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# **Finance, growth and human development: An Islamic economic development perspective**

Md. Akhter Uddin<sup>1</sup> and Mansur Masih<sup>2</sup>

## **Abstract**

In a growing body of literature, importance of financial sector development and growth on human development has been emphasized but so far little empirical evidence to support this. Islam is a pro-growth religion but the concept of development in Islam is multidimensional, understanding the relationship between finance, growth and human development would help us better explain and develop a sustainable pro-Islamic economic growth model, which would help eradicate mass poverty, income inequality and develop human capital in the Muslim world. This study aims to investigate how finance and growth affect human development in Malaysia from Islamic economic development perspective by using standard time series technique, ARDL. The study finds that there is a long term relationship between finance, growth and human development. Human development is found significantly correlated with the growth in the long run. It can be argued that financial development supports growth and growth ultimately promotes human development in the long run, also, macroeconomic stability is found significant for sustainable economic growth in Malaysia. However, oil price is found not correlated with growth in the long run for the Malaysian economy.

Key words: economic growth, financial development, human development, ARDL

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# **Finance, growth and human development: An Islamic economic development perspective**

## **Introduction**

The history of economic development in Islam has started in Medina since the first Islamic state was established by our Holy Prophet (SAWS). Anwar (1987) while proposing an interest-free economic model argues that the failure of the traditional approaches to economic development is evident from the mass poverty, co-existence of hunger and affluence, exploitation of poor by rich and the powerful, increasing disparities at the regional and international levels, the unsuitability of production and consumption processes to environmental needs, and the irrational use of non-renewable resources. Mirakhor and Askari (2010) state that until the last decades of the twentieth century, development thinking had evolved within a framework of “missing person,” namely, the human being. The goals of the Islamic concept of economic development cannot be explained in terms of Gross National Product and increase in per capita income only. It must be explained in terms of raising the absolute income levels of the poor to eradicate poverty, meeting material or non-material human needs, the conservation of natural resources, wildlife, and ecological environment (Mannan, 1989). Bacha & Mirakhor (2014) confirm that importance of capital markets and the financial sector for economic growth and development in Muslim countries. On the other hand, Cizakca (2014) argues that even though Islamic finance has developed significantly in the recent past, however, this development alone, without fulfilling certain preconditions in the rest of the economy, cannot generate economic growth.

Fundamental theory behind our study is endogenous growth theory, an economic theory which argues that economic growth is generated from within a system as a direct result of internal processes (Romer, 1994; Aghion et al., 1998; Solow, 2000). On the other hand, many economists argue finance is a relatively unimportant factor in economic development. Particularly, Robinson (1952) contends that financial development simply follows economic growth. Later, Lucas (1988) terms the relationship between financial and economic development “overstressed” (cited in King & Levine, 1993). Finance and growth are positively correlated and finance plays important role in growth in the long run (Goldsmith, 1969; King and Levine, 1993; Demirguc-Kunt and Levine, 2004; Beck, Levine, and Loayza, 2000; Beck et al., 2014). On the other hand, negative and non linear relationship between finance and growth has also been reported (Deidda and Fattough, 2002; Arcand, 2011; Huang and Lin, 2009; Law and Singh, 2014). We can state that in spite of voluminous amount of research the issue is still remain somewhat controversial.

Human development, one of the fundamental ideas of economic development, and its relationship with growth is not straight forward. There are two strands of the literature on economic development that are relevant here but have tended to remain rather distinct. The predominant one has been concerned with the determinants of Endogenous Growth, going back to classical times, extending to neo-classical growth models and, more recently, the “new growth theory” models. The second strand asks what the ultimate objective of economic development is and how to measure it, including a discussion of the determinants of HD(Mankiw, Romer and Weil, 1992; Benhabib & Spiegel, 1994). Boozer et al. (2003) argue that human development is not only a product of economic growth but also an important input to it. At the same time, Pischke (1998) argue that access to informal credit contribute to development by facilitating entrepreneurship among the poor and increasing their capacity to manage risk(Pischke, 1998; Pischke, 2012).

Financial development increases average growth (Beck et al., 2007; Gennaioli et al., 2011; Monacelli et al., 2011; Clarke et al., 2013). However, Lee & Hong (2011) argue that the contributions of education and total factor productivity in Asian past economic growth remain relatively limited. No significant relationship between finance, growth and human development was found (Demirguc-Kunt and Levine, 2004). While there is no doubt that a developed economy needs a sophisticated financial sector, at the current state of knowledge there is no theoretical reason or empirical evidence to support the notion that all the growth of the financial sector in the last forty years has been beneficial to society (Zingales, 2015) .

From the above discussion, we can argue that relationship between finance and growth is not clear, moreover, how finance and growth can promote human development, a key indicator of real economic development of an economy in Islamic economics, did not get enough attention from the economist A humble attempt has been made in this study to investigate the relationship between financial development, growth and human development, we have chosen Malaysia as a case study to examine how financial development has supported growth and examine how this growth really promotes to human development. 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 teaching, only country from 56 OIC countries to be included in the Islamicity index developed by Askari (Askari, 2013).

This paper tries to investigate the long and short-run determinants of finance, growth and human development in Malaysia. We employ yearly data over the period 1973-2013 by using a robust and advanced time series technique, Autoregressive Distributed Lag (ARDL) cointegration method which is applicable regardless whether the variables are I(1) or I(0). Finance, growth and human development is

found cointegrated in the long run, i.e. there is a long-run relationship between these variables. There exist bi-directional finance and growth relationship, it can be argued that, finance is initially leading the growth but in the long run growth actually leads the finance. Human development is found significantly positively correlated with growth but the magnitude is not conclusive. Short term volatility in oil price and exchange rate has lag effect on growth, which might ultimately affect the growth in the long run. However, oil price is found not correlated with growth in the long run for Malaysian economy. Finally, it can be argued that financial development supports growth and growth ultimately promotes human development in the long run, also, macroeconomic stability is found significant for sustainable economic development in Malaysia.

The paper is organized as follows. Section 2 reviews on the relevant theoretical and empirical literature. The theoretical model specification, data and the ARDL cointegration methodology are explained in section 3. The empirical results and discussions are presented in section 4. The last section ends with the concluding remarks and policy implications of the paper.

### **Literature Review**

The history of economic development in Islam has started right from the concept and establishment of the first Islamic state in Medina after the Holy Prophet (SAWS) migrated from Makka. The Prophet (SAWS) has established the principles of a welfare state and clearly specifies the rules of every stakeholder and the most importantly the institution, Bait-ul-mal (As-Sadr, 1989). After reigning for centuries the Muslim have diverted from the true principle and teaching of Islam and more importantly Islamic economic development guideline (Cizakca, 2014) as a consequence Islamic economics had been in hibernation for unexpectedly long time and only four decades ago it revived and has got some kind of momentum for the last few decades.

Anwar (1987) while proposing an interest-free economic model argues that the failure of the traditional approaches to economic development is evident from the mass poverty, co-existence of hunger and affluence, exploitation of poor by rich and the powerful, increasing disparities at the regional and international levels, the unsuitability of production and consumption processes to environmental needs, and the irrational use of non-renewable resources. As a result, several economists have stressed the need for taking account of social, cultural and religious factors in choosing the development paths, rather than adhering to the Western development strategies. Anwar (1987) further argues that full employment and price stability are among the major economic goals of all the Muslim countries leaning towards economy-wide interest-free reforms. He further argues that in an interest-free economic system the savers and entrepreneurs will obtain the same real rates of return, they intended at the time of fund transfer if their

contracts are concluded on the basis of interest-free Islamic principles even in the presence of inflation or deflation, thereby leading to steady economic development.

Mirakhor and Askari (2010) state that until the last decades of the twentieth century, development thinking had evolved within a framework of “missing person,” namely, the human being. During the 1970s, the intellectual and practical field of development totally changed its focus to human beings, both as the means and as the end of the development process (Mirakhor & Askari, 2010).

The goals of the Islamic concept of economic development cannot be explained in terms of Gross National Product and increase in per capita income only. It must be explained in terms of raising the absolute income levels of the poor to eradicate poverty, meeting material or non-material human needs, the conservation of natural resources, wildlife, and ecological environment (Mannan, 1989), in other words, major foundational elements of development in Islam are: individual self-development, the physical development of the earth and its natural resources, and the development of human collectively ( Mirakhor & Askari, 2010; Askari, 2014; ). In addition, the goals of the Islamic concept of development must be designed for the preservation of moral and spiritual values, as reflected in the concept of ‘Tazkiyah’ (moral purification plus growth).

