From Monetary Aggregates To Interest Rate 2004-2011

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Introduction:

The monetary policy in Iraq is aiming to use intermediate nominal anchor in order to achieve its goals with a less financial cost and time, as well as its total suitability. It also trying to achieve the goal of protecting the economy from the volatility as considered it is always the goal and the hinge of the monetary policy.

It has been moving, since the 1990s, to use a very short-run interest rate, installing a substitute to the monetary aggregates (Money Supply) for theoretical and practical reasons relating to the instability of the money demand function, and the expansion of: the financial instruments and the participants in the impact upon the money supply, and Taylor rule has been adopted as an approach targeted by the monetary authorities of the developed and developing countries or at least seeking to target it as the Central Bank of Iraq is announcing.

The problem with the Iraqi economy is embedded on its renter nature which makes the money supply as endogenous variable following the changes in the public budget through waves of public expenditure by the monetizing oil revenues process.

Therefore this research is trying to find out its way through the hypothesis that (there is a difficulty in transition from the monetary aggregates to the policy interest as mediator variable in Iraq for the years from 2004-2011, which also reflected by the hard application of Taylor Rule).

1-1 LITERATURES REVIEW

1- (Michael Woodford 2001) entitled “The Taylor Rule as Optimal Monetary Policy” concluded that Taylor Rule has many advantages which make, applying the optimal monetary policy which responds to the fluctuation in inflation and the output, and tend to make these variable stable as much as possible. They also found that under the normal circumstances,

Taylor Rule creates a fixed rule to the inflation gap's path and the output by the short-run interest rate which creates a type of the optimum balance to respond to the fluctuations in the real activities and addressing these fluctuations through moving the short-run interest rate.

2- **The study (Woodford, 2001, 232-243)** deals with Taylor rule as differentiated approaches to build the monetary policies. Rule fully response to inflation and output fluctuations, so it enhances the macropolicy makers to secure the stability.

The Taylor rule formulate **nominal anchor (interest rate policy)** which adapting for any changes in inflation and macroactivity.

3- **The study of (Asso, et.al, 2010)** dealt with the practice of Taylor Rule in the central banks. It found that the monetary policy makers have to make an organized respond to the price fluctuations and with depending on the available information of the economic status in the country. It also clarified about how the monetary policy makers have used (Taylor Rule) which requires increasing the interest rate more than the increase of the inflation rate to reach to an optimum targeting that triggering the economic growth.

2-1:- CONCEPT OF THE MONETARY POLICY:

The concepts of contemporary monetary policy can be clarified through several definitions, the monetary policy has been identified as a set of monetary measures which are seeking to achieve monetary and non monetary goals and non-monetary measures to achieve monetary goals, it concentrates on the link between the intermediate goals and the final goals through the control of the monetary policy upon a set of monetary measures like the interest rate and rediscount rate. Beside non- monetary measures like restrictions on banking institutions and the legislative and administrative decisions (AL Said Ali, 1986, 369).

It is a set of procedures depended by the government or the monetary authorities responsible on managing the money supply, interest rate, in order to make economy reaches the potential output stage (Kalil,1983,p465).

The monetary policy seeks within the economic policy framework to achieve the general goals, called the (Magic square) which are: high growth rates, full utilization, balance of payment equilibrium, and the monetary stability (Salih, 2011, 2). Even if these goals varied between the developing and the developed countries due to the difference of the growth levels and the institutional efficient, it has become scientifically more acceptable currently for the monetary stability to head and to become the main goal of the monetary policy ones (Michael Parkin, 2012, 348-353).

3-1: MONETARY POLICY MANAGEMENT THROUGH THE MONEY SUPPLY INSTRUMENT

The central banks of different developing and developed countries have followed intermediate targets centered on the growth of the Money Supply to cope with price fluctuations in the seventies and eighties of the 20th century. This trend stemmed from strong convictions based of the new QTM theory by Milton Freedman which requires from the central banks to maintain a small and constant growth rate for the money supply within the limits of the growth rate of the monetary base around 4% per annum (F.S.Mishkin, 2004, 403).

Thus, most of industrialized countries identified targets for themselves started from the middle of the 1970s concerned about different types of money supply to control the inflation, and the identification of the monetary aggregates is based on the money demand stability hypotheses and exist a

close relationship between the ultimate goal and the specified money supply (Alan Griffiths and Stuart wall, 2004, 287).

Under the floating exchange rates regime, the control upon the monetary base becomes the goal or the intermediate variable instead of the stabilization of exchange rates, and to be capable of achieving stability in the prices. Central bank influence the money supply growth through directing its tools like the interest price as considered has a close relationship with the inflation levels in the long run.

