Can GDP Growth Linked Instrument Be Used For Islamic Monetary Policy?

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CAN GDP GROWTH LINKED INSTRUMENT BE USED FOR ISLAMIC MONETARY POLICY?

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Abstract— **We investigate Islamic monetary policy and propose an alternative monetary policy instrument, namely gross domestic products (GDP) growth linked instrument. The study adopts the ordinary least square (OLS) method to a dataset of 99 countries for the year 2012 and time-series data for Malaysia throughout 1983-2013. Moreover, six months (January – June 2014) daily data on Islamic and conventional interbank rates are used for the correlational study. The results show that adjusted GDP growth rate can be set as a benchmark for money market instruments and also can be used as the reference rate for the capital market to set the cost of capital. Moreover, we find that real interest rate is not representative across 99 countries since policy rates are often determined by either the money market which is usually disintegrated with the real sector of an economy or the Central Bank. Interestingly, Islamic and conventional money market rates are found significantly correlated in the presence of the dual banking system. Moreover, inflation and employment rate in the Organization of Islamic Cooperation (OIC) countries are higher than in non-OIC countries. Therefore, the interest rate can be replaced with a more representative policy rate like the GDP growth rate linked instrument which could provide a benchmark rate for pricing products in Islamic commercial banks and an avenue for investment in the Islamic financial market.**

Keywords- GDP Growth Rate, Real Economy, Real Interest Rate, Real Exchange Rate, Inflation, Islamic Monetary Policy, Gross Savings

I. Introduction

Monetary policy in a conventional economic system, is a mechanism to handle the demand and supply of money through manipulating the interest rate, while this interest rate (riba) is prohibited in Islamic economic system. So, an alternative method or instrument to interest rate is necessary in order to control the supply and demand of money in the economic system. This instrument is essential since the change of this can set stable local currency, stable inflation, lower unemployment, and sustainable growth. There are two types of monetary policy i.e. expansionary and contractionary. Expansionary monetary policy is applied to enhance the supply of money in the economy whereas contractionary monetary policy is applied to reduce the availability of money in the economy. Moreover, the expansionary policy is traditionally used to combat unemployment in the economy by lowering interest rates assuming that easy credit entices businesses into expanding. On the other hand, contractionary policy is applied to slow inflation in order to avoid the resulting distortions and deterioration of asset values.

In conventional definition, monetary policy refers to the management of expectations (Wallace & Sargent, 1976), expectation of the Central Bank and general public. In a detail way, the relationship between the interest rate and the supply of money is hinged by monetary policy. Therefore, monetary policy applies a number of tools to control either one or both in order to influence the economic growth, inflation, exchange rate, saving and unemployment rate.

Monetary policy mechanism based on Interest rate has mostly failed to reflect the real growth of an economy in the last century as well at the beginning of this century; the Great Depression of 1930s and 2007-2008 global financial crisis are the results of this catastrophic failure. Since the Great Depression the classical school was overtaken by the Keynesian thought, and later Friedman (1968) has introduced monetarist approach. Global financial markets faced several financial crises over the last 100 years, which were directly or indirectly due to the failure of interest rate mechanism in the economy.

Economists and academicians are motivated to develop a comprehensive framework for modern Islamic monetary economy by the reemergence of Islamic economics and finance particularly in the middle of the last century. Since riba 1, (Interest rate) is banned in Islam, a possible alternative is essential. Mowdudi's writings on Sood 2 (interest) incited economists and academicians to rethink about riba free economy and thereupon many scholars such as Khurshid Ahmed, M.N. Siddiqi, M. Uzair, Umer Chapra, Muhammad Anwar, Al-Jahri, Mohsin Khan, Abbas Mirakhor, Mohsin

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[1] The Glorious Qur'an (30:39; 4:161; 3:130 and 2:275-9)
[2] Mawdudi, A. A. (1961). *Sood* means the interest.

Khan and others provided some theoretical framework and Islamic instruments to solve this problem. Scholars on the one hand propose profit loss sharing instrument to conduct monetary policy, on the other hand, few scholars argue that the system is inherently instable and not relevant in real economic sense. To this regard, Islamic economic system would be stable if there is no interest rate and no speculative demand for money (Chapra, 1985; 1996). Whereas, speculative demand is likely to exist due to the unstable nature of return on equity-based instrument and therefore demand for money is also going to be unstable (Khan, 1996).

The following figure [3] summarizes the recent economic condition of dominant Muslim countries which was also not very different in the last century. In nut shell, we can say that while inflation and the interest rate in developed economy remained too low for too long before finally hit zero lower bound, monetary authorities, lost their conventional weapon to control economic business cycle, and we have seen unprecedented and unconventional monetary policy like QE on the both side of Atlantic, the Muslim world however has been suffering from higher inflation and unemployment.
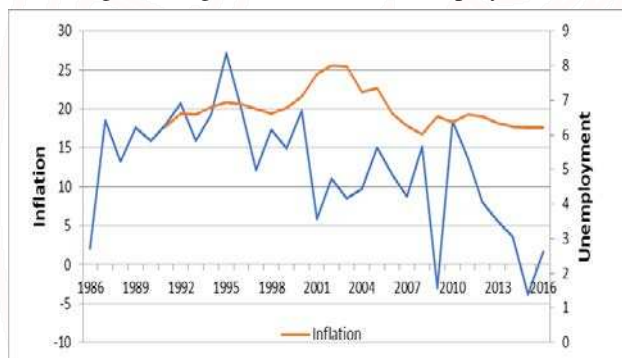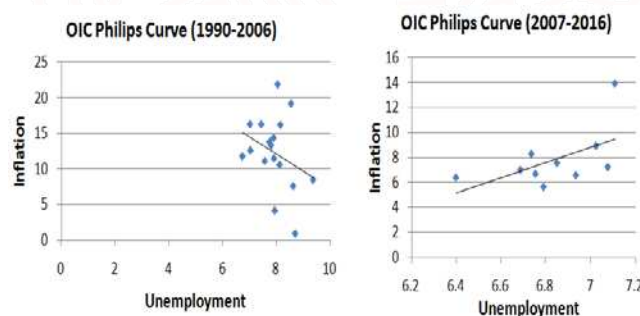

