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# Family Takaful in developing countries: the case of Middle East and North Africa (MENA)

## Abstract

**Purpose:** Using a sample of fifteen countries from the Middle East and North Africa (MENA), we investigate the driving forces (economics and socio-demographic) that influence family Takaful demand in MENA region.

**Design/methodology/approach:** We use multivariate analysis, Bootstrapping and Generalised Method of Moments (GMM) techniques. We first examine a full model that combines all variables; second, a model that controls for product market factors; and finally, a model that controls for socio-demographic factors. We further separate all models into linear and log-linear demand functions.

**Findings:** We demonstrate that the relationship between the demand for family Takaful in MENA and Islamic banking deposits, education, dependency rate, female life expectancy and Muslim population is significantly positive. On the other hand, the significant factors that are inversely related to the demand for family Takaful in MENA are inflation, financial development and male life expectancy.

**Research limitation and implications:** The crucial limitation of this study is the amount of data available in regards to our dependent variable, family Takaful contributions. Consequently, to improve the understanding in explaining the family Takaful demand in MENA, further research can take advantage of expanding the variables that were omitted in this research as a consequence of the unavailability of data. Some of the possible influential variables can include government social security expenditure, legal system and government policies, price of Takaful and level of competition within the Takaful and insurance industry.

**Originality/value:** It is obvious that there are very few studies that focus on MENA market and indeed, none of them gives attention to the factors that influence demand for family Takaful. While this study is expected to provide more understanding and awareness on the concept of Takaful and the factors that influence its demand, we hope that it would encourage more studies on various issues on the Takaful industry so as to help researchers to understand more aspects of this new emerging business.

Keywords: Family Takaful; Economics and Socio-demographic Factors; MENA.

JEL Classification: G22; D12; R13; J11

## 1. Introduction

Islamic investment and finance have long been evolved as a form of financial intermediation for the Islamic community to conduct financial transactions that conform to Islamic tenets. The last decade in particular has witnessed a rapid evolution and expansion of the Islamic financial services industry, which has gained wider acceptance and appreciation. Since its inception, the international Islamic finance industry has expanded beyond the traditional borders of the Muslim-based economies into the major industrial economies and grown greatly (Billah, 2002; Fisher and Taylor, 2000; Annuar 2004; Rahman et al. 2008; Rahman and Daud, 2010; Gustina and Abdullah, 2012; Sherif and Shaairi 2013). Today, Islamic Finance is no longer a niche product serving a specialised market, but is now offered in more than 60 countries, with total assets in Islamic banking reportedly growing at a compound annual growth rate (CAGR) of 40.3% between 2004 and 2011, reportedly exceeding USD1.1 trillion as seen in Figure 1. Such increase in financial assets are supported by Middle-East petrodollars as well as the global spread of the Islamic religion, there are around 1.6 billion Muslims worldwide (Pew Research Centre 2011) who are seeking for products that adhere to their principles (Zaher and Hassan, 2001, Sherif, 2016).

*INSERT Figure 1 here*

This combined with the ever-increasing oil prices has led to higher savings and net worth individuals (HNWI) wealth rates of the Middle East region. Those regions also have a higher net worth individuals (HNWI) wealth (see Figure 2). Such steady growth in HNWI and savings rates have increased the demand for *Shariah* - compliant investment opportunities that in turn show great potential in the Islamic finance industry. Furthermore, over the past three decades, Islamic banking has become a growing force in global financial circles, as Islamic banks exist in over 70 countries worldwide (Warde, 2010). 'Islamic Indexes' were created in 1999 by Dow Jones to accommodate cautious Muslim by offering *Shariah* compliant investment portfolios. It is clear that Islamic Banking and Finance (IBF) has now become a major feature in global finance from just a mere ambiguous financial experiment. In addition, numerous western banks have established either Islamic banking subsidiaries or offered their customers Islamic financial products such as those provided by Citibank, Bank of America, HSBC, Union Bank of Switzerland and Goldman Sachs (Zaher and Hassan, 2001; Khan, 2010).

*INSERT Figure 2 here*

Given the growing developments of the Islamic financial system, the Takaful industry has experienced significant growth and developments (Zainuddin and Noh, 2013), indicating a clear manifestation of the recognition of Islamic insurance as an important source of enhancing the *Shariah*

(Islamic law), which refers to an Islamic way of joint guarantee.<sup>1</sup> According to *Takaful Act of Malaysia*, ‘Takaful is a scheme grounded on brotherhood, mutual assistance and solidarity, it offers financial aid which is mutual and provides assistance to policyholders when they are in need whereby policyholders reciprocally agree to make a contribution for that purpose’. Consequently, Takaful Insurance is considered as a mechanism to provide some degree of financial protection against these catastrophes by way of compensation or a promise of compensation for specific possible losses in future in exchange for a payment periodically (Anwar and Hussain, 1994).