However, the growth possibility of the monetary base or any other selected monetary aggregates become as intermediate targets and it is the effective element for achieving the price stability goal, and the capability of the central bank became subject to the extent of its experimental knowledge about the effectiveness of these aggregates. All of these are followed by the accumulated experiments of the central bank which went through about the nature of the monetary and the bank sector and about economy in general (F.S. Mishkin, 2004, 403).

The belief was that when an expansionary monetary policy is adopted, this will be accompanied by a certain growth in the inflation rate with keeping a low level of unemployment and increasing in the level of the GDP. But what caused by this policy through the seventies and the eighties of the 20th century was a significant rise in the inflation rate and decline in the rate of economic growth besides increasing unemployment rate. In addition, there was a problem in the exact statistical determination for the monetary aggregates as intermediate targets.

The solution of this problem became elusive in a circumstances distinguished by the expansion of the monetary innovations developed in the financial market beside the lack of agreement about the most significant aggregate and the correlation with the inflation (Raja Bandar, The Central Bank, P5). This lead to the changes on the structure of the financial sector beside creating some financial tools, which contributing to weakening the traditional relationship between the money supply, output, and the prices, and that motivated some central banks to reconsider their applied monetary policy (Lloyd B. Thomas, 2006, 578).

Thus the central banks in the industrial countries have faced, since the middle of the 1980s, a problem of the lag of using the variables or the intermediate targets as exchange rate and money supply in achieving the monetary policy goals especially the contradictory ones as the increase of the economic growth and decreasing the inflation rate.

Due to these circumstances, it is sureness now that the final goal of any monetary policy is represented by maintaining the total economy stability, and keeping the price at a stable and relatively low levels, so this approach started looking at the monetary policy framework known as (interest rate targeting) as one of the most important new developments at the central banks works, and then the idea, of giving the central banks the independency in managing the monetary policy, started, to reach the stability goal (Jwartny, 448-446 – AL Toni, 2000,6).

The monetary aggregates targeting has neglected considering it as endogenous variable affected by many bodies like the commercial banks, individuals, as well as having a contradictory among the monetary policy

goals which create a lack of trust to the public regarding the priorities wanted to be achieved, also the weakness of the link among the monetary aggregates and its effect on the final goal of the monetary policy. Under the circumstances of the instability of the demand function because of the shocks which the financial markets have faced and not giving substantial independency for central banks, it became difficult to manage the money supply by the central bank as it is not controlling it directly and it should have looking for a substitution (Daghir, 1988, 151).

4-1. MANAGING THE MONETARY POLICY THROUGH THE INTEREST RATE.

Most developed countries left monetary aggregates as a target and moved to short-run interest rate instrument and used it as an intermediate and operational goal to target the inflation since the beginning of nineties of 20th century. There was many reasons lead to adopt the inflation targeting like the rise of the inflation rate which affected negatively on the economic growth rates, and on economic resources allocation.

As well as the new innovations in the financial markets and the development in payment systems, and also the lack of stability of the relationship among the monetary aggregates lead to create a problem to the monetary policy in decreasing the rate of inflation toward its targeted level.

The modern developments have led to weaken or give a minor role for monetary aggregates, and giving the importance to the short-run interest rate which responds to the variables of the inflation and the output, and it is one of the most important variables in the Macroeconomic.

When the central bank targeted interest rate rule, it is more realistic than targeting the money supply. Where the central bank is following the real short-run interest rate rule, i.e. it works to make the real interest acts in certain way as a function with economic variables like the inflation and the output, and this approach is a description of the procedures followed by many central banks in the developed countries. which are following the short-run interest rate rule with the interbank's loans, its making to the short-run monetary policy, and building a concentrated long-run policy on the most important economic variable which is the long-run price stability.

The interest rate rule is being built through raising the short-run interest among the banks when raising the current inflation from the targeted, and this is making the commercial banks decreasing the lending. So this leading to decrease the overnight credit in a liquidity decreasing image, then to control the inflation rates, and also to decrease and lowing the price fluctuations.

The inflation targeting by the short-run interest rate has lead to a wide success since being applied by many of the developed countries, note that the first country that targeted the inflation is New Zealand in the late of eighties of the 20th century, followed by many of the developed and developing countries at the same level like Brazil, Chili, UK, Germany, and other countries.

The approach of the IT through is considered as the most flexible one regarding responding to the unexpected shocks in economy, if economy is in deflation, the central bank can respond, through lowering the interest for stimulating the economy for preventing it from reaching the recession level.

For instance the central bank has some freedom for maneuver and to respond flexibly to face price fluctuations which happened whether that was by the increase or the decrease on the overall level of the prices (Alan Griffiths - Stuart Wall, 2004, 389).

The real interest rate rule considered simpler by analysis from LM where the rule of the real interest price is a direct assumption of the central bank behavior, while we have to derive LM from the analysis of the monetary market.