Establishment of an Islamic financial system is one of the pioneering efforts needed to reform all economic institutions in accordance with the principles of Islamic Economics. Anwar (1987) argues that advantages of financial markets are greater diversification of portfolios, the possibility of alterations in risk levels, and the transfer of resources from savers to investors, all of which permit increased investment opportunities and higher levels of economic development. Bacha & Mirakhor (2014) confirm that importance of capital markets and the financial sector for economic growth and development in Muslim countries. On the backdrop of current global financial crisis, they further argue that conventional capital markets that are heavily biased toward debt and debt-based instruments are inherently unstable, therefore, they propose a risk-sharing framework that minimizes debt – if not avoids debt completely – and brings about renewed stability. Bacha & Mirakhor (2014) states that Malaysia and Bahrain have attempted to build comprehensive Islamic capital market (ICM). They further argue that although governments, such as those of Malaysia are determined to develop their ICM, policy making at the macroeconomic level remains conventional – especially monetary policy. On the other hand, Cizakca (2014) concludes that even though Islamic finance has developed significantly in the recent past, however, this development alone, without fulfilling certain preconditions in the rest of the economy, cannot generate economic

growth. He identifies the rule of law, the democratic package, the basic freedoms, and the avoidance of sectarian violence.

Askari (2013) argues that in most Muslim societies, efficient institutions, rules and rule-compliance to promote development are not embraced and practiced, therefore, in many countries that profess Islam and are labeled as Islamic today, we see injustice and underdevelopment. He further argues that despite the fact the Islamic basis of development is multidimensional, having its moral, social, political and economic dimensions, moral and spiritual development need to be integrated into the very concept of economic development right from the beginning.

Thus, economic development in Islam is not simply materialistic development. The spiritual and moral phases are assigned capital importance and they were made explicitly in 'Takaful' or 'Tadamun' or mutual social security of Islam. The ideal pattern of Islamic belief, which contains enough motivational properties regarding work, can influence actual patterns of Muslim behavior. It is possible to motivate economic achievement, thereby accelerating economic development through a systematic program of moral, educational training and more evident in the context of present disorder in the financial sector (Zingales, 2015).

In the following part we are going to look at the finance growth theory and consider how financial development and growth contributes to human development. As many Muslim countries have abundance of natural resources, the impact of one of the key strategic resource oil on human development is also going to be investigated.

Fundamental theory behind this study is endogenous growth theory, an economic theory which argues that economic growth is generated from within a system as a direct result of internal processes (Romer, 1994; Aghion et al., 1998; Solow, 2000). More specifically, the theory notes that the enhancement of a nation's human capital will lead to economic growth by means of the development of new forms of technology and efficient and effective means of production. This view contrasts with neoclassical economics, which contends that technological progression and other external factors are the main sources of economic growth. Supporters of endogenous growth theory argue that the productivity and economies of today's industrialized countries compared to the same countries in pre-industrialized eras are evidence that growth was created and sustained from within the country and not through trade.

Since the Second World War, the world economy has been growing faster than ever before. The USA and the former Soviet Union the winner, Japan and Germany the loser of the war had become the

global growth engine until late twentieth century. In the recent past, Brazil, Russia, India, China and South Africa (BRICS) have shown phenomenal growth until 2007-2008 financial crisis. Adam Smith, Thomas Malthus and David Ricardo could be regarded as the main precursors of modern growth theory. Growth has been a central issue for economists for over a century and many theories were developed in 1950's and 1960's, and some early growth models are collected in Stiglitz and Uzawa (1969) (cited in Jovanovic, 2000). Since 1980 arrival of better data set has helped economists to answer better the rationale (factors that determine growth) behind the past growth and future predictions (Jovanovic, 2000).

Growth is a complex phenomenon and many theories have been developed to explain this phenomenon. Voluminous amount of research has been conducted in this field and has been growing continuously. One of the most prominent areas of growth research is the study of finance-growth nexus. In his ground breaking research Schumpeter (1911) (cited in King & Levine, 1993) argued that the financial intermediaries play an important role in technological innovation and economic development. In his seminal work, *Financial Structure and Development*, Raymond W. Goldsmith (1969) wanted to accomplish three goals. Firstly, how financial structure – the mixture of financial instruments, markets, and intermediaries operating in an economy – changes as economies grow. Secondly, impact of overall financial development – the overall quantity and quality of financial instruments, markets, intermediaries – on economic growth. Finally, whether financial structure influences the pace of economic growth, in other words, does the mixture of markets and intermediaries functioning in an economy influence economic development. Goldsmith (1969) argues that one of the most important problems in the field of finance, if not the single most important one, almost everyone would agree, is the effect that financial structure and development have on economic growth (Goldsmith, 1969 cited in Demirguc-Kunt and Levine, 2004, 3).

On the other hand, many economists argue finance is a relatively unimportant factor in economic development. Particularly, Robinson (1952) contends that financial development simply follows economic growth. Later, Lucas (1988) terms the relationship between financial and economic development “overstressed” (cited in King & Levine, 1993).

After Goldsmith's groundbreaking empirical research many empirical works have been carried out to investigate finance-growth relationship. King and Levine (1993) studied 80 countries over the 1960-1989 period to investigate the relationship between higher level of financial development and faster rate of economic development, physical capital accumulation and economic efficiency improvement. In their comprehensive research in this field, Demirguc-Kunt and Levine (2004) confirm that in the recent past,



researchers have shown that financial development has positive impact on economic growth, not due only to simultaneity bias, at firm level (Demirguc-Kunt & Maksimovic, 1998), industry level (Rajan & Zingales, 1998; Wurgler, 2000) and pooled cross-country, time series studies (Beck, Levine, and Loayza, 2000; Beck et al., 2014).

On the contrary, a study conducted by Stephen Cecchetti and Enisse Kharroubi recently outlined the negative link between the finance sector and growth, after a certain point. They further argue that when an economy is immature and the financial sector is small, then growth of the sector is helpful (Cecchetti & Kharroubi, 2012).

Singh and Law (2014) by using dynamic panel threshold technique on 87 developed and developing countries found that more finance is not necessarily good for economic growth and highlight that an optimal level of financial development is more crucial in facilitating growth (Law and Singh, 2014). Arcand (2011) found that finance starts having a negative effect on growth when credit to private sector reaches 100% of GDP. Non-linear positive relationship between finance and growth (Deidda and Fattough, 2002), the positive effective is more evident in the low-income countries than in the high-income countries (Huang and Lin, 2009).

Therefore, we can argue that the finance-growth relationship is not settled yet, in spite of, vast literature contributed in understanding this dynamic relationship. Now, we are going to look at the literature on how finance growth nexus affect human development (HD).

There are two strands of the literature on economic development that are relevant here but have tended to remain rather distinct. The predominant one has been concerned with the determinants of Endogenous Growth (EG), going back to classical times, extending to neo-classical growth models and, more recently, the “new growth theory” models. The second strand asks what the ultimate objective of economic development is and how to measure it, including a discussion of the determinants of HD. We take the position that a long and healthy life represents the “bottom line” objective of human activity, even though this issue continues to be contested.

Human development has been defined as enlarging people's choices in a way which enables them to lead longer, healthier and fuller lives (UNDP). We shall consider the HD of a country as consisting of the health and education of its people, recognizing that this is very much a reductionist interpretation. There two approaches in this nexus, a standard approach is to treat human capital, or the average years of schooling of the labor force, as an ordinary input in the production function (Mankiw, Romer and Weil,

1992). Another is associated with endogenous growth theory, the growth of total factor productivity as a function of the level of education or human capital, life expectancy. The presumption is that an educated and healthy labour force is better at creating, implementing, and adopting new technologies, thereby generating growth. Benhabib and Spiegel (1994) in their seminal work study the role of human capital in economic development and proposed a new model. The significance of this alternative model in terms of its empirical implications is that human capital stocks in levels, rather than their growth rates, now play a role in the determining the growth of per capita income (Benhabib & Spiegel, 1994).

Pischke (1998) argue that access to informal credit contribute to development by facilitating entrepreneurship among the poor and increasing their capacity to manage risk. He further argue that finance contributes to economic and human development. Finance assists economic growth by creating more efficient markets through intermediation between savers and borrowers, selection of good investments, reduction of transaction costs and through integrating market generally. He confirms that finance matters in economic development, without which human development is retarded in the long run. Similarly, economic growth may not be achievable without human development. Financial services supplied broadly and efficiently accelerate economic growth, increase the efficiency of resource allocation, and spread wealth more broadly. However, there is a skepticism in some quarters about the nature of these relationships, but, historically, growth and human development are correlated. (Pischke, 1998; Pischke, 2012).