Fig 1: Inflation and Unemployment in OIC

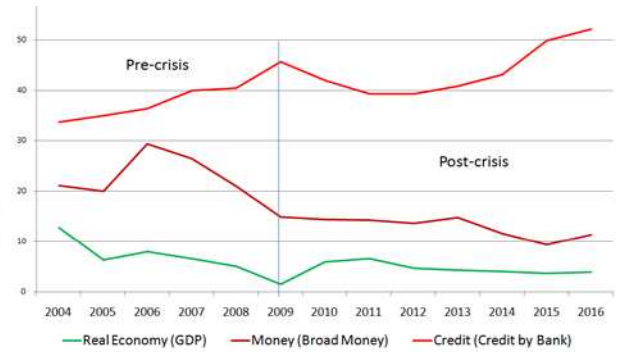*Fig 2: OIC Philips curve (Authors' estimation)*

Fig 3: Disintegration of real sector from financial sector in OIC

On the backdrop of above situation, we make an attempt to give an overview of Islamic monetary policy framework, and rationally argue on why interest rate cannot be an ideal instrument of monetary policy and benchmark for money and capital market, and propose a viable alternative benchmark rate, which could be set up realistically, a true represent of real economic growth by target employment, stable inflation, stable exchange rate, maximum savings and investment opportunities depending on the real sector. Accordingly, we develop a linear econometric model to see whether key monetary policy variables can explain interest rate or GDP growth rate better. We have followed two steps in our study. Firstly, we have looked at the cross-country level and then at the country level. We have applied ordinary least square (OLS) method as this gives consistent and efficient results when the estimations are best linear unbiased estimate (BLUE). All our estimated equations fulfill the BLUE criteria and pass the diagnostic tests. The results tend to show that all the key monetary economics variables, at both cross-country and country level, can explain real GDP growth rate better than real interest rate. Money market is usually disintegrated with the real sector of an economy or it is controlled by the Central Bank. The study finds that Islamic and conventional money market rates are highly correlated. On top of that, it finds that inflation and employment rates are higher in OIC countries than non-OIC countries. Therefore, it is proposed that the interest rate should be replaced with more representative policy rate like the GDP linked instrument that can provide a benchmark rate to set the price for Islamic banking products and services and also an avenue for investment in the Islamic money and capital market.

The structure of the paper follows. Section 1 presents introduction, section 2 elaborates the theoretical foundation of Islamic monetary economics. Later on section 3 provides the theoretical model specification, data and the econometric methodology. The empirical results and discussions stand in section 4, and the last section finishes with the concluding remarks and policy implications.

II.   LITERATURE REVIEW

The present monetary system has come to this stage after passing through several stages of evolution, but the monetary system during the Prophet's time was a bimetallic standard based on gold and silver (dinar and dirham) circulating simultaneously. The ratio between these two coins was 1:10 which seemed stable throughout the period of first four caliphs. Afterwards, such stability could not persist continually because of the different supply and demand condition which made to destabilize the relative prices of those. The ratio varied at different times particularly at the time of Umayyad period and Abbassid period, it was 1:12 and 1:15 respectively. Over the time of decline, the exchange rate between dina and dirham fluctuated widely in different parts of the then Muslim world (Chapra, 1996). The evolution of money is given in the following figure;
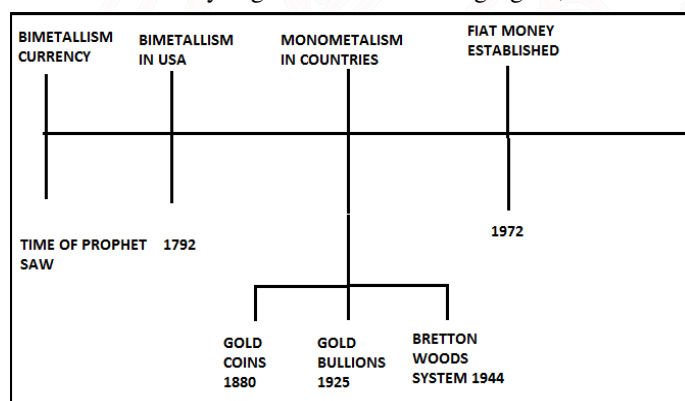

Fig 4: Evolution of the money over the period of time (Based on Chapra, 1996)

Islamic finance has emerged as a viable alternative of conventional finance (Zaher and Hassan, 2001); particularly during crisis period, Islamic banks performed comparatively better that its counterpart-conventional banks (Kayed & Hassan, 2011; Beck et al., 2013; & Hussain et al., 2015). It has been proved by the recent financial crisis, that interest rate determined in the money market without considering the real economy is unable to solve the unemployment, high inflation, low income, saving and investment, and slow and unstable growth of real economy (Kayed & Hassan, 2011). Thus, conventional monetary policy is deemed unsuitable to control the economic system both in developed and developing countries, which led policy makers to think about unconventional policy measures [4] . However, to get a sustainable and growing economic growth, we need to search a suitable alternative approach to run and manage monetary policy. Though the interest rate is not acceptable in Islamic economic system, a number of conventional monetary instruments are still available: changes in reserve

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[44] The ongoing debate on *rethinking macroeconomic policy* shows the importance of this issue.

requirements, overall and selective controls on credit flows, changes in the monetary base through management of currency issue, and moral suasion. Anwar (1987), Khan and Mirakhor (1989), and Khan (1996) attempted to develop interest-free economic model with the help of conventional ISLM framework. A 25% of demand deposits with the banks for advancing interest-free loan to government were proposed by Chapra. To comply with the Islamic monetary policy, he further emphasized the need fulfillment, optimum growth, full employment, equitable distribution and economic stability and proposed to include such monetary instruments as statutory reserve requirements, credit ceilings (in particular, goal-oriented allocation of credit), equity-based instruments, changes in profit-and-loss sharing ratio and moral suasion (Chapra, 1985; Chapra, 1996).