For MENA region, the insurance industry is still in its nascent stages compared to the more developed world economies due to the low penetration, density, undercapitalization and an underdeveloped legal and regulatory support system. However, there has been significant growth in the past five years as mirrored by double digit growth though MENA and is not far from being the ‘insurance hotspot’ (Mikhael et al., 2010). For example, over the past years, Takaful was one of the most leading segments of the financial sector across the Asian and MENA regions with over 20% growth rate per year (Ernst & Young, 2013). According to the World Islamic Insurance Directory (7<sup>th</sup> edition), the number of Takaful operators worldwide has increased by 10% between 2012 and 2013, which indicates an upsurge in the growth of the near future.

Overall, MENA has witnessed a significant growth in the gross contributions for Takaful as shown in Figure 3, indicating huge expansions in family and medical Takaful since 2006. Moreover, countries in MENA have been demanding more Takaful over conventional insurance as demonstrated by Figure 4.

*INSERT Figure 3 here*

Despite the importance of the Takaful industry in general and for MENA region in particular (see for example, Browne and Kim, 1993; Chen et al., 2001; Ward and Zurbruegg, 2002; Hwang and Gao, 2003; Awang and Zakaria, 2005; Lim and Haberman, 2004; Lenten and Rulli, 2006; Li et al., 2007; Hamid et al., 2009; Noor and Abdullah, 2009; Ahmad et al., 2010; Hamid et al., 2010; Swartz and Coetzer, 2010; Hamid and Rahman, 2011; Hussain and Pasha, 2011; Ghazali et al., 2011; Ismail et al., 2011; Rahim and Amin, 2011; Abduh et al., 2012; Abdullah, 2012; Ayinde, 2012; Kasim, 2012; Matsawali et al., 2012; Yazid et al., 2012; Lambak, 2013; Razak et al., 2013; Salleh et al., 2013; Hanif, 2014), there are very few studies that focus on the MENA region and indeed none of them gives attention to the economics and socio-demographic factors that influence demand for family Takaful.

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<sup>1</sup> The word originates from the Arabic word *Kafalah* meaning ‘guarantee’.

This study, therefore, attempts to identify the factors that determine the demand for family Takaful in MENA region. We strongly believe in the importance of understanding these factors, as Takaful contributes significantly in stimulating the economic growth through its role as risk transfer mechanism and financial intermediation. In addition, this study helps in filling some of the gaps in the scope and coverage of the studies in ethical insurance and other similar areas. This in turn provides more understanding and awareness of the concept of Takaful and the factors that influence its demand in MENA.

*INSERT Figure 4 here*

The remainder of the paper is set out as follows. Section 2 is a brief review on the Takaful framework. Section 3 provides details of the methodology and models. Section 4 presents the data and empirical results and section 5 concludes.

## **2 Takaful Framework**

### *2.1 Islamic Insurance-Takaful*

Nature is of such that all human beings are exposed to the prospect of meeting tragedies and catastrophes giving rise to hardships and sufferings, for instance death, an accident or annihilation of a business or of wealth. Insurance acts as a mechanism to provide some degree of financial protection against these catastrophes by way of compensation or a promise of compensation for specific possible losses in future in exchange for a payment periodically. According to the principles of Islam, all that takes place in this world is by the will of *Allah* (God) and Muslims must obey to all activities instructed in the Quran (The holy book for Muslims). Also, Muslims are taught to take any necessary steps to reduce losses occurring from any unfortunate events; this can be seen from the following Islamic proverb:

*“The Holy Prophet told a Bedouin Arab who left his camel untied, trusting to the will of Allah, tie the camel first, then leave it to the will of Allah...”*

(Sunnan Al-Tirmizi 668)

*Shariah* is the code of social conduct based on the Quran put together by Islamic scholars. From an Islamic perspective, the concept of insurance does not oppose to those practices and requirements of *Shariah*. Essentially, insurance is the same concept as of a system of mutual help which requires the pooling of resources to help people in need. It has similar principles of compensation and shared responsibility as practiced between the *Muhajirin* of *Mecca* and the *Ansar* of *Medina* following the migration of the Prophet over 1400 years ago. Overall, there are differences between conventional

insurance and Takaful. As highlighted by Sherif and Shaairi (2013), Takaful can be distinguished from conventional insurance in five ways: contract, the parties' right and obligations, ownership of risks, operational framework of Takaful, and the status of nominee.