Boozer et al. (2003) argue that human development is not only a product of economic growth but also an important input to it. They further argue that human development must be given priority for the achievement of both higher economic growth as well human development. They conclude that Education, health, and other aspects of HD involve fixed costs that can create non-convexities in the social returns to various levels of HD, and thus result in low and high level equilibria.

While there is no doubt that a developed economy needs a sophisticated financial sector, at the current state of knowledge there is no theoretical reason or empirical evidence to support the notion that all the growth of the financial sector in the last forty years has been beneficial to society (Zingales, 2015). In fact, we have both theoretical reasons and empirical evidence to claim that a component has been pure rent seeking. By defending all forms of finance, by being unwilling to separate the wheat from the chaff, we have lost credibility in defending the real contribution of finance. “over the long sweep of history, financial innovation has been important in promoting growth” (Stiglitz, 2010 cited in Zingales 2015).

Beck et al (2007) argue that if financial development increases average growth only by increasing the incomes of the rich and hence by increasing income inequality, then financial development will not

help those with lower incomes. They found that financial development disproportionately increases incomes of the poorest quintile and reduces income inequality. However, they didn't give any policy recommendation on how to foster poverty reducing financial development.

The paramount importance of human capital in human development is well established (Gennaioli et al., 2011). They further argue that evidence from more than 1,500 sub-national regions of the world suggests that regional education is a critical determinant of regional development, and the only such determinant that explains a substantial share of regional variation. Using data on several thousand firms located in these regions, they have also found that regional education influences regional development through education of workers, education of entrepreneurs, and perhaps regional externalities. The latter come primarily from the level of education (the quality of human capital) in a region, and not from its total quantity (the number of people with some education).

Monacelli et al. (2011) study the empirical link between a range of financial development indicators and human development index using data on 68 countries over 1990-2005 period. They conclude that various measures of financial development concerning both financial market and financial architecture are robustly associated with Human Development Index, a composite indicator of health, education and income. They argue that for human development the diffusion of financial intermediaries and instruments are necessary.

By examining the relationship between financial intermediary development and income inequality in a panel of 91 countries for the period of 1960-95, Clarke et al. (2013) find that there is a reasonably strong evidence that inequality decreases as economies develop their intermediaries (Clarke et al., 2013).

Lee & Hong (2011) argue that the contributions of education and total factor productivity in Asian past economic growth remain relatively limited. However, policy reforms in education, property rights, and research and development can substantially raise GDP growth in the region and partly offset the slowdown in growth caused by the convergence phenomenon. Demirguc-Kunt and Levine (2004) in their comprehensive research on finance-growth relationship, they use average years of schooling their model to see the human development but didn't find any significant relationship between growth and human development.

From the above theoretical and empirical literature review, we can argue that human development is the fundamental of economic development and is recognized in the west but economic development in Islam goes beyond the realm of worldly materialistic gain and include creation of all kind, environment, the earth and solar system itself. Although empirical study based on theoretical models make distinct

predictions about the relationship between financial sector development and growth, and growth and human development but little empirical research has been conducted to understand the finance, growth and human development relationship. The current literature has also shown that Islamic economics dimension of development has got less attention from economists and most of the work has been carried out in the developed world to explain their growth phenomenon (Mirakhor & Askari, 2010).

A humble attempt has been made to investigate relationship among financial development, growth and human development, we have chosen Malaysia as a case study to study how financial development has supported growth and how this growth promotes human development. Malaysia is considered as a bright example among Muslim community for upholding the true value of Islam, only country from 56 OIC countries to be included in the Islamicity index developed by Askari (Askari, 2013).

Malaysia, one of the emerging economies in the south-east Asia, is a bright example of non-oil tradable diversification and financial sectors development (Cherif and Hasanov, 2014). For the last three decades and so, financial sectors, especially banking and capital market, have enjoyed significant growth, at the same time, the economy has become less dependent on oil rents. For example, crude oil export (% of total export) has fallen from 53.8% in 1970 to less than 5% in 2014. On the other hand, GDP per capita has increased by approximately 10 times in the same period. Net funds raised by private sectors from capital market have increased from RM 76 Million in 1970 to RM 90,788 Million in 2012 while at the same time total market capitalization to GDP was 156% and in 2013 market capitalization of Bursa Malaysia was RM 1.6 Trillion. Simultaneously, domestic credit to private sectors by banks (% of GDP) has increased by 6 times. At the same time, Malaysia has shown a significant progress in human development, life expectancy has increased by more than 10 years since 1970. This helps us to assume that the rapid development of financial sectors which ultimately promotes domestic trade, investment and manufacturing sectors which help in overall economic diversification, growth and development.

According to Malaysian Financial Sector Development Plan, over the next decade, the financial sector is envisioned to grow beyond its role as an enabler of growth to be a key driver and catalyst of economic growth, with growth in the financial system firmly anchored to growth in the real sector. Based on the rate of growth of the economy projected for the next decade, it is envisaged that the financial system will grow at an annual rate of 8-11%, increasing the depth of the financial system to six times times of gross domestic product (GDP) in 2020 (2010: 4.3 times of GDP). At the same time, the contribution of the financial sector to nominal GDP is expected to grow from 8.6 percent of nominal GDP in 2010 to between 10 and 12 percent by 2020.

## Data and Model Theoretical Specifications

This study is conducted by applying the Autoregressive Distributed Lag model (ARDL) analysis (also known as the Bounds testing procedure) by using six variables based on previous studies and our research objective, a number of variables as potential determinants have been divided into three major categories namely, growth, financial development and human development. The growth variables refer to the country's real GDP per capita (King & Levine, 1993; Beck, Levine, and Loayza, 2000). Liquidity liabilities (M3) to GDP measures the level of financial development (Demirguc-Kunt and Levine, 2004; Beck, Levine, and Loayza, 2000). As main focus of our study is to understand the finance and growth from human development prospective, we use life expectancy as a proxy of human development (Demirguc-Kunt and Levine, 2004). In addition to that we have three control variables, WTI crude oil price and two macro-economic variables, exchange rate and inflation. In this context, theory asserts that countries that have stable exchange rate and moderate inflation in the long run might grow faster. In this study, variable that represent external shock to the economy, namely oil price is also examined.

## Theoretical Model Specifications

$$G = \int (F, L, P, INF, X)$$

**Where,**

G= real GDP per capita, proxy of growth

F = Liquidity liabilities to GDP, proxy of financial development

L = Life expectancy, proxy of human development

P = WTI crude oil price per barrel USD, proxy of oil price volatility (control variable)

X = MYR Exchange Rate Per USD (control variable)

INF = Inflation (control variable)

The data used here are the yearly in the period January 1973 to 2013. A total of 40 observations were obtained. Due to longer duration of the series and many missing values we have to use multiple sources for collecting data for all variables used in the study. Real GDP per capita, life expectancy, Inflation and exchange rate are collected from the World Bank Database, WTI crude oil price per barrel

USD is collected from Datastream and Liquidity Liabilities to GDP is calculated from Bank Negara Malaysia (BNM) monthly statistical bulletin.

## Methodology

The ARDL cointegration approach is used first for testing the presence of a long term relationship with the lagged levels of the variables. It helps in identifying the dependent variables (endogenous) and the independent variables (exogenous) which are called the ‘forcing variables’.

Moreover, if there is a long term relationship among the variables, then the ARDL analysis generates the ECM equation for every variable, which provides information through the estimated coefficient of the error correction term about the speed at which the dependent variable returns back to equilibrium once shocked. This enables us to test whether or not the financial development at a higher speed (compared to human development and oil price) to changes in the macroeconomic variables change.

In regard to the time-series studies, the regression analysis that has been applied for many decades to estimate the long-run relationship among economic and social variables is now considered to have either estimated a spurious relationship (if the original ‘level’ form of the variables was non-stationary) or estimated a short-run relationship (if the variables were ‘differenced’ to make the original variables stationary). The damaging limitation of the traditional regression analysis (i.e., either spurious or not testing theory) has been addressed by the recent and ongoing cointegration time series techniques. The significant contributions made by the time series cointegration techniques starting with the publication of the seminal paper by Engle and Granger (1987) has been recognized through the recent award of the Nobel Prize in Economic Science to Engle and Granger in 2003.