Equity-based profit and loss sharing products would be effective in interest free economy (Khan and Mirakhor, 1989). Moreover, the profit-sharing ratio, public share of demand deposit, refinance ratio, allocation of credit and qard hasan ratio are also recommended as distinctive. Throughout the all Shariah compliant monetary policy instruments, mudarabah mode deposit mobilization was focused more in the literature of Khan and Mirakhor (1994). There is a great semblance between their thinking and what is available in conventional economics. Of course, the instruments like *mudarabah* and *musharakah* certificates are expected to have Shari`ah legitimacy. Moreover, they regard macroeconomic stability, characterized by price stability and viable balance of payments position as the chief goals for monetary policy. As for monetary policy, they conclude: Monetary policy of an Islamic state takes place in a framework in which all conventional tools normally available in a modern economy are at the disposal of the monetary authorities with the exception of the discount rate and other policy tools that involve interest rate. All other tools, namely open market operations (where equity shares rather than bonds are traded) and credit policies, can be as effective in an Islamic system as they are in interest based conventional system. Additionally, the authorities in an Islamic system can utilize reserve requirements and profit-sharing ratios to achieve changes in the stocks of money and credit (Khan and Mirakhor, 1994). Later, Choudhry and Mirakhor (1997) proposed the use of equity-based government securities with rates of returns based on budgetary surplus for the purpose of monetary management. The area has lost its motivation since mid-nineties, and since then no significant contributions have been made on theoretical developments in monetary economics from Islamic perspectives. Khan (2004) argued against elimination of interest by a legal decree and favored free market forces to bring the interest rates down to zero. He further stressed on providing incentives for the use of equity over debt financing, and proposed following policy measures: i) reducing reserve requirements to increase supply of loanable funds; ii) enforcing unlimited liability; iii)

gradual decline in interest to make investments in debt based instruments less lucrative and shift loanable funds towards equity based instruments; iv) allowing dividend as a tax deductible expense; and v) providing fiscal incentives to non-leveraged firms and disincentives to leveraged firms.

Furthermore, Zangeneh and Salam (1993) proposed that the Central Bank could charge the borrowing bank a weighted average rate of return in different sectors of the economy. However, this will create problems with reference to choose of sectors to calculate the weighted average rate of return. A particular bank may not have any investment in certain sector or sectors. Furthermore, this suggestion is not considered as a solution of all the problems pertaining to pricing of products in Islamic finance. Hanif and Shaikh (2010) referred to Usmani's (2003) proposal of issuance of GDP growth linked instruments to finance public debt. Secondary market can be made for it by directing banks to meet their statutory requirements by way of trading in these instruments. This will deepen money market and the rate at which this instrument will be traded can be taken as the benchmark for pricing and structuring other products. Since the source of funds and use of funds both use the same benchmark as in the current system, adopting an alternative benchmark on the source of funds side can be used in pricing commercial banking products on the use of funds side. Hanif and Shaikh (2010) recommended the use of a nominal GDP growth rate (NGDPGR) as a benchmark rate. They argued that the appeal in the use of NGDPGR is that not only can it be used as a base rate for the banking sector but also for Central Banks as their monetary policy tools that encompass both the conventional and Islamic financial systems. In their analysis using data from various countries, they showed that there are no statistical differences between NGDPGR and various benchmark rates (for example, discount rate, treasury bill rate, deposit rate etc.) used in those countries under their study. Therefore, this instrument can be used for indexing financing for public exchequer and could also be a major investment alternative for money market players as well as an alternate to open market operations (OMO).

The number of empirical studies on monetary policy from Islamic economics perspectives are still very few but recent attention from International Monetary Fund (IMF) has motivated few insightful publications (Cevik and Charap, 2011; Kammer et al., 2015; Khatat, 2016). Earlier empirical works confirm the stability of money demand function in interest-free economy (Darrat, 1988) but the results are still not convincing and need further research in this area. On the one hand, some empirical findings suggest that monetary policy works through Islamic banking channel (Sukmana and Kassim, 2010; Basu et al., 2015), on the other hand, it is argued by other researchers that monetary transmission channel does not pass through Islamic banks (Zaheer et al., 2012). The mix results are not surprising as in most Muslim countries Islamic banks operate under dual banking system and financial developments are heterogeneous. In addition, most of these countries suffer from higher inflation, little or no monetary freedom due to fixed exchange rate regime, shallow financial markets and strict capital control, among other reasons.

The relevant literature shows that the aims of Islamic monetary policy and conventional monetary policy are quite similar even though in the Islamic economic system justice and equitable social welfare get priority and no existence of '*riba*' i.e., interest rate makes the Islamic system unique (Ahmad and Hassan, 2007; Biancone & Radwan, 2018; Biancone & Radwan, 2019). There are many tools available in the conventional monetary policy which can easily be replicated in Islamic monetary policy with the exception of the discount rate and other policy tools that involve interest rate. Inflation, exchange rate, unemployment, gross savings and investment are variables frequently mentioned in the literature as the best indicators of effective monetary policy outcome both in conventional and Islamic. Therefore, an attempt has been made to develop two models to compare and see whether real interest rate or GDP growth rate can better reflect and predict the monetary policy outcome.