The bottom line is under the interest rate rule, we done need to analysis the money market, and we can get the result in a more quick and simple way (especially the instability of demand function and having a relationship between the interest changes and the money velocity speed is experimentally acceptable).

Targeting the interest rate clarifies the link between aggregate demand and inflation and output, in case of no inflationary shocks, inflation rises when output is highest than its potential level (or the natural level of unemployment: overheating), and the inflation slows down when the output is less than it potential. There are two hypothesis: the direct effect of the aggregate demand increase is all happen to the output and then start to absorb it, and that's because of the output is responding quicker from the inflation to the positive demands shocks. The second one is the output on its potential level and there are no inflating shocks, which means there is a low rate of inflation and cannot get lower more than natural even time passes with output less than its natural level (David Romer, 2000 155-161).

The stability of the money demand function is considered as an essential point for the central banks to be able to build up their policies as the targeting of interest rate or money supply, if there is an unstable demand function on money, and then the money supply is not linked or close to the economic activity, this lead to the instability of money velocity speed, and then it will become hard to be estimated or to be predictable, and this what the experience has proven: the level of the interest rate which the central bank set will be the best tool on its expressing about the monetary policy compared to the money supply as a target (Mishkin, 2012, 241-242).

5-1:- INFLATION TARGETING IT (TAYLOR RULE)

The Keynesian monetarist controversy was based upon using economic policies to combat against the economic problems especially the inflation problem. However, the Monetarists called for using the constant rate of money supply growth rule on behalf of affecting and controlling the inflation, while the Keynesians were calling for using the discretionary of the monetary policy intervention for the economic tools like the interest to control the price fluctuations.

The American economist John Taylor gathered between the so called rules VS Discretionary, by the rules, it means the constant rate of money supply growth, and the Keynesian Discretionary with intervention in order to correct the short-run imbalances, reaching the final goal which is the price stability which is almost the same macroeconomic stability, Taylor has gathered through a simple rule known as (Taylor Rule) focused on the very short run interest rate (Overnight interest), and the short-run interest rate is interacting

with the price fluctuations and the output by an equation which its formula can be described as follow:

$$i = R + \pi + \alpha (\pi - \pi^e) + \beta (RGDP - PRGDP) \dots \dots (1)$$

Where:

***i*: the short – run targeted interest rate.**

***R*: the real interest rate.**

***π*: the actual inflation .**

***α, β*: a constant growth level for each the inflation and the GDP which should be constant in the short and the mid.**

***(π-π^e)*: the inflation gap, i.e. the difference between the real inflation and the targeted one.**

***(RGDP-PRGDP)*: the GDP gap, i.e. the difference between what achieved and what is potential (Woodford,2001,1&Daghir, 2012, 8-9).**

The operational goal is the very short-run interest rate (Overnight interbank) and to be changed successively and respond to the price changes and the output whether by increase or decrease.

Taylor Rule has been designed as an organized reaction to the economic fluctuations and emphasis on the very short-run interest rate as an operational target for formulating a policy. Taylor Rule has brought a revolution in monetary policy making and its administrations in many of the developed and developing countries, and Taylor has assumed for the USA that the Federal Fund Rate is 2% and the targeted inflation rate is 2% also. But in case of a deviation happened between the real and targeted inflation (the Inflationary gap) or between the achieved and the potential output (the output gap), then the short-run interest rate will respond to these changes, if having

an increase on the inflation rates, and the inflation gap was 1 percent, then the interest rate will go up to respond to the price fluctuations (Bernanke et.al, 2005,47 & Cochrane, 2007, 1-5).

6-1: THE SPLITTING OF THE FINANCIAL BEHAVIOR FROM THE REAL BEHAVIOR AT THE POLICY OF THE IRAQI CENTRAL BANK

The central bank has announce that it is committed to a monetary frame based, for its organizing, on the Nominal Anchor to Taylor Rule, regarding to its apply to the monetary frame work to IT (Iraqi Central Bank, 2008, 43).

Building the monetary Frame to organize the policy work has the proportionality indication with the inflation targeting (IT), comparing with the state where the policy is in total commitment to the taken policy rule. and the wanted flexibility by the policy makers which is also fit with their discretionary powers, but under organized mechanism regarding the proportional respond (the Nominal interest rate – the nominal exchange rate) which is founded by Taylor Rule that fits very much to monetary policy frame design and especially to the frames based on targeting the inflation. but it is not without difficulties represented by targeting the interest rate through the output gap and it is an obstacle which the central bank's policy makers are suffering from, as it is hard to measure the economy potential output away from the economic shocks and the Structural changes especially the country lacks to policy making centers and statistic provisions as well as the growth of the GDP is so much far from the income circular flow pattern.