Although the conventional cointegrating procedure has made an important advance on regression analysis by focusing on the point that any regression analysis should start off, not mechanically, but by testing the stationarity and cointegration properties of the time series involved, the cointegrating estimates also are subject to a number of limitations (Masih et al., 2008). The estimates derived from the cointegrating tests (such as the Johansen test) and the unit root tests (such as, the augmented Dicky-Fuller and Phillips-Peron, etc. which precede the cointegrating tests), are found to be biased. The tests lack power and are biased in favour of accepting the null hypothesis. The cointegration tests require the variables to be  $I(1)$  but the order of integration of a variable, whether  $I(1)$  or  $I(0)$ , may depend on the number of lags included or whether the intercept and/or the trend are included or excluded in the unit root

tests. Moreover, the Johansen cointegrating tests have small sample bias and simultaneity bias among the regressors.

The Auto-Regressive Distributive Lag (ARDL) method (also known as the bounds testing approach) proposed by Pesaran-Shin-Smith (2001) that we have employed is free from the above limitations of the unit root and cointegration tests. The ARDL bounds testing approach does not require the restriction imposed by cointegration technique that the variables are  $I(1)$  or  $I(0)$ . Moreover, the bounds testing procedure employed in this study is robust for small sample size study (Pattichis, 1999; Mah, 2000; and Tang and Nair, 2002). Pattichis (1999) applied ARDL bounds test with 20 observations, whereas studies of Mah (2000) and Tang and Nair (2002) had observations of 18 and 28 respectively. Furthermore, the bounds testing approach is possible even when the explanatory variables are endogenous (Alam and Quazi, 2003).

The ARDL technique involves two stages. At the first stage, the existence of a long-run relationship among the variables is investigated. This is done by constructing an unrestricted error correction model (VECM) with each variable in turn as a dependent variable and then testing whether or not the 'lagged levels of the variables' in each of the error correction equations are statistically significant (i.e., whether the null of 'no long run relationship' is accepted or rejected ).

Basically, the ARDL method is the Wald test (F-statistic version of the bounds testing approach) for the lagged level variables in the right-hand side of VECM. That is, we test the null hypothesis of non-cointegrating relation ( $H_0: b_1 = b_2 = b_3 = \dots = b_n = 0$ ) by performing a joint significance test on the lagged level variables. The asymptotic distribution of the F- statistic is non-standard under the null hypothesis of no cointegrating relation between the examined variables, irrespective whether the explanatory variables are purely  $I(0)$  or  $I(1)$ .

The test consists of computing an F-statistic testing the joint significance of the 'lagged levels of the variables' in each of the above error-correction form of the equation. The computed F-statistic is then compared to two asymptotic critical values. If the test statistic is above an upper critical value, the null hypothesis of 'no long-run relationship' can be rejected regardless of whether the variables are  $I(0)$  or  $I(1)$ . Alternatively, when the test statistic falls below a lower critical value, the null hypothesis of 'no long-run relationship' is accepted regardless of whether the variables are  $I(0)$  or  $I(1)$ . Finally, if the test statistic falls between these two bounds, the result is inconclusive. It is only in this case that the researcher may have to carry out unit root tests on the variables. As regards the implications of the F-statistics, if all the F-statistics in all equations happen to be insignificant, then that implies the acceptance of the null of 'no

long run relationship' among the variables. However, if at least one of the F-statistics in the error-correction equations is significant, then the null of 'no long-run relationship' among the variables is rejected. In that case there is a long run relationship among the variables. When the F-statistic is significant, the corresponding dependent variable is endogenous and when the F-statistic is insignificant, the corresponding dependent variable is exogenous or called 'long-run forcing variable'.

Once the long run relationship has been demonstrated, the second stage of the analysis involves the estimation of the long run coefficients (after selecting the optimum order of the variables through AIC or SBC criteria) and then estimate the associated error correction model in order to estimate the adjustment coefficients of the error-correction term. Since the data are yearly, we choose one for the maximum order of the lags in ARDL model. Since the observations are yearly, for the maximum order of the lags in the ARDL model we choose 1 and carry out the estimation over the period of 1973 to 2013.

The ARDL model specifications of the functional relationship between real GDP per capita(G), Liquidity liabilities to GDP(F), WTI crude oil price (P), Life expectancy (L), Inflation(INF) and Exchange rate (X) can be estimated below:

$$DG_t = a_0 + \sum_{i=1}^k b_1 DG_{t-i} + \sum_{i=0}^k b_2 DL_{t-i} + \sum_{i=0}^k b_3 DP_{t-i} + \sum_{i=0}^k b_4 DF_{t-i} + \sum_{i=0}^k b_5 DINF_{t-i} + \sum_{i=0}^k b_6 DX_{t-i} + b_7 LG_{t-1} + b_8 LL_{t-1} + b_9 LP_{t-1} + b_{10} LF_{t-1} + b_{11} INF_{t-1} + b_{12} LX_{t-1} + \mu_t$$

ARDL bounds testing procedure permit us to take into consideration I(0) and I(1) variables together. The null hypothesis of the non-existence of a long-run relationship is denoted by  $F_{LG}(LG|LL, LP, LF, INF, LX)$  is  $H_0 = b_7 = b_8 = b_9 = b_{10} = b_{11} = b_{12} = 0$ . Similarly, we compute the F-statistics when the other variables in Eq. (2) are used as dependent variables and denote them with  $F_{LL}(LL|LG, LP, LF, INF, LX)$ ,  $F_{LP}(LP|LG, LL, LF, INF, LX)$ ,  $F_{LF}(LF|LG, LL, LP, INF, LX)$ ,  $F_{INF}(INF|LG, LL, LP, LF, LX)$ , and  $F_{LX}(LX|LG, LL, LP, LF, INF)$  while the null hypothesis means there is no cointegration, against the alternative hypothesis of there is cointegration.  $H_0: b_7 \neq b_8 \neq b_9 \neq b_{10} \neq b_{11} \neq b_{12} \neq 0$ . In equation, k is lag criteria.

The calculated F-statistics derived from Wald test are compared with Pesaran et al.(2001)'s critical values. If calculated F-statistics falls below the Pesaran et al.(2001)'s lower critical values, it is accepted that there is not relationship between time series. If calculated F-statistics is among Pesaran et al.(2001)'s lower and higher critical values, it is avoided to make certain commitment and referred to other



cointegration tests. If calculated F-statistics is upper than boundcritical values, it is accepted that there is relationship between time series. In other words the null hypothesis is rejected.

After estimating the existence of long run relationship between variables the second step is selecting optimal lag length by using of standard criteria such as Swartz Bayesian (SBC) or Akaike Information (AIC). After that long run and short run coefficients could be predicted. ARDL long run form is exhibited in equation below:

$$LG_t = a_0 + \sum_{i=1}^k b_1 LG_{t-i} + \sum_{i=0}^k b_2 LL_{t-i} + \sum_{i=0}^k b_3 LP_{t-i} + \sum_{i=0}^k b_4 LF_{t-i} + \sum_{i=0}^k b_5 INF_{t-i} + \sum_{i=0}^k b_6 LX_{t-i} + \mu_t$$

Error correction term is used in the ARDL short run model. The short run dynamic model can be presented as follows:

$$DG_t = a_0 + \sum_{i=1}^k b_1 DG_{t-i} + \sum_{i=0}^k b_2 DL_{t-i} + \sum_{i=0}^k b_3 DP_{t-i} + \sum_{i=0}^k b_4 DF_{t-i} + \sum_{i=0}^k b_5 DINF_{t-i} + \sum_{i=0}^k b_6 DX_{t-i} + b_7 ECT_{t-i}$$

Where, ECT is lagged error correction term.

The hypothesis that we will be testing is the null of ‘non-existence of the long-run relationship’ defined by

$$H_0: b_1 = b_2 = b_3 = b_4 = b_5 = b_6 = 0$$

Against, existence of a long-run relationship.

$$H_1: b_1 \neq b_2 \neq b_3 \neq b_4 \neq b_5 \neq b_6 \neq 0$$

As discussed earlier, we use the following variables for our lead-lag analysis. All the variables (except the inflation rates) are transformed into logarithms to achieve stationarity in variance. All the level forms of the variables were transformed into the logarithm scale but that was not necessary for the inflation rate variable, which was originally in percentage form. We begin our empirical testing by determining the stationarity of the variables used. In order to proceed with the testing of cointegration later, ideally, our variables should be I(1), in that in their original level form, they are non-stationary and in their first differenced form, they are stationary. The differenced form for each variable used is created by taking the difference of their log forms. For example,  $DG = LG - LG_{t-1}$ . We then conducted the

Augmented Dickey-Fuller, Philip-Perron and KPSS test. (ADF) test on each variable (in both level and differenced form). The table below summarizes the results.