Since our aim is to study a Muslim country for a long time period, it is not easy to choose a country from 56 OIC member countries. However, Malaysia has shown tremendous potential as an emerging economy among Muslim countries. Moreover, Malaysia is an emerging economy in the South-East Asia with a per capita GDP of more than 10,000 USD and has a vision to become a developed economy by 2020, and considered as a bright example among Muslim community for upholding the true value of Islamic teachings, only country from 56 OIC countries to be included in the Islamicity index developed by Askari and Rehman (Askari and Rehman, 2013). Malaysia has succeeded in developing the most robust Islamic money market in the world, with a range of Sharia`h compliant instruments for liquidity management for banks and financial institutions and other corporations. To this end, Ali et al, (2018) find that sukuk as a Shariah compliant instrument is able to reduce excess liquidity problem in Malaysia. In Malaysia, the Islamic Inter-bank Money Market (IIMM) was introduced on January 3, 1994 as a short-term intermediary to provide a ready source of short-term investment outlets based on Shari`ah principles. Through the IIMM, the Islamic banks and banks participating in the Islamic banking scheme (IBS) match the funding requirements effectively and efficiently. Some of the Islamic monetary instruments used in Malaysia for money market operations are as follows (Bacha, 2008):
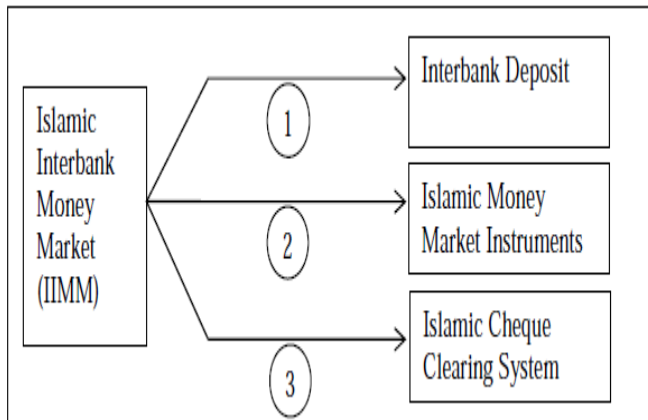
Fig 5: Overall structure of the IIMM in Malaysia (Bacha, 2008)

However, on the theoretical ground there are potential shortcomings while using GDP growth linked instrument as a policy tool. Shaikh and Hanif (2009) argue that in recession, real GDP may be negative, but nominal GDP growth rate will be positive. They wonder if it will not give an undue upward bias to the cost of capital when the production to which it is linked with is not increasing in recession. They further argue that stagflation and cost push inflation can be better tackled with better supply chain management, reducing intermediaries, and promoting market competition. Scarcity of capital created by interest can better be managed through a high wealth tax and inheritance tax (Piketty, 2014) i.e., *zakah* (2.5% on wealth, 5% and 10% on productions) in an Islamic economy. This will boost up production, improve competition and remove obstacles giving rise to cost push inflation, and increase revenues for the government by increasing the tax base. Inflation is most likely to be low in recession and hence GDP growth rate would not be that high. Even if it is high, private sector financiers like banks would give financing based on cash flows discounted on that GDP growth rate. Therefore, cost would have to be paid by the finances that have higher cash flows discounted on GDP growth rate. We could further argue that by including inflation in the public and corporate finance with the benchmark rate, and GDP growth rate, which takes into account inflation; as a result, the government do not need to resort to printing paper money, quantitative easing, to meet the fiscal deficit. If necessary changes are made to avoid budget deficits paper money may not need to be printed often and seignior age, profit made by a government by issuing currency, will not be presented as a compelling problem.

To the best of our knowledge no study has so far looked at the issue from this perspective by taking cross-country and country level data over the period. Therefore, we have attempted to investigate whether monetary policy goals are more achievable by following the GDP growth rate or real interest rate.

III. DATA AND METHODOLOGY

We follow two steps in our study. Firstly, we look at the cross-country level and then at the country level. The OLS estimator is consistent when the independent variables are exogenous and multicollinearity is not an issue. Moreover, when the errors are homoscedastic and serially uncorrelated it provides unbiased estimators. In other words, we apply ordinary least square (OLS) method as it gives consistent result when the estimations are Best Linear Unbiased Estimator (BLUE). All of our estimated equations fulfill the BLUE criteria. In this study we use data collected from World Bank, IMF and Bank Negara Malaysia database. To determine the impact of the independent variables on Real Interest Rate and GDP growth rate we apply standardized Ordinary Least Square (OLS) regressions by using cross sectional data of 99 countries for the year 2012 and time series data from 1983 – 2013 for our country of concern Malaysia. To detect model misspecification, multicollinearity, irrelevant variables and explaining power of the independent variables we run additional regressions as robustness check. In Appendix Table 1 and Table 2, we present descriptive statistics and correlation matrix, the following standard diagnostics tests are conducted: Jarque-Bera test for normality, Heteroskedasticity Test: Breusch-Pagan-Godfrey and Breusch-Godfrey Serial Correlation LM Test.

We estimated the following two equations:
$$RIR = \beta_0 + \beta_1\,Y + \beta_2\,Z + \varepsilon \quad (1)$$
$$GDP = \beta_0 + \beta_1\,Y + \beta_2\,Z + \varepsilon \quad (2)$$

Where, RIR is Real Interest Rate (%), GDP is nominal GDP growth rate (%), Y and Z are control and focus variables respectively, β_0 is Intercept, $\beta_1 - \beta_2$ indicate coefficient of the independent variables, and ε is Error term.

We have incorporated the independent variables from literature. It is well established that maintaining stable inflation, strong currency, sustainable growth, higher savings, and investment are fundamental objectives of monetary policy. We assume that GDP growth rate and the real interest rate models would provide equal estimation. We expect OIC dummy and two other interactive dummies to be statistically significant. Appendix 1exhibits definition of the variables.

IV.   EMPIRICAL RESULTS AND DISCUSSIONS

Table 1:OLS estimation output for cross-country data

Variables	Real Interest Rate	GDP Growth Rate
Intercept	-64.711*	-12.596
	(26.834)	(23.814)
Inflation	0.275	0.419*
	(0.217)	(0.134)
Log Real Exchange Rate	14.681*	2.426
	(5.759)	(5.154)
Log Gross Savings	-0.138	1.072
	(0.797)	(0.580)
Unemployment Rate	0.155	-0.153*
	(0.082)	(0.076)
OIC dummy	3.071	3.561*
	(2.026)	(1.722)
OIC*UNE	-0.096	0.105
	(0.159)	(0.125)
OIC*INF	-0.535	-0.498*
	(0.295)	(0.193)
R^2	0.117	0.338
Adjusted R^2	0.047	0.285
F-Value	1.668	6.405
Probability	0.127	0.000

Notes: Standard errors are in the parentheses. *denotes statistical significance at the 5%

Table 1 shows the baseline estimation of equation 1 and 2. In the first model the R2 is 0.117 and adjusted R2 is 0.047 which indicates all independent variables together could explain only 11.7% of independent variable, which is not statistically significant as P-value is 0.127. However, in equation 1, Real exchange rate has positive relationship with real interest rate at 5% significance level. Surprisingly, we didn't find any significant relationships with other key independent variables. Most importantly, the model is not good fit to explain the focus variables which represent key objectives of conventional monetary policy. However, we expect better results in time-series data for a single country, Malaysia, where dual banking system has been prevalent.