It is so much associated with the growth of the petroleum sector which shows that the process of targeting the interest rate through the real gap (the output gap) is unrealistic formula regarding policy designing and making.

And it is the same for targeting the interest though inflationary gap although the fact is less difficult as it depends on price variables, and these difficulties were cleared by Taylor by his description to his rule on a potential way, and this result which Taylor reached has supported by the practical experiences in the central banks which ended up with depending on the basic relation in targeting the interest price represented by the Proportional exponential between the targeted interest rate and the actual inflation rates which is so called (Taylor Principle) to distinguish it from the Basic rule (Taylor Rule) which is described by this movement which ruled by the effect of Taylor rule to reach the short-run equilibrium nominal interest rate of the monetary stability makers (Yousif 2012, 114-120).

The Iraqi monetary policy makers faced difficulty in applying the Taylor Rule due to its dependency on two variables *viz.*, the inflation gap and the output gap. When analyzing the Iraqi economy, we face a split between the changes in policy rate^(*) and the output. They walks in a mysterious relationship, and the output doesn't respond to the changes happened in the interest rate, because of the distortion of the real sector and being away from the changes which happened to the interest rate as illustrated by Table (1).

(*) The policy rate in Iraq is considered as the short-run interest rate, and it is the anchor of the monetary policy, and leading rate for various interest rates, and it is the interbank to influence the liquidity.

Table(1)

Years	The output growth %	Annual inflation growth%	Policy Rate growth %
2004	79.9	26.9	6
2005	38.1	36.9	11.7
2006	30	53.2	56.7
2007	16.6	30.8	90.5
2008	40.9	2.7	-16
2009	-16.4	-2.8	-47
2010	21.6	2.5	-29.2
2011	15	5.6	-4

Table Sources: Hamzah Abid Yousif – Monetary policy through the inspective of policies and goals: An Empirical Study of the Central Bank of Iraq, "Institute of Higher Studies of accounting and finance, Diploma equivalent to Master degree, University of Baghdad, 2012.

Table (1) shows the positive relationship between the interest rate and the output, where a growth of output has been achieved 38% at 2005 in front 11.7% growth on the policy rate. This proportion of unclear significant and this opinion has been emphasized on 2006 where the GDP growth has decreased to 30.0%, and on the other hand the interest rate has increased to 56.7%.

Which means the relation has been transmitted from the positive trend to inverse proportion, and if we suppose that the interest rate is the independent factor in the relationship, so this relationship seemed deformed

in 2009, where the interest rate got low in a large margin reached almost the half versus another decrease in the output growth of about -16.4%. And this shows the split of the central bank behavior from the real sector behavior represented by the GDP, and also shows the weakness of the effect of targeting the interest rate in affecting the GDP as indicative tool which responds to the changes in the output.

So this weak and irregular relationship between the interest rate and the output fluctuation goes to inaccurate description which is: the policy rate as anchor cannot be used to affect the fluctuations of the output because of the weakness between the two variables, and also shows the non-targeting of the Iraqi central bank to the GDP, and the interest rate if was targeted, then it is targeted to achieve the balance to the monetary market not the real market as Taylor Rule shown, because of its targeting to the inflationary gap and the output gap.

While in related to the relationship between the inflation and the interest rate in the Iraqi economy, it is close to reality when tracking the inflation from 2004 till 2011. It is in the same line with Taylor principle/ Rule as describing the positive relationship between the inflation rates and the interest rate as described on Table (1).

The interest rates at (2004-2011) started to take a proportional track on its relationship with the inflation rates, in 2005, the inflationary rate reached 36.9% versus an increase in the interest rates that reached 11.7%, and this coincidence between the inflation and the policy rate has continued, where in 2009 when the inflation rates got low to -2.8%, the policy rate has been decreased as well for its growth rate to reach -47%.

And this is what is clarifying the proportion of the two variables with positive relationship, but this is not enough to consider the policy rate which affects the decrease of the inflation rate: and this is due to the renter nature of Iraqi economy and beside the weakness of the financial market structure, the weakness of the local credit, beside many of reasons which prevent the interest rate practicing its role as a tool to target the inflation in Iraqi economy.

The nature of the Iraqi economy and its connection with the international market beside the level of the economic exposure, which may reaches to more than 90%: the external nominal anchor (the exchange rate) is the most effective in the process of targeting the inflation of an economy, suffers from the extreme renter nature and the huge dependency on what it gets from selling the crude oil and getting the foreign currencies.

Reflected through the intervention in the exchange rate market by the central bank through currency auctions which took place on daily basis.

Also Table (2) illustrates the approach of the official exchange rate, and its price in the equivalent market which emphasis that the central bank is completely capable to control as external nominal anchor, maintaining the local currency purchasing power and targeting the inflation through the external nominal anchor (Exchange rate).