**Discussion of the results and findings**

A stationary series has a mean(to which it tends to return), a finite variance, shocks are transitory, autocorrelation coefficients die out as the number of lags grows, whereas a non-stationary series has an infinite variance(it grows over time), shocks are permanent(on the series) and its autocorrelations tend to be unity. If the series is ‘stationary’, the demand-side short run macroeconomic stabilisation policies and financial development are likely to be effective and promote economic growth but if the series is ‘non stationary’, the supply-side policies are more likely to be effective in promoting growth with the accumulation of financial and human capital in the long run.

**Table 1: Unit root test**

Variables	ADF			PP			KPSS		
Level Form	T-stat	CV	Decision	T-stat	CV	Decision	T-stat	CV	Decision
LG	3.284	3.659	NS	2.798	3.587	NS	0.141	0.197	S
LL	3.663	3.536	S	11.146	3.587	S	0.148	0.197	S
LP	1.439	3.476	NS	2.39	3.587	NS	0.107	0.197	S
LF	1.798	3.687	NS	1.041	3.452	NS	0.142	0.168	S
INF	2.41	3.479	NS	4.223	3.587	S	0.157	0.197	S
LX	2.102	3.659	NS	2.615	3.587	NS	0.116	0.197	S
	ADF			PP			KPSS		
Differenced Form	T-stat	CV	Decision	T-stat	CV	Decision	T-stat	CV	Decision
DG	4.688	2.874	S	5.042	2.881	S	0.271	0.384	S
DL	1.699	2.85	NS	0.016	2.882	NS	0.437	0.384	NS
DP	3.527	2.85	S	7.447	2.882	S	0.153	0.384	S
DF	4.013	2.922	S	9.419	3.544	S	0.318	0.378	S
DINF	3.888	2.85	S	9.518	2.882	S	0.203	0.384	S
DX	4.34	2.874	S	6.756	2.882	S	0.191	0.384	S

Notes: NS denotes non-stationary and S denotes stationary

On the above mentioned results of unit root test we can see that it varies from one test to another test. If we analyze the results of unit root tests of all variables in the level and differenced form, we observe that life expectancy and inflation show different result from ADF and PP tests however, KPSS shows most of the variables are stationary except life expectancy in a differenced form. It is more than evident that the results are not consistent across various tests. Therefore, variables we are using for this analysis are  $I(0)$  or  $I(1)$ .

As the results of unit root test are not consistent we decided to use ARDL technique to test the long run relationship among the variables. Before proceeding with the test of cointegration, we try to determine the order of the vector auto regression (VAR), that is, the number of lags to be used.

As per the table below, results show that AIC recommends order of three whereas SBC favours one lag.

**Table: 2 VAR Order Selection**

		Selection criteria	
		AIC	SBC
Optimal order of the VAR	4	4	1
Optimal order of the VAR	3	1	1

There are conflicts between recommendation of AIC and SBC. This can interpreted as inherent nature of time series data of our study. This could also be due to existence of at least two major structural break, namely in 1998 Asian crisis and 2008 global recession.

As we have yearly data and observation is only 40, we take maximum 4 VAR order, AIC gives us 4 lags whereas SBC shows us 1 lag. Having chosen the order of the VAR it is prudent to examine the residuals of individual equations for serial correlation (Pesaran et al., 2001). As the results are conflicting auto-correlation test has been carried out for each variables(Appendix) and found that only DL (Life Expectancy) and DG(GDP Per Capita) has no auto-correlation and other variables have statistically significant auto-correlation. In this situation, it difficult to chose the lowest lag order.

To increase robustness, at this stage, we tried 3 VAR order, and result shows that AIC and SBC gives 1 lag order and supported by Adjusted LR test as well. Moreover, when auto-correlation test has been conducted, no auto-correlation has been found for only DF (Liquidity Liabilities to GDP), which

indicates us to choose lower lag order. In order to proceed to the next stage, we have decided to choose 2 lag order.

**Testing Cointegration**

An evidence of cointegration implies that the relationship among the variables is not spurious, i.e. there is a theoretical relationship among the variables and that they are in equilibrium in the long run.

**Table 3: Engle –Granger (E-G) Test**

		T-statistics	Critical value
Order of the ADF test	2	2.782	5.163

As depicted in the above table the critical value is higher than the t-statistics. So, we cannot reject the null that the residuals are non stationary. Statistically, the above results indicate that the variables we have chosen, in some combination, result in not a stationary error term. As It is non stationary that indicates that there is no cointegration. These initial results are not intuitively appealing, to our mind. On the other hand that if the variables are not found to be cointegrated, they may be fractionally cointegrated. So, we have decided to go for Johansen cointegration test in the following step.

As depicted in the table below, the maximal Eigenvalue shows three, and HQC shows four, Trace and SBC indicate that there is two cointegrating vector whereas according to AIC there are 6 cointegrating vectors, respectively .

**Table 4: Johansen cointegration**

Criteria	Number of co-integrating vectors
Maximal Eigenvalue	3
Trace	2
AIC	6
SBC	2
HQC	4

The above co-integration results implies that each variables contain information for the prediction of other variables i.e. in our research setting, we can determine the predicting variable for human

development as we are examining how macroeconomic variables affect finance and growth in the short and long run. However, these results conflict each other, it also conflicts with Engle – Granger. As these approaches have many limitations that are taken care by ARDL. For that we decided to go for ARDL approach for testing cointegration among variables.

**Table5 : F-Statistics for Testing the Existence of Long-Run Relationship (Variable Addition Test)**

Variables	F-Statistics	Critical value lower	Critical value upper
DG	2.393	2.649	3.805
DL	4.759*	2.649	3.805
DP	2.915	2.649	3.805
DF	1.497	2.649	3.805
DINF	4.614*	2.649	3.805
DX	2.493	2.649	3.805

The critical values are taken from Pesaran et al. (2001), unrestricted intercept and no trend with six regressors. \* denote rejecting the null at 5 percent level.

Table above shows the calculated F-statistics for dependent variable DL (life expectancy) is 4.759, which is higher than the upper bound critical value 3.805 at the 5% significance level. This implies that the null hypothesis of no cointegrating long-run relationship can be rejected. These results reveal that a long-run relationship exists between finance, growth and human development in Malaysia. This could be considered as a finding in view of the fact that the long run relationship between the variables is demonstrated here avoiding the pre-test biases involved in the unit root tests and cointegration tests required in the standard cointegration procedure. The evidence of long run relationship rules out the possibility of any spurious relationship existing between the variables. In other words, there is a theoretical relationship existing between the variables.

At this stage we run the ARDL test to confirm the short-term and long-term relationship, study long-run coefficients and error-correction model to identify which variables are endogenous and which are exogenous.

**Table6: ARDL Bound test for existence of a level relationship**

Dependent Variables	F-Statistics	Critical value lower	Critical value upper
---------------------	--------------	----------------------	----------------------

LG	7.232*	3.189	4.329
LL	86.44*	3.189	4.329
LP	3.480	3.189	4.329
LF	6.410*	3.189	4.329
INF	3.570	3.189	4.329
LX	2.193	3.189	4.329

The critical values are taken from Pesaran et al. (2001), unrestricted intercept and no trend with six regressors. \* denote rejecting the null at 5 percent level.

From the table above, we can see that when real GDP per capita is the dependent variable, the calculated F-statistic  $F_{LG}(LG|LL, LP, LF, INF, LX) = 7.232$  is greater than the upper bound of the critical value obtained from Pesaran et al. (2001), indicating there is compelling evidence for cointegration between growth and its determinant in Malaysia for the study period. These results reveal that a long-run level relationship exists between finance, growth and human development and they are co-integrated. This by itself is a significant finding in view of the fact that the long run relationship between the variables is demonstrated here avoiding the pre-test biases involved in the unit root tests and cointegration tests required in the standard cointegration procedure. The evidence of long run relationship rules out the possibility of any spurious relationship existing between the variables. In other words, there is a theoretical relationship existing between the variables. The process has been repeated for the other variables and result shows that for life expectancy (LL) and liquidity liabilities to GDP (LF) are highly cointegrated with their determinants.