## *2.2 Development of Takaful Industry*

The emergence of Islamic insurance (Takaful) in both MENA and other countries was believed to be through the demand of the Muslim community itself. Although, the operation of Islamic insurance was re-introduced in the Muslim world in 1970s to replace the conventional type of insurance, it is, however, argued that the practices of helping and guaranteeing each other was a norm in the Arab culture even before the advent of Islam. The practice which is known as 'aqilah', though, was said to resemble the conventional insurance in concept, but differs to it in the way and manner it is operated

The first modern Islamic insurance company was established in Sudan in 1979, known as the Islamic Insurance Company of Sudan. Then followed by the establishment of Islamic Arab Insurance Company in Saudi Arabia in 1979. Several other Arab Gulf States later launched their own Takaful companies. For example, the United Arab Emirates established her own in 1980, while the Islamic Arab Insurance Company was established by Bahrain in 1983. In 1999, Bahrain Islamic Insurance Company was re-capitalized and renamed Takaful International. Another one was established in Saudi Arabia in 1983, Takaful Islamic Insurance Co., Bahrain in 1985, Islamic Insurance and Reinsurance Company Saudi Arabia in 1986, National Company for Cooperative Insurance Saudi Arabia (1992), al Rajhi Islamic Company for Cooperative Insurance Qatar (1995), Islamic Insurance Company of Qatar and UAE (1997), and Dubai Takaful Insurance Co. (1997). (Fisher & Taylor, 2000).

Indeed, insurance industry in MENA region has expanded and grown greatly ( Mikhael et al, 2010). Today, Takaful is considered as one of the most leading segments of the financial sector across the Arab and African regions with the growth rate over 20% each year (Ernst & Young, 2013). According to the World Islamic Insurance Directory (7<sup>th</sup> edition), the number of Takaful operators worldwide has grown by 54% since 2006. Figure 5 illustrates the number of Takaful operators in MENA region over the period 2006 - 2013.

*INSERT Figure 5 here*

For 2013, the insurance premiums in MENA have registered 1.3% of GDP, a fifth of the global average. Starting from 2008 through 2013, the total non-life and life insurance premium volumes in the region have expanded from about US\$ 30 billion to more than US\$ 50 billion and expected to

continue. For example, Swiss Re forecasts real annual premium growth of about 5.5% for 2015 and 2016, which exceeded the International Monetary Fund's economic growth forecast for the region.

With regards to Takaful operation models, the first applied model was the *Al-Mudharaba* model, for which the Takaful operator acts as a *mudharib* (entrepreneur) and the participants as *rabbul mal* (capital providers). Additionally, the contract covers the way of distributing the surplus from Takaful operations between the Takaful operator and the participants. In order to protect the interest of participants, the Takaful operator is required to observe prudential rules, which include the provision of financing interest-free loans by the operator when there is deficiency in the Takaful risk funds. Next, the *Al-Wakala* model, which is effectively an agent-principal relationship whereby the Takaful operator acts as an agent on behalf of the participants and receives fee/payments for the service provided has been established. Such fee is based on an agreed ratio of investment profit or the surplus of the Takaful funds (or a fixed amount). Finally, a hybrid model contains both the *Al-Mudharaba* and *Al-Wakala* models have gained much attention in MENA region. Here, the manager of the company obtains a fixed fee from the policyholder's funds, same as the *Wakala* model, but the profits are shared like the model of *Al-Mudharaba* using the investments available to the company. In addition, the policyholder has the right to have a share in the underwriting profits as well as the profits made from investments. For example, Saudi Arabia as a part of the MENA region, use the Cooperate model, for which the supervisor does not permit the facility of *Qard*<sup>2</sup> and the charge of *Wakala* fee, but some of the premium is permitted to be deducted as the income of the shareholder if the net surplus is adequate.

### 2.3 Relative Literature Review on Takaful Insurance

Indeed, there is a limited literature examining the factors affecting the demand for family Takaful, as most of the previous studies focus on the conventional life insurance rather than the factors associated with family Takaful.<sup>3</sup> For example, Aris (2004) investigates the relationship between business variables (contribution of *zakat*<sup>4</sup> and opportunities for employment), and macroeconomic variables (GDP and inflation rate). The results show that while the business variables have a positive connection with the profitability of Takaful, the macroeconomic variables have insignificant impact. In a related study, Redzuan et al. (2009) investigate the impact of economic factors on the demand for family Takaful in Malaysia, and find that income has a positive significant impact on the demand for life insurance, whereas long-term interest rate and composite stock index inversely affected the

<sup>2</sup> The *Qard* refers to an interest free loan provided by shareholders to the fund of the policy holder if there is a deficit.