Table (2)

The exchange rate of ID on the central bank and its market price versus the US \$ in the Iraqi economy For the period from (2003 – 2011)

Years	The equivalent exchange rate	The auction exchange rate	2-1 (3)	The growth of the auction price	The growth of the market price
2003	1936	1896	40		
2004	1453	1453	0	-23.3	-24.9
2005	1472	1469	3	1.1	-0.2
2006	1475	1467	8	-0.13	0.2
2007	1267	1255	12	-0.14	-14.1
2008	1203	1193	10	-0.4	-5.1
2009	1182	1170	12	-1.9	-1.7
2010	1186	1170	16	0	0.3
2011	1196	1170	26	0	0.8
Standard deviation	253.7	241.5			

Source: Iraqi Central Bank, Annual statistical releases 2004-2012 General Directorate of Statistics and Research (2004-2012)

It could be noticed from the table (2) that the exchange rate in daily currency auctions and its price in the alternative market are walking consistency which make the central bank more credible, and makes the monetary policy capable to transmit its effect through the tool of exchange rate to the real market. From 2006 to 2010, the rate of nominal exchange rate growth keeping its regressive growth to raise the real exchange rate value without sharp fluctuations which lead to deviation out from the specified margin, and without a significant move between it and the alternative price which also

retreated during the years 2007-2009, so made the central bank capable to achieve A relative shift for the effect of the monetary policy to the real policy. When targeting the inflation through the exchange, it makes the connection between the intermediate goals and the operating ones to reach the final goal which is the monetary stability, and that means making the inflation as less as possible to make economy reached the potential level i.e. achieving the economic stability regarding the unemployment level and building a competitive financial system if the responds' chain continued away toward real sector.

7-1 ESTIMATING THE INTEREST RATE IN THE LIGHT OF TAYLOR PRINCIPLE

The main goal of the monetary policy is achieving inflation stability, which conduct the monetary policy management to follow Taylor's principle. It is insist the importance of increasing the nominal rated of the interest with more than the increase of the potential rate of inflation, so that the real interest rate function by inflation as shown in the form below:

$$i = f(\pi) \dots\dots\dots (1)$$

$$i = \alpha + \beta(\pi) \dots\dots\dots (2)$$

Where *i* represent the nominal creditable interest rate at the short-run (appendix 1), β presents the respond rates, if the inflation is change with only one unit, the nominal interest rate changed by β unit. The results of Taylor principle estimation:

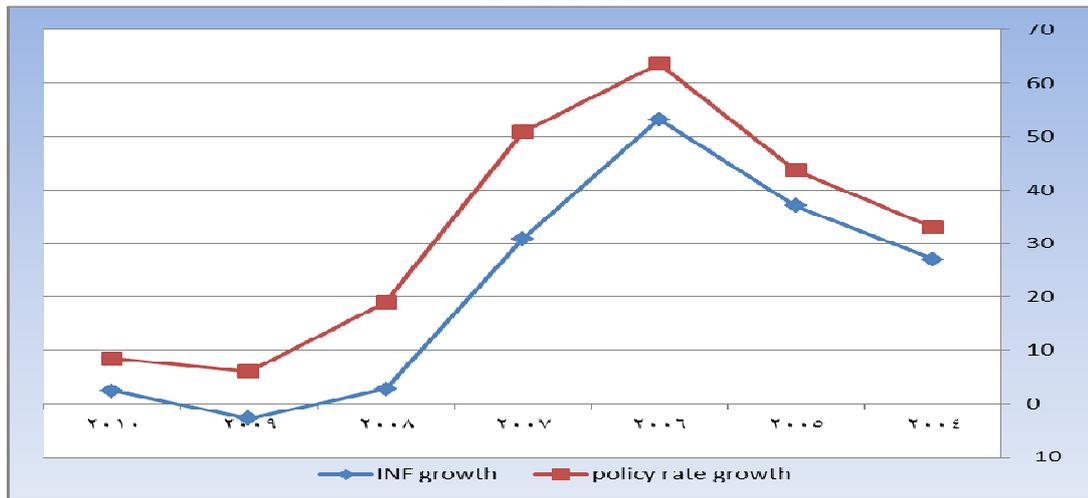
$$i = 9.1 + 0.9(\pi) \dots\dots\dots (3)$$

And it refers to matching the estimated form to the economic logic. When the inflation rate increases of one unit, this leads to increase the nominal interest rate of (0.9) and it correspond the economic theory. In spite of corresponding the equation to the logic and the theory but this is not consistent with Taylor principle, where Taylor principle assumes that the increase of the nominal interest is bigger from the potential inflation increase.