At this stage, we can argue that human development is cointegrated with finance and growth, moreover, importance of oil price and macro economic variables are also significant in determining long term human development prospect. Interestingly, growth and finance seem to have bi-directional interdependence with each other, it can be argued that initially financial development leading the growth and after growth has reached a threshold it started to take the lead. Oil price doesn't seem to be co-integrated with its determinant i.e., this variable is exogenous, as we can argue price of crude oil is exogenous in the model, other factor like international events, oil production, and oil reserve may determine the oil price in the short and long term, however, oil price is considered important determinant of growth, finance and human development as oil revenue constitute a significant revenue source for Malaysia and recent shock in oil price has negative impact on Ringgit, consequently Ringgit depreciates significantly. Moreover, as the result indicates exchange rate and inflation are exogenous, which can be considered as very important finding for policy implication as well, as it would help policy makers, in our

case, in order for financial development and economic growth stable exchange rate and moderate inflation is desirable which will ultimately promote human development in the long run.

**Table 7: Results of Estimated Long-Run Coefficients using the ARDL Approach**

Dependent variable	Real GDP per capita (LG)	Liquidity Liabilities to GDP (LF)
LG	-	-0.101 (0.207)
LL	45.665 (10.561)*	15.344 (4.369)*
LP	-0.138 (0.139)	-0.115 (0.047)*
LF	-1.836 (0.761)*	-
INF	0.005 (0.014)	-0.002 (0.009)
LX	-1.975 (0.615)*	-0.793 (0.254)*
Intercept	-175.614 (40.569)*	-58.712 (16.976)*
Chi-square SC	0.661 [.416]	.325 [.569]
Chi-square FF	0.275 [.600]	2.482 [.115]
Chi-square N	0.482 [.786]	.710 [.701]
Chi-square Het	2.189 [.139]	.129 [.719]

Note: \* denotes significant at 5 percent level, figure in the first bracket ()denotes standard error, and figure in the third bracket [] denotes p values.

The table above provides the estimates of the ARDL long-run coefficient for two models based on our research objective. The estimated long run coefficients of the long run relationship above show that life expectancy (LL), liquidity liabilities to GDP (LF) and exchange rate (LX) have significant effects on the real GDP per capita in Malaysia. The coefficient of liquidity liabilities to GDP (LF) implies that 1% increase in liquidity liabilities to GDP would reduce the real GDP per capita by 1.836%. At the same time, the coefficient of exchange rate indicates that 1% increase i.e. depreciation in Malaysian Ringgit would decrease the real GDP per capital by almost 1.84%. It can be argued that Malaysian Ringgit has been very strong against US dollar for a long period of time even before it was pegged with US dollar after 1998 Asian crisis, as a result, this findings may be somehow misleading, as in devalued local currency scenario, export oriented economy like Malaysia, would be in better competitive position, however, we have to remember about import as well inflation in the economy.

If we analyze all the diagnostic tests we can argue that the model is quite well-specified. In addition to that, in theory, it is argued that appreciation in local currency would promote export and ultimately lead to growth in the long run, at the same time, if the economy is import dependent, would create more pressure and also imported inflation. The coefficient of life expectancy, a measure of human development, indicates that 1% increase in span of life of people in Malaysia would lead to increase in real GDP per capita by 45.66%, which is counter intuitive . One reason could be, relationship between life expectancy and growth is reverse, that is life expectancy may depends on the growth which is more sound

and theoretical supported even though when we removed the life expectancy from the model, overall model remained quite well-specified but significance of financial development and exchange rate would reduce significantly. This result shows us that life expectancy is a significant indicator of economic development in Malaysia and financial development and stable Ringgit promotes economic growth in the long run. Interestingly, crude oil price is not found significant for economic growth of Malaysia. It may be because of Malaysian economy is less dependent on oil rents now than it used to be 30 years ago. Another reason could be, international crude oil may not affect the local economy as government had been giving subsidy on oil, however, recently government has stopped giving subsidy on oil for internal domestic use, this may change the scenario in the long run and can be a policy support for the government. Moreover, it may be due to data nature, as yearly WTI crude oil price taken is end of year data which may not reflect the overall change in oil price during the whole year as we know oil price has been fluctuating very randomly even day to day basis.

In the following table, the ECM's representation for the ARDL model is selected with AIC Criterion.

**Table 8: Error correction model of ARDL**

Variables	Coefficient	Standard Error	P-value
ecm (-1) dLG	-0.341	0.114	2.990*
ecm (-1) dLL	<b>-0.030</b>	0.013	2.244*
ecm (-1) dLP	-0.459	0.101	4.539*
ecm (-1) dLF	-0.699	0.109	6.382*
ecm (-1) dINF	-0.987	0.202	4.885*
ecm (-1) dLX	-0.348	.196	1.721

Notes: \* denotes significance at 5 percent level

As discussed earlier, cointegration tells us that there is a long run relationship between the variables. However, there could be a short-run deviation from the long-run equilibrium. Cointegration does not unfold the process of short-run adjustment to bring about the long-run equilibrium. For understanding that adjustment process we need to go to the error-correction model. The T-ratio or the p-value of the error-correction coefficient indicates whether the deviation from equilibrium (represented by the error-correction term, 'ecm') has a significant feedback effect or not on the dependent variable (e.g. real GDP per capita). In other word, whether the variable is endogenous or exogenous. The error-



correction coefficient being significant confirms our earlier findings of a significant long-run cointegrating relationship between the variables. Moreover, the size of the coefficient of the error-correction term indicates the speed of medium to long run adjustment of the dependent variable to bring about the longrun equilibrium. The size of the coefficient of the error-correction term is also indicative of the intensity of the arbitrage activity to bring about the long-run equilibrium. The error correction coefficient estimated for variable Life expectancy at -0.030 (0.013) is highly significant, has the correct sign and implies a slow speed of adjustment to equilibrium after a shock. The error correction coefficient estimated for variable Liquidity liabilities to GDP (LF) and real GDP per capita (LG) at -.699 (0.109) and -.341(0.114) are highly significant, has the correct sign and implies exist a medium to long term adjustment to equilibrium after a shock. Finally, the “t” or “p” value of the coefficients of the  $\Delta$ (i.e. ,differenced) variables indicate whether the effects of these variables on the dependent variables (i.e., life expectancy, real GDP per capita and liquidity liabilities, Crude oil price, inflation) are significant or not in the short run. At this stage, we can argue that VECM has given a clear picture of short and long run relationship among variables, regarding our research objective, VECM shows that all of our focus variables are endogeneous, that is all these variables are dependent on other variables, which helps us to argue that there is a dynamic relationship among finance, growth and human development. Our result shows that Crude oil price (LP) is endogenous which seems to be counter intuitive, as theory and empirical evidence suggest that oil price affect growth in the long run, so financial development, especially for countries which are heavily dependent on oil rents. However, Malaysia’s dependence on crude oil revenue has declined and in 2013 oil rents contribution to GDP was only 5%. Although the error correction model tends to indicate the endogeneity/exogeneity of a variable, we had to apply the variance decomposition technique to discern the relative degree of endogeneity or exogeneity of the variables.

### Variance Decompositions (VDC)

The relative exogeneity or endogeneity of a variable can be determined by the proportion of the variance explained by its own past. The variable that is explained mostly by its own shocks (and not by others) is deemed to be the most exogenous of all. We started out applying generalized VDCs and obtained the following results.

**Table 9: Generalized VDC**

Horizon	Variables	LG	LL	LP	LF	INF	LX	Total
1	LG	47.10%	1.64%	2.48%	28.35%	5.28%	15.15%	1
1	LL	2.42%	94.74%	0.13%	0.34%	0.09%	2.28%	1