In the second regression, all the independent variables are regressed on GDP growth rate. In this regression four statistically significant variables are identified. Inflation, Unemployment, OIC dummy and OIC x INF interactive dummy show statistically significant relationship with GDP growth rate at 5% significance level. In this model, R2 (R Square) is .338 (0.338) and adjusted R2 (R Square) is 0.285 which means all independent variables together could explain 33.8% of change in GDP growth rate, which is statistically significant as P-value is 0.000. In robustness test, both regressions were run through Jargue Bera normality test, Breusch-Pagan-Godfrey heteroskedasticity test and

Breusch-Godfrey Serial Correlation LM test. As we are dealing with cross-sectional data, we apply Newy-West method to solve heteroskedasticity problem.

V.   DISCUSSIONS OF RESULTS:

The first column of the table 1shows one percent increase in exchange rate would lead to 14.68% increase in real interest rate. As discussed earlier the overall model is not good fit the explanation of the co-efficient may be misleading. However, we have a large number of cross section observation (99). The results of this equation clearly indicate that commonly accepted monetary policy variables cannot explain the changes in real interest rate which is considered as the key conventional monetary instrument. We have been experiencing the unprecedented monetary policy measures since the global financial crisis of 2007-08. We find a clear evidence that interest rate as a monetary policy instrument has lost its significance. This is mainly due to dis-integration of real economy from financial economy and ex-ante nature of the interest rate.

On the other hand, the second model indicates that inflation and unemployment rate have significant positive and negative affect on nominal GDP growth rate respectively. To further elaborate one standard deviation shock to inflation would lead to increase in 0.419% increase in nominal GDP growth rate. Higher inflationary pressure is detrimental to economic growth as real growth tends to slow down. On the contrary, low and moderate inflation can stimulate growth in the long run as it push down the interest rate which promote investment and reduce unemployment. It is clear from the second estimation that OIC countries have higher growth prospect but not without the expense of higher inflation. Nominal GDP growth rate and inflation for sample countries are shown below.
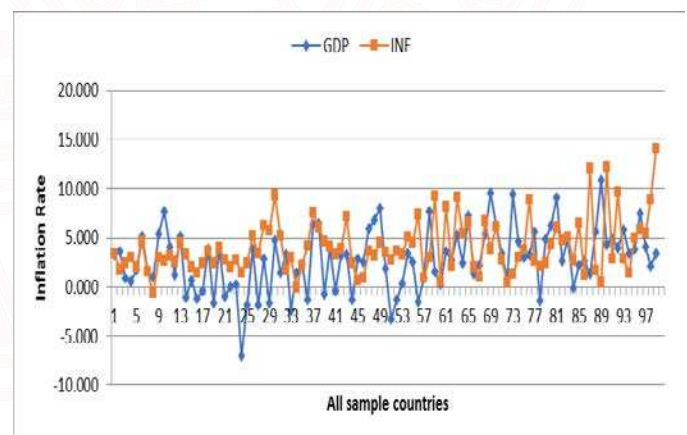

Fig 6: GDP vs Inflation of sample countries in 2012

A. *Inflation in OIC member countries*

In the second model, OIC x INF interactive dummy has statistically significant affect on nominal GDP growth rate. One way to explain the coefficient is 1% increase in inflation rate would lower OIC nominal GDP growth by -0.498% compare to non-OIC countries. It clearly shows OIC countries are more prone to inflation than the non-OIC countries. Many OIC countries like Turkey, Pakistan, Egypt, Indonesia, Nigeria, and Bangladesh have been suffering from higher inflation and weaker currency in the recent past. On this backdrop, inflation targeting has become more popular among many OIC central bankers. Moreover, almost all OIC countries are developing and the economy of GCC countries are largely dependent on oil windfall, decrease in oil price would lead to skyrocketing inflation. However, central bankers are facing challenges due to relationship breakdown between inflation and unemployment rate. The figure 4 shows the inflation rate in non-OIC and OIC countries.
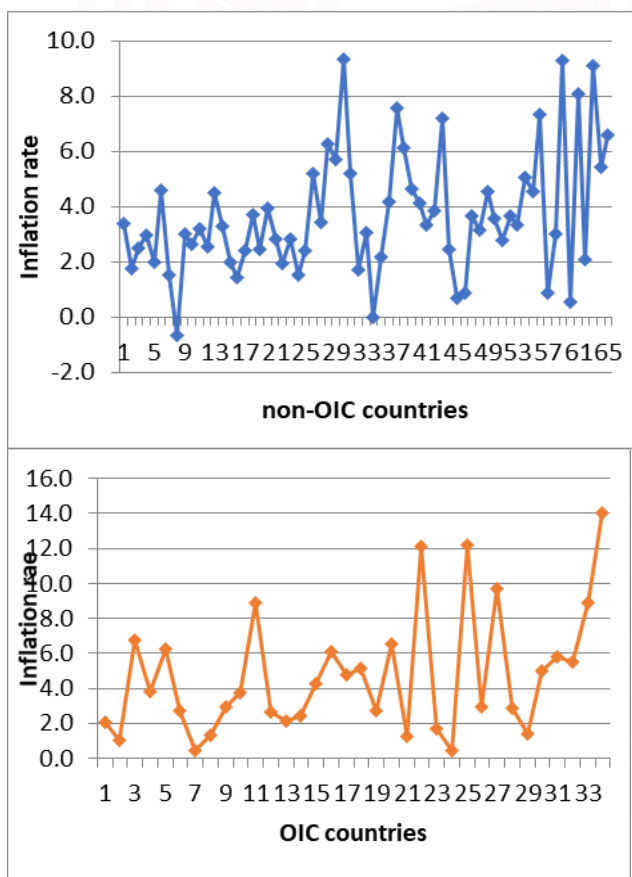