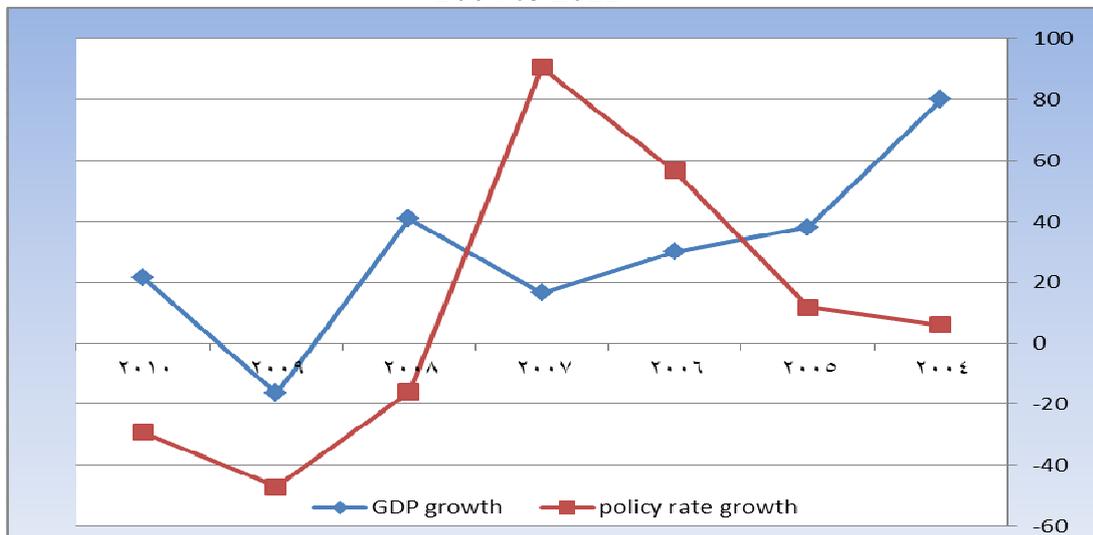
In the Iraqi economy, the nominal interest increases with the increase of the inflation but with a less rate than the inflation one. The weakness of the relationship between the internal nominal anchor and the output fluctuation leads to irregular description.

So we cannot say the interest rate satisfy Taylor principle, and this specially because of two reasons, the first one is the central bank non targeting GDP directly but through creating a stability for the local currency value, the second one is: the interest rate was not targeted directly to achieve the equilibrium between real supply and the real demand but its targeting was conducted straight to achieve the balance between the demand and the supply in money sector and the figures (1-2) clarifying the path of the inflation and the policy rate in one hand, and the output and the policy rate respectively .

Figure (1)
The path of the policy rate with the inflation rate in Iraq from 2004-2011



Figure(2)
The track of the policy rate and the growth of GDP in Iraq from 2004 to 2011



Source: Done by the researchers depending on the annual statistical Bulletins of policy rate, the output and the annual inflation, the Iraqi central bank, General Directorate of statics and researches, the annual statistical Bulletins for sporadic years (2004-2011)

Now we can say that the targeted interest rate by the monetary policy makers under Taylor principle has been organized in positive proportion with the inflation rate as shown by the figure (1).

also the policy rate has not been consist with the output rate as shown by figure (2) which reflected the move of the output growth away from the policy rate and we can is translated to (split of the monetary behavior from the real behavior of the Iraqi central bank policy).

When applying the linear regression form between the inflation and the real interest rate, the results were as below:

$$R = f(\pi) \dots\dots\dots (4)$$

$$R = 9.5 - 0.9 (\pi) \dots\dots\dots (5)$$

The results of Equation (5) indicate: there is inverse relationship between the inflation and the real interest rate, when inflation increases of one unit, the value of the real interest rate decreases about (0.9) and this inverse effect of inflation upon the real interest rate make the interest in the Iraqi economy negative from 1990 to 2007, and after this year, the interest rate became positive, i.e. after the decrease of the inflation to the one digit (Salih, 2010, 269).

8-1 TAYLOR RULE ESTIMATION IN THE IRAQI ECONOMY

Taylor rule will be clarified and applied in the Iraqi economy, and its apply will be for showing the change of nominal interest rate (internal Nominal Anchor)within inflation gap and the output gap, then to be applied by the exchange rate variable (external Nominal Anchor).