1	LP	15.53%	0.15%	61.31%	20.93%	0.26%	1.82%	1
1	LF	26.10%	0.02%	9.26%	56.34%	6.89%	1.39%	1
1	INF	11.54%	0.07%	0.81%	14.90%	69.65%	3.03%	1
1	LX	8.73%	2.52%	1.92%	3.28%	2.52%	81.03%	1
	Variables	LG	LL	LP	LF	INF	LX	Total
5	LG	38.64%	2.54%	4.11%	32.70%	3.77%	18.23%	1
5	LL	3.36%	92.79%	1.66%	0.70%	0.26%	1.23%	1
5	LP	18.92%	0.42%	43.47%	34.24%	0.32%	2.62%	1
5	LF	17.87%	0.94%	11.29%	45.45%	4.98%	19.47%	1
5	INF	12.73%	0.09%	2.34%	15.25%	66.16%	3.44%	1
5	LX	7.82%	2.25%	10.42%	8.17%	2.36%	68.97%	1
	Variables	LG	LL	LP	LF	INF	LX	Total
10	LG	34.69%	2.28%	5.54%	30.32%	3.65%	23.52%	1
10	LL	2.76%	88.50%	4.55%	0.27%	0.12%	3.80%	1
10	LP	16.38%	0.49%	39.10%	31.01%	0.54%	12.48%	1
10	LF	16.51%	1.87%	10.42%	39.80%	4.36%	27.04%	1
10	INF	12.80%	0.10%	2.35%	15.28%	65.92%	3.54%	1
10	LX	6.99%	2.21%	12.87%	9.32%	2.36%	66.24%	1
	Variables	LG	LL	LP	LF	INF	LX	Total
20	LG	33.86%	2.38%	6.17%	29.91%	3.59%	24.10%	1
20	LL	2.38%	88.98%	6.36%	0.45%	0.51%	1.32%	1
20	LP	16.02%	0.53%	38.60%	30.53%	0.56%	13.75%	1
20	LF	16.12%	1.97%	11.08%	39.38%	4.28%	27.17%	1
20	INF	12.79%	0.11%	2.37%	15.29%	65.87%	3.58%	1
20	LX	6.97%	2.34%	12.83%	9.33%	2.31%	66.23%	1

From the table we can see that in the 1 year horizon, life expectancy is the most exogenous and growth is the most endogenous followed by finance. In the 5 year horizon, growth is still the most endogenous. In the medium term, growth becomes more endogenous in the long run followed by crude oil price and financial development. More interestingly financial development, LF (liquidity liabilities to GDP) has become more endogenous in the long run. In the short to medium term, exchange rate is the second most exogenous variable however become relatively weakly exogenous in the long run.

In the long run, life expectancy becomes relatively weakly exogenous however remain leader for the whole time horizon. Impact of financial development on human development has increased slowly over the 20 years period. Financial development depends heavily on growth but dependency declines over the long run while impact of exchange rate seems more significant in the long run followed by oil price. Simultaneously, growth depends largely on financial development and exchange rate in the short to

medium run but declined a little bit in the long run. Dependency of inflation remains constant on growth and financial development over the whole horizon.

### Impulse Response

Generalised Impulse Responses to one SE shock in the equation for LG

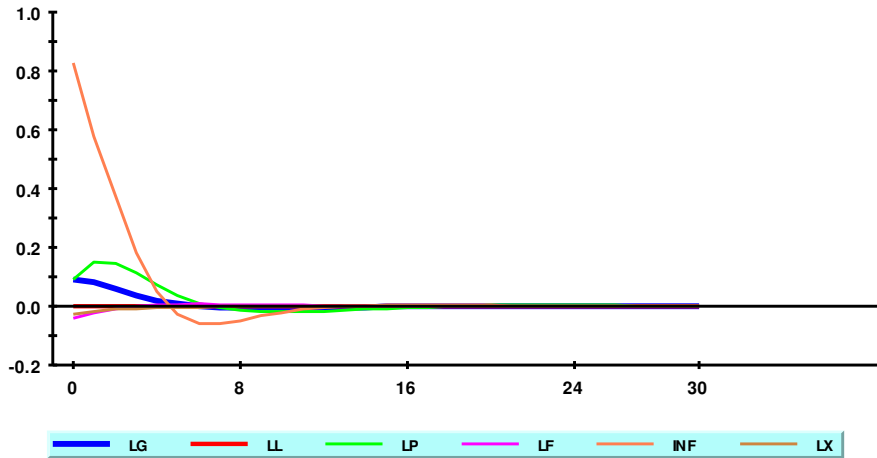


Figure: Shock of growth(LG) to other variables

Generalised Impulse Responses to one SE shock in the equation for LG

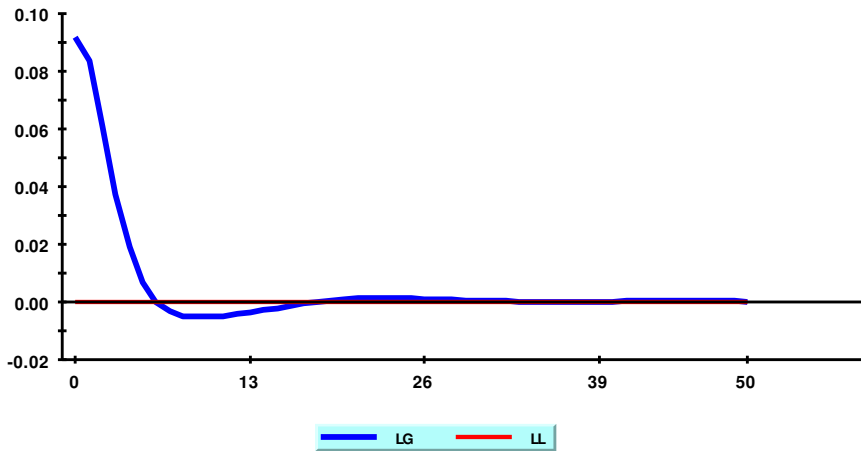


Figure: Shock of real GDP per capita (LL) on life expectancy(LL)

### Generalised Impulse Responses to one SE shock in the equation for LF

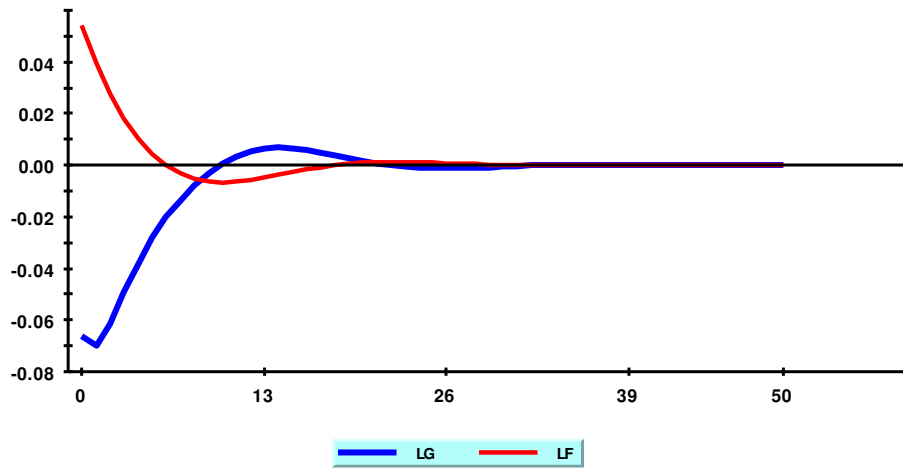


Figure: Shock of liquidity liabilities to GDP (LF) to Growth (LG)