Fig 7: Inflation Rate in Non-OIC and OIC Member Countries in 2012

B. *Unemployment*

The second model of cross-sectional estimation shows increase in unemployment rate would reduce the economic growth significantly. For instance, the co-efficient indicates 1% increase in unemployment rate would decrease the GDP growth rate by 0.153%. Unemployment is one of the most common problems in many OIC countries, more specifically, youth unemployment which was one of the key factors of Arab spring. However, we didn't find any significant difference in level of unemployment between non-OIC and OIC countries. The figure 5 exhibits the unemployment rate scenario of the two groups.
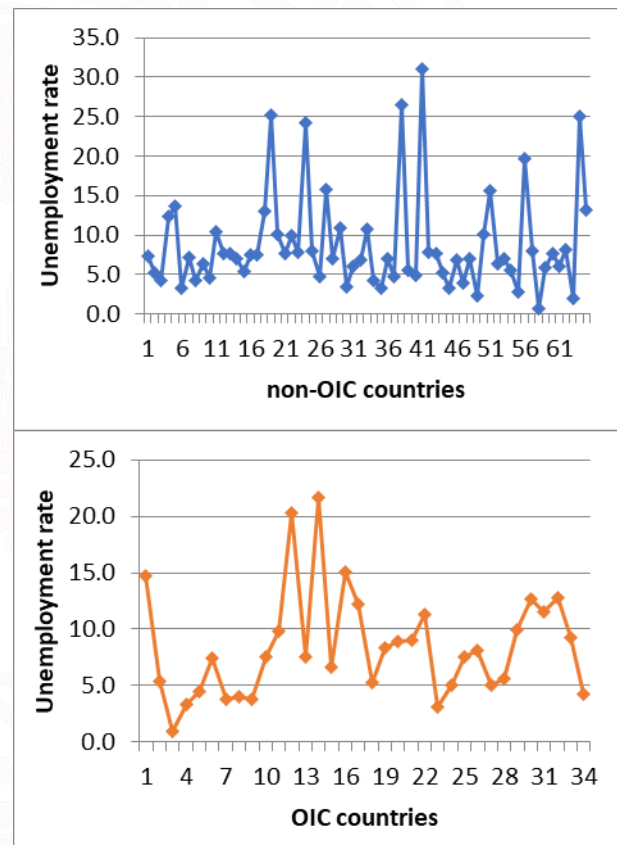

Fig 8: Unemployment rate in Non-OIC and OIC Member Countries in 2012

C. *OIC economic growth*

OIC dummy in the second estimation shows OIC countries have 3.56% higher nominal GDP growth rate than the non-OIC countries which is statistically significant. The convergence hypothesis could potentially explain the situation, developing countries tend to have higher GDP growth rate compare to developed countries. The figure 6 illustrates the GDP growth rate of non-OIC and OIC countries.
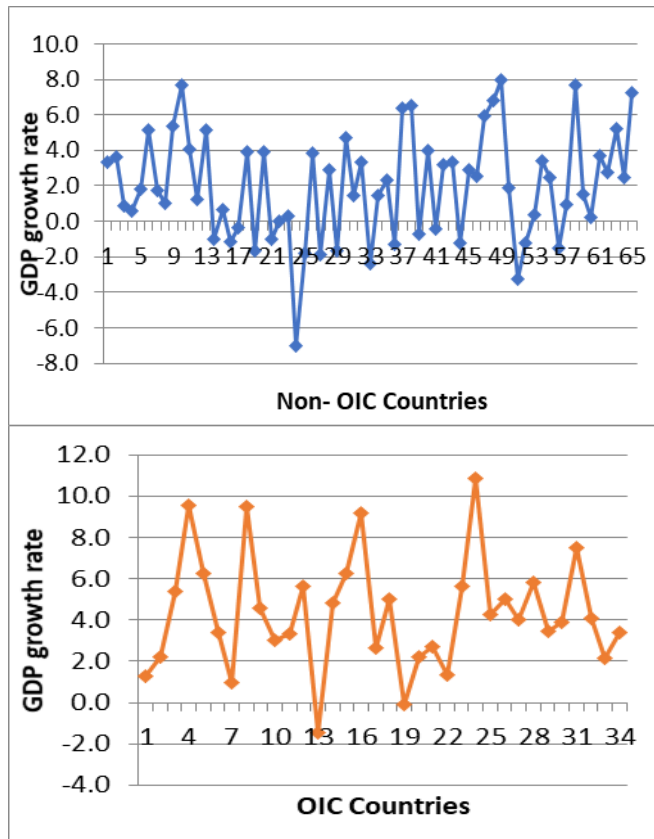
Figure 9: GDP Growth Rate in Non-OIC vs OIC Member Countries in 2012

Figure 10: Real Interest Rate vs GDP Growth Rate of Sample Countries in 2012

Interest as monetary tool in conventional way is negatively related to GDP (r=-0.076) and positively related to inflation but in our study, it shows it is negatively correlated (r=-0.150), this may be due to relatively low and stable inflation rate for a long time in Malaysia. Normally, the central bank will adjust the interest rate accordingly based on their economic objective that is whether it is for inflation targeting or growth targeting.