The Taylor rule will be estimated according to the following formulas:

$$i = R + \pi + \alpha(\pi - \pi^e) + \beta(RGDP - PRGDP)$$

$$EXC^* = REXC + \pi + \alpha(\pi - \pi^e) + \beta(RGDP - PRGDP)$$

The first relation represent Taylor rule to estimate the nominal interest rate^(**) which the central bank affects the Iraqi economy through it, while the second relationship is Taylor base with the exchange rates variable used as a substitution for the short-run interest rate (Proxy) ^(*) and the estimation results were as below:

$i = R + \pi + 0.94 (\pi - \pi^e) + 0.00007 (RGDP - PRGDP)$ For the interest rate

$EXC^* = R + \pi + 18.01 (\pi - \pi^e) + 0.053 (RGDP - PRGDP)$for exchange rate

Results shows that the relative responding for each of the inflation and the output was not significance, and has no influence on the interest rate or exchange rate in Iraq economy. which prove that it is impossible to apply Taylor rule in Iraqi economy at least at this time for many reasons like the distortion of the banking system, the lag of financial market and the inactiveness of the interest rates, and despite the fact that the national economy moved to the market mechanism, but this move is ineffective one because of the semi-complete absence of the output growth after the exclusion of the petroleum sector.

(**) The internal nominal anchor (the very short-run interest rate).

(*) many researchers used this variable, see more:

-Hernando Vargas H," Exchange Rate Policy and Inflation Targeting in Colombia", **Inter-American Development Bank, working paper, Vol. 639, 2005, pp 8-15**

- Orphanides, Athanasios" *Monetary Policy Rules Based on Real-Time Data*" Finance and Economics Discussion Series, Board of Governors of the Federal Reserve System, No.03, 1997, pp 5-8.

So these reasons make the output (the real supply level) rigid to respond for the demand shocks in the macro economy.

Table (3)
The results of applying Taylor rule for the interest rate and the exchange rate in the Iraqi economy from 1990-2011

Years	Nominal interest rate	Nominal exchange rate
1990	-124.3	-78.3
1991	-185.6	-7.7
1992	-76.7	4.4
1993	-166.4	104.3
1994	-242.5	2644.3
1995	-300.8	42500.4
1996	-34.5	24097.8
1997	-69.1	36484.7
1998	-42.3	45439.6
1999	-31.5	60946.2
2000	-18.5	60586.7
2001	-13.4	68540.8
2002	-14.5	81540.8
2003	-39.8	81679.6
2004	16.5	107026.6
2005	14.8	98014.3
2006	14.2	131780.7
2007	7.4	195619.8
2008	9.4	213780.7
2009	15.3	200642.5
2010	12.1	192466.4
2011	7.3	200819

Source: Researchers work depending on the following formula

$$i = R + \pi + \alpha(\pi - \pi^e) + \beta(RGDP - PRGDP)$$

Where :

$$i = \text{nominal interest rate (policy rate)}$$

R = real interest rate

π = actual inflation

π^e = targeted inflation

α : relative responding to inflation

β = relative responding to the output

RGDP = real GDP

PRGDP = Potential GDP

It is possible to get the hand of the core inflation supposing ^(*) it is the inflation rate which the Iraqi central bank targeting, and after measuring the supposed gap between the core inflation and the total inflation for getting the short-run nominal interest rate as in Taylor Rule, it has been reached to the following results:-

$$I = R + \pi + 0.95(\pi - \pi^e) - 0.133(GDP - PGDP)$$

^(*) For reaching to the estimation of Taylor rule and getting the monetary side of it, they have been used the core inflation supposing that it is the targeted inflation rate excluding fuel, lights, and the transportation which considered the most expresser about the Iraqi economy fact instead of accounting the targeted inflation by the time trend (Smoothing) to reach more accurate results and expressing about the economical condition in Iraq.