### Generalised Impulse Responses to one SE shock in the equation for LX

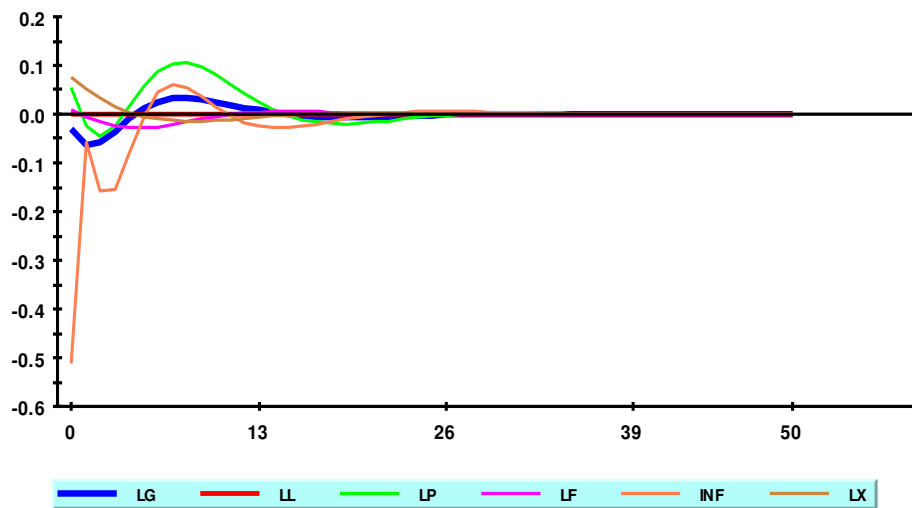


Figure: Exchange rate shock on growth finance and other variables

**Generalised Impulse Responses to one SE shock in the equation for LP**

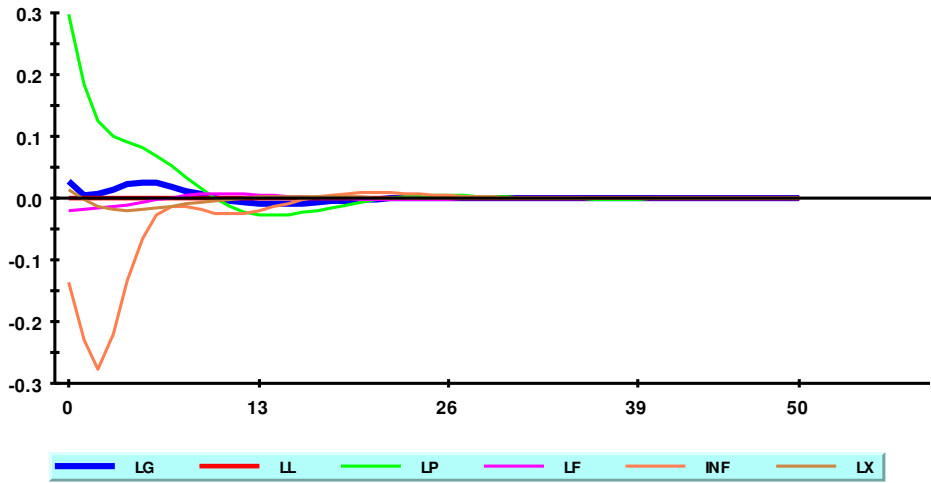


Figure: Oil price shock on growth, finance, human development and other variables

**VDC and Impulse response analysis and findings**

From the analysis of VDC and impulse response (IR), which necessarily shows the same result in different form, by shocking our target variables, mostly finance and growth variables to identify their affect on human development. We can argue that the result in IR seems to support the findings from VDC, however, some of them are supported by theory while some of them are counter intuitive.

We can argue that shock in growth has little or no affect on life expectancy but almost no affect from finance(Zingales, 2015), this result is consistent in both IR and VDC, life expectancy seems to be the most exogenous among all variables, which is counter intuitive, one the one hand, we can argue that life expectancy should be endogenous, which was found endogenous in ARDL variable addition test as in the long run financial development and growth helps improving human development and theoretical and empirical results support this idea (Mankiw, Romer and Weil, 1992;Pischke, 2012;). On other hand, we can argue that life expectancy in Malaysia has increased significantly during the period of study. Is this due to financial development and growth or other factors? As some economists argue life expectancy largely depends on quality of life, healthcare facilities, social welfare, ecology, and other factors, finance and growth are not so important (Zingales, 2015; Demirguc-Kunt and Levine, 2004).

In addition to that, we wanted to see the impact of macroeconomic variables on finance, growth and human development, which gives an interesting result. Inflation has very little impact on growth and moderate affect on finance in the medium term and long term horizon as shown in VDC and IR. This may

be due to stable inflation in Malaysia for a longer period of time. However, theory suggests moderate inflation promotes economic growth and stability in the financial sector which would ultimately help in human development in the long run. But growth depends largely on exchange rate both in medium to long run supported by VDC and IR. We can argue that for exchange rate the result is more in line with theory, as we observe recent depreciation in Ringgit after oil price shock, we found similar findings in our result. On the other hand, we can argue that exchange rate is not significant determinant of growth and finance in Malaysia, as longer period of time Ringgit was packed against dollar after 1998 financial crisis.

On the human development side, there is almost no significant impact of inflation and exchange rate on life expectancy, it seems logical as inflation in the short run doesn't have an effect, however, theoretically, in the long run, persistent higher inflation could reduce the purchasing power of the people and which may affect income growth, consequently affect human development. At the same time, stable exchange rate would promote export, as Malaysia is a major commodity export country and large portion of its revenue coming from exporting crude oil, palm oil, rubber and other natural resources and more recently high value added manufactured goods like consumer electronics and computer hardware. That's why stable exchange rate could have indirect affect on human development in the long run.

Even though theoretical evidence assert that these variables converge in the long run and change in one variable would affect the other variable, however, we found contradictory result at this stage of our analysis this could be due to longer time period of the study where two major structural break, namely 1998 Asian currency crisis, when Malaysian economy was badly hurt and 2008 global financial crisis, where Malaysian economy was also affected, consequently all these variables may be disintegrated and started to converge gradually in the long run.

## **Conclusion and policy implications**

Economic development in Islam cannot be explained in terms of growth in real income only. It must be explained in terms of raising the absolute income levels of the poor to eradicate poverty, meeting material or non-material human needs, the conservation of natural resources, wildlife, and ecological environment. Even though, the concept of development in Islam is multidimensional, understanding the relationship between growth and human development, also finance and human development would help us better understand and develop a sustainable pro-Islamic growth model, which will help to eradicate mass poverty, income inequality and develop human capital in the Muslim world to lead from the front. The reemergence of Islamic finance after such a long period of hibernation indicates the urgency and necessity of a unique model of growth and development based on true Islamic principles. Recent debate on whether

finance reduces poverty and promotes human development has got momentum among the policy makers and economists. Against the backdrop of global financial crisis in 2007-2008, the issue has even become more vital, consequently, huge government bailout with taxpayers money, corporate fraud, LIBOR manipulation, and many more finance scandals create doubt about role of finance in economy (Zinagles, 2015).

The voluminous amounts of research in finance-growth nexus suggest positive relationship between finance and growth, but there are counter arguments and empirical evidence against this theory. In our study, we have investigated economic development, in terms of human development, a foundational goal of Islamic economy and how finance and growth affect human development. Very few empirical research argue that finance supports growth and growth ultimately promotes human development but most of these studies were conducted in a developed economy, like in OECD or G-20 countries, so the same inference cannot be made on the least developed or developing countries. In our study we try to investigate the long- and short-run determinants of finance and growth and their impact on human development in Malaysia with the help of a standard time series technique, ARDL, which is applicable regardless whether the variables are stationary or non-stationary at their level and differenced form.

From the analysis of our result we can conclude that finance, growth and human development are found cointegrated in the long run. It is found that life expectancy (LL), liquidity liabilities to GDP (LF) and exchange rate (LX) have significant effects on the real GDP per capita in Malaysia. Human development, life expectancy, is found significantly positively correlated with growth but the magnitude is inconclusive, One reason could be, relationship between life expectancy and growth is reverse, that is life expectancy may depend on the growth which is more sound and theoretically supported. This helps us to conclude that life expectancy is an important determinant of growth of an economy.

The coefficient of liquidity liabilities to GDP (LF) in our long term model implies that 1% increase in liquidity liabilities to GDP would reduce the real GDP per capita by 1.836%. This indicates the importance of finance on growth in Malaysia. However, in a recent research it is found that when credit to the private sector reaches around 80-100% of GDP, there is a non-monotone relationship between credit to GDP and growth (Arcand et al., 2011; Cecchetti & Carroubi, 2012). In Malaysia, bank credit to private sectors to GDP increased from 49.01% in 1980 to 123.88% in 2013 (BNM Monthly Statistical Bulletin, 2014). This finding indicates a growing concern for Malaysian economy which policy makers need to take into consideration.

Moreover, in our study, bi-directional finance and growth relationship is found, it can be argued that, finance is initially leading the growth but in the long run growth actually leads the finance which is

supported by similar findings. Short term volatility in oil price and exchange rate has lag effect on growth, which might ultimately affect the growth in the long run, however, oil price has no significant impact on growth of Malaysian economy, this can be explained as crude oil rents contribute only 5% of total GDP, another reason could be international oil price as we used WTI crude oil price, in our country doesn't have an effect on the economy because Malaysian government gave subsidy to oil price for domestic use, which has been abandoned very recently. This may also due to technical issue well, as in ARDL lag orders are chosen automatically but while doing VDC and IR we have chosen specific lag order manually based on AIC or SBC criteria. Moreover, even though Generalized VDC is not biased towards the first variable, but it does not make such an assumption of all other variables switched off, so, the result we get is the mostly of one variable shocked. This really puts a lot of doubt in doing VDC and IR while running ARDL cointegration. This is one of the many limitations in our study.

Finally, we can conclude that, economic development is the core of Islamic economics, more importantly human development should be the first priority. The necessity of finance for growth and ultimately for human development is evident in Malaysia. In order to maintain sustainable economic development governments of developing and least developed countries need to promote financial liberalization and financial inclusion and is even more important for backward Muslim communities in Asia and Africa. The study suggests that macroeconomic stability can support financial sector development and growth, which will promote human development by increasing purchasing power, better health care, social benefits and education in the long run. From this point on, human development indicators like, education, healthcare, environmental issue need further research and how finance and growth has impact on these, which can be considered as future research direction.



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