In this part of the study we have analyzed the relationship of real interest rate and nominal GDP growth rate with inflation, unemployment by taking into account other key monetary policy variety. We have observed key monetary variables have no significant affect on real interest rate even though vice-versa may happen. We argue that interest rate is usually determined in the money market and consequently it has no strong influence on the real economy. This has become evident in the recent past as the central bankers start using unconventional monetary policy instruments to control unemployment and inflation and stimulate growth. The figure 7 shows that nominal GDP growth rate and real interest rate.
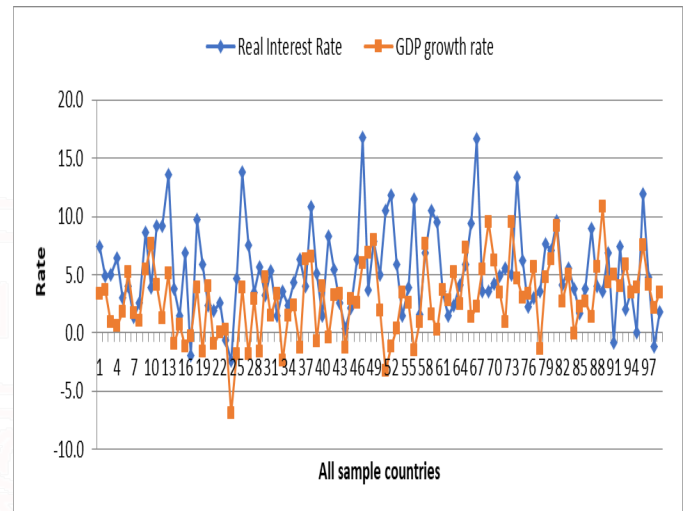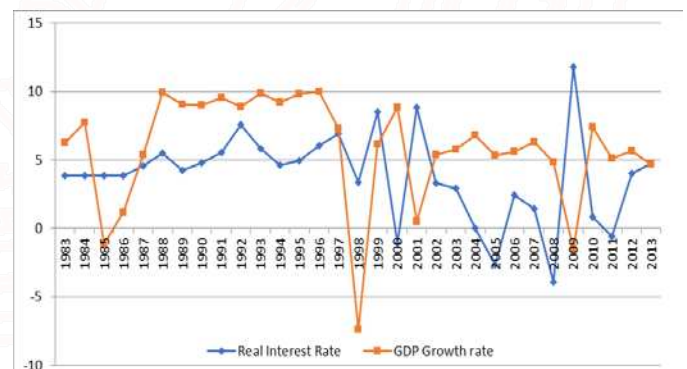

Fig 11: Real Interest Rate vs GDP Growth Rate in Malaysia (1983-2013)

On the other hand, GDP growth rate is positively correlated with GNI growth rate and FDI net inflow. In other words, higher GNI and FDI growth will lead to increase in GDP growth rate which is supported by the literature. Moreover, Inflation is positively correlated with GDP growth rate which indicates low and moderate inflation can stimulate growth of an economy.

In this stage of our study we focus at the specific country level. As Malaysia has recently developed its Islamic interbank market, it would be interesting to see whether this market operate independently from conventional market.

Table 2

Correlation matrix of Islamic vs Conventional interbank rate

	Islamic interbank rate	Conventional interbank rate
Islamic interbank rate	1.0	0.90***
Conventional interbank rate	0.90***	1.0

Notes: ***. Correlation is significant at the 0.001 level (2-tailed).

To investigate the difference between current Islamic and conventional money market we have taken six months' data (Figure 7) from Bank Negara Malaysia database. We have observed that there is no statistically significant difference between these two rates and they are highly correlated with each other (Table 2).
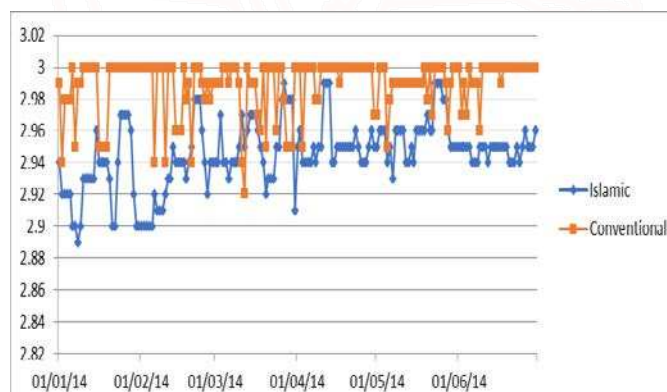

Fig 12: Islamic interbank rate vs. conventional interbank rate (January – June 2014)

Table 3: OLS estimation output for Malaysia from 1983-2013

Variables	Real Interest Rate	GDP growth rate
Intercept	-26.811	-12.187
	(53.678)	(15.601)
GNI	-0.934**	1.124***
	(0.320)	(0.093)
Net FDI	-1.799	0.717**
	(0. 873)	(0.254)
Log Gross Savings	2.431	0.701
	(7.678)	(2.232)
Log Real Exchange Rate	5.907	1.745
	(6.186)	(1.798)
Inflation	-0.338	-0.040
	(0.059)	(0.170)
GNI*FDI*LOGGS	0.081**	-0.021**
	(0.029)	(0.008)
R^2	0.353	0.961
Adjusted R^2	0.185	0.952
F-Value	2.097	96.078
Probability	0.093	0.000

Notes: Standard errors are in the parentheses. *, **, and *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

In the first model (Table 3), the result of OLS estimation indicates that real interest rate is not reflected in overall growth of the economy, not statistically significantly correlated with net inflow of foreign direct investment, gross savings, real exchange rate and inflation and only little impact when three key variables combined. However, real interest rate is negatively correlated with gross national income; in other words, increase in GNI by one point would lead to decrease in real interest rate by 0.934% assuming Ceteris paribus. It can be explained in another way, increase in real interest rate would discourage production and investment activities which will lead to decrease in gross national income. Nevertheless, the estimated model shows the real interest rate is very weakly (R^2 =0.357; P-value =0.0.093) explained by key macro-economic variables.