Table (4)
The results of applying Taylor Rule in Iraqi economy

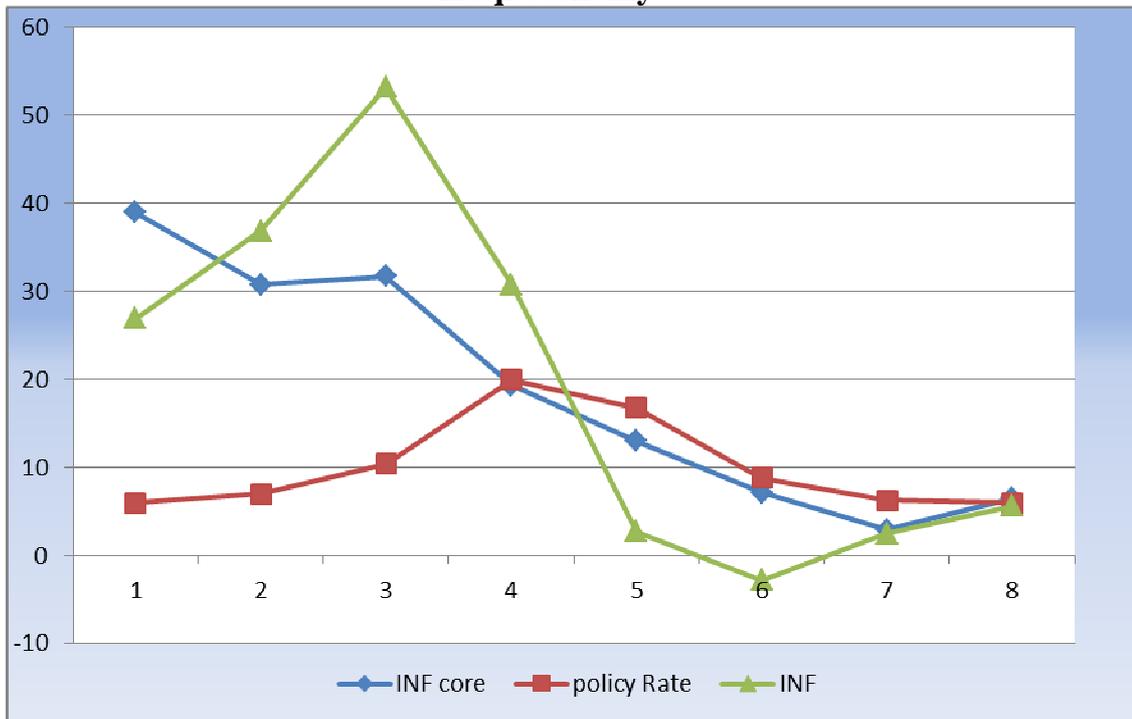
Year	Total inflation	core inflation	Inflation gap	Policy rate	Interest rate Taylor rule
2004	26.9	39	-12.1	6	-65.5
2005	36.9	30.8	6.1	7	1012.3
2006	53.2	31.7	21	10.42	-561.4
2007	30.8	19.3	11.5	20	-341.2
2008	2.7	13	-10.3	16.75	-201.7
2009	-2.8	7.1	-9.9	8.83	-355.7
2010	2.5	2.9	-0.4	6.25	-579.9
2011	5.6	6.5	-0.9	6	-560.9

Source: for the columns (1), (2), and (4) – Central Bank “the annual statistical Bulletins, General Directorate of statics and researches, several bulletins (2004-2011). The Two columns (3) (5) are calculated by the researcher.

It shows that the relative responding for each of the inflation and the output whether by using the smoothing way to calculate the targeted inflation or depending the core inflation as a hypothetical targeted inflation, it is not significant and has no effect upon the interest rate in Iraqi economy.

which proves that it is impossible to apply Taylor Rule in the Iraqi economy, at least at the current time for many reasons like the distortion of the banking system, the lag of securities market and the inactiveness of the interest rates, , and despite the fact that the national economy moved to the market mechanism, but this move is ineffective one.

Figure (3)
The Total inflation, the core inflation, and the policy rate path in the Iraqi economy



The summary after applying Taylor rule in Iraqi economy: the gained results are not corresponding the economical logic, or the central bank policy in particular, where the monetary policy makers and in various occasions stated that the Iraqi central is committed to a monetary frame depending on Taylor rule in its organizing (Iraqi central Bank, 2008, 43) targeting the inflation, and this results shows the incapability of applying Taylor rule by the inflation gap and the GDP gap as the financial behavior is away from the real behavior for the monetary policy maker, and also the interest rates in Iraq has a weak effect in monetary variables, and this is due to the weakness

of the financial system structure in the country beside the weakness of the domestic credit, also the achieved results in Table (3) proved and when applying Taylor Rule for the exchange rate variable with the inflation gap and the output gap, the results are not coincide the nominal rate announced by the central which prove the non-commitment of the central in using Taylor Rule whether with the short-run interest rate, or with the exchange rates (Nominal Anchors), so the central has nothing left only to use Taylor principle with the potential inflation rate without the output level (macro activity) for splitting the monetary behavior from the real one of the central, and cannot considered the interest rate as an active tool in the country economy for creating a monetary stability, fighting the inflationary pressures, and driving force for output growth.

And in relates to the exchange rate tools and using it as a tool to kill the inflation, it considered as the most effective tool to influence the national economy variables, whether they are real variables or monetary ones as the statistical tests proved the major role played by the exchange rate to affect the inflation, and the output unlike what the statistical tests of interest, inflation, and the output showed, that cleared the weakness effect of the short-run interest rate upon the inflation and the output.

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APPENDIX

Source: CBI – Annual statistical 1990-2011(Baghdad: statistic and researches department).

For columns: 2-4-7-8 researcher calculated depending on (Eviews.6) output, also used smoothing method by (Hodrick- Prescott Filter).

INF: Actual inflation.

IT: Inflation targeting.

GDP no Oil: Non oil GDP.

PGDP: potential GDP.

R: Creditor interest rate(6 month).

EXC: ID Exchange rate.

INF Gap: Iraqi Inflationary Gap.

GDP Gap: Iraqi GDP Gap.