<sup>3</sup> See previous studies on the conventional life insurance in Sherif and Shaairi (2013). Table 1 presents seminal papers on Life insurance.

<sup>4</sup> *Zakat* refers to the annual payment made under the Islamic law on properties owned. This payment is a charitable donation and it is considered one of the Five Pillars of Islam.

demand for family Takaful, the findings that are in line with Yaari (1965) and Fortune (1973). Similarly, Yusoff (2009) investigates the factors affecting the demand for family Takaful using economic and socioeconomic factors and reports that education, dependency ratio, Islamic banking development, Muslim population and income are positively associated with the demand for family Takaful. In line with Browne and Kim (1993), Sherif and Shaairi (2013) examine the factors affecting the demand for family Takaful in Malaysia and demonstrate that Muslim population, income, dependency ratio, education and income are positively and significantly related to the demand for family Takaful. On the other hand, family Takaful is negatively related to real interest rate, financial development, inflation and life expectancy.

Considering a different approach, Bashir et al. (2010) investigate the awareness of family Takaful plan in Muslim households in Kuala Lumpur in order to examine how awareness of family Takaful affects the purchasing of a family Takaful plan. They find a significantly positive relationship between ownership of family Takaful and the awareness of the family Takaful. This is consistent with the findings of Headen and Lee (1974) who also investigated consumer expectations of life insurance. Furthermore, Amin (2011) found a significant positive impact to attitude, social influence and the price of Islamic products on the demand for family Takaful. Pricing was also found to be a significant factor affecting life insurance by Lewis (1989) and Lim and Haberman (2004). Additionally, Beck and Webb (2003) find that Muslims are not purchasing conventional life insurance due to religious obligations, implying that religion should be a significant factor impacting on the demand of *Shariah* compliant products.

Recent literature has also placed emphasis on family Takaful. For example, Gustina and Abdullah (2012) investigate the factors that have impact on the demand in family Takaful compared with conventional counterpart. They find that GDP per capita, Education, saving and religion are positively related to Takaful demand. While the factors that have significant positive impact on the conventional products are GDP per capita, saving and religion. In another study, Yazid et.al. (2012) claim that socio economic and demography factors are the main determinants of family Takaful. Further, Siala (2012) found a positive relationship between the exogenous religiosity and religious centrism constructs, and the endogenous attitudinal brand loyalty, price tolerance and word-of-mouth constructs. According to Ismail, et al. (2011), there is a significant difference between Takaful industry and insurance industry, in particular with technical efficiency. In another study, Qureshi (2011) examined the residuals of conventional insurance and Takaful, and found supportive evidence of the similarities of reinsurance and investment of insurance funds in both conventional and Takaful insurance. In contrast, Awang and Zakaria, (2005) find no relationship between family Takaful consumption and gender, profession and income, but there is a positive relationship with Takaful schemes. Saad (2012) investigates the efficiency of general or non-life Takaful and insurance industry



in Malaysia and suggested that Kurnia Insurance has the highest amount of output for both premium and net investment income; while Yakob et al. (2012) demonstrate that that CAMEL rating has significant impact on family Takaful. Furthermore, Salleh and Kamaruddin (2011) investigate the effects of personality attributes on the sales performance of the Takaful's agents. They found that Self efficacy and self-monitoring are positively related to the sales performance. On the other hand, the significant factor that is inversely related to the demand for family Takaful is the locus of control.

On a different factor, Aris et.al. (2012) examine the risk of Takaful Company and find that risk management practice and management of Takaful operators are significantly impact on family Takaful consumption. In the same line, Lambak (2013) found that *gharar* (risk) is one of the factors that significantly influence the demand for family Takaful. Additionally, Abdullah (2012) highlights that Islamic virtuous goals and values are believed to have significant impact on family Takaful consumption. Similarly, Arifin, et al. (2013) investigate the main determinants that drive family Takaful demand in Malaysia, and report that agency system (*alwakalah*), reputation and recommendation, product and services, marketing and advertising are the main factors that positively influence family Takaful demand.

Elsewhere, Htay and Salman (2013) investigate Takaful in India using 216 Muslims and 117 non-Muslims respondents, and find that demand on Takaful is significantly high