On the other hand, in the second model (Table 3) result of the analysis shows that gross national income and net foreign direct investment are significantly correlated with GDP growth rate (**r=**0.97; p=0.001 and r=0.58; p=0.001). From the OLS estimation (2) we can explain that increase in GNI by one unit would contribute in 1.124 % of GDP growth rate. This of course is quite significant which need further investigation or variable itself is highly exogenous. At the same time, increase in FDI by one unit would lead to increase in GDP growth rate by 0.717%. In other words, if

we can predict gross national income and net inflow of foreign direct investment we can predict the GDP growth rate more accurately. In addition to that, when we added more independent variables to see the impact of these variables on GDP growth rate, we observe that explaining power of the model increases. In other words, inclusion of gross savings, real exchange rate and inflation help better explaining the change in GDP growth rate (Adjusted R^2 =0.952; p=0.001). However, when we try to see the impact of three variables jointly namely gross national income, net inflow of foreign direct investment and gross savings, we find that the model even explain better but there is a sign change for inflation and decrease in coefficient from 0.077 to -0.040 which indicates weakness in this model. From the above discussion, we can conclude that in the estimation 2 (Table 3) reflects the overall aim of Islamic monetary policy and explain GDP growth rate much more accurately and consistently.

VI.   IMPLICATIONS AND CONCLUSIONS

A comparative literature review of Islamic and conventional monetary policy has revealed that there are many monetary policy instruments which can be adopted in Islamic monetary policy with or without major modifications such as: legal reserve ratio, credit rationing, selective credit control, issue of directive, and moral suasion. At the same time, Islamic economists and researchers have come up with instruments which are unique and Shari`ah compliant such as: profit sharing ratio, refinance ratio, public share of demand deposits, value-oriented allocation of credit, and *qard hasan* ratio (Biancone & Radwan, 2018).

In Islamic economic system, the main objectives of monetary policy are to 1) promote a sustained and balanced economic growth and mobilize resources for economic development; 2) maintain stability in the value of money so as to avoid excessive periodic fluctuations; and 3) maintain stability in the external value of money to promote an equitable distribution of income and wealth. We have found GDP growth holistically represents the real economy and connects real sector and financial sector of an economy. Therefore, we can argue that it is reasonable to use GDP growth rate as the benchmark for making and refining instruments for money market. It is unlike a bond indexed for inflation which is not recommendable as inflation does not always imply growth in production especially in stagflation. Moreover, inflation is more subjective and relative a measure to index an instrument with. If Indexation for inflation allowed in financial intermediation at broad based level, then it is not practicable in the financial system. As interest rate is prohibited in Islamic economic system, and all loans linked with inflation, then more the loans taken, more will be the credit money generation (assuming fractional reserve system) and more will be the inflation. For those who had

nothing to do with all this who were neither the borrowers nor the lenders, would suffer with this inflation, and this cannot be controlled since there is no interest rate mechanism. So, we also need to think of how to control inflation which is in essence a tax, as argued by many economists rather than encouraging indexation for inflation and thereby fueling expected inflation.

For the last two decades, an increasing number of Islamic monetary management tools and policies have been developed by financial institutions and markets in Malaysia and other Muslim countries around the world but still LIBOR is the ultimate benchmark in the money and capital market. Consequently, we found that Islamic and conventional money markets rate highly correlated. Dual banking system could be one of the main reasons of this phenomenon. Moreover, this conjecture is likely to be true for other OIC countries where Islamic banks co-exist with the conventional banks. Also, we found that real interest rate is mostly not representative across 99 countries as most of the time policy rates are either determined in the money market, which is usually disintegrated with the real sector of an economy, or it is fixed by the Central Bank. As many economists argue after such a long time of great moderation, a reduction in the volatility of business cycle fluctuations starting in the mid-1980s believed to have been caused by institutional and structural changes in developed nations in the later part of the twentieth century. The recent global financial crisis has proven to us that interest, which is the definitive instrument of monetary policy regulation has not only failed to control the economic system but also has created inequality, social injustice and rampant corruption and manipulation by global financial institutions supported by the government officials (Chapra, 2011; Mirakhor, 2014;). For example, during the recession, the USA and many European countries have intentionally violated the so-called market principles and intervened overwhelmingly to protect many giant financial institutions.

Given that, the interest rate needs to be replaced with more representative policy rate like the GDP growth rate linked instrument, which could provide a benchmark rate for pricing products in Islamic commercial banking and provide an avenue for investment in the Islamic money market and capital market such as GDP growth linked Sukuk (Bacha and Mirakhor, 2013). The GDP growth linked benchmark can also be used to benchmark not only domestic debt but also foreign debt. Central Bank in an interest free economic framework will continue to have statutory reserve ratio to contain money supply and control credit creation. Furthermore, introducing GDP linked instruments would provide a base instrument for OMO and create a secondary market for the instrument. Using refinance ratio, *qard hasan* ratio issue of directive, and moral suasion the Central Bank will be able to manage liquidity in the banking sector. In conclusion, we acknowledge that due to the limited and

focused scope of the study we could not take into account other macro-economic variables that may affect real interest rate and GDP growth rate. It is also important to remember that there are arguments against using GDP growth rate as benchmark rate. Moreover, further research is required in this emerging area, especially by taking large panel dataset and advanced econometric techniques in order to determine the relationship and consistency across countries and regions.

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Appendix 1

Variables Defined

Real interest rate (%)	Real interest rate refers to the lending interest rate for inflation which is measured by the GDP deflator.
GDP growth (annual %)	GDP growth rate is the annual percentage growth rate of gross domestic product in local currency market price. Aggregate acre constant 2005 USD.
Real effective exchange rate index (2010 = 100)	This variable means the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) which is devided by a price of deflator.
GNI growth (annual %)	GNI is calculated as such; the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad.
Foreign direct investment, net inflows (% of GDP)	Foreign Direct investment (FDI) refers to the net inflows of investment in order to acquire a lasting management interest in an a firm which operates in any state other than that of investor. This is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP.
Gross savings (% of GDP)	Gross savings are constructed as gross national income deduct total consumption and add net transfers.
Inflation, consumer prices (annual %)	The variable inflation refers to consumer price index which means the annual percentage change in the cost to the average consumer for acquiring a basket of goods as well as services that could be fixed or varied at a specific time intervals such as quarterly, yearly.
Unemployment, total (% of total labor force) (modeled ILO estimate)	Unemployment is the share of the labor force which is without job but available and seeking for job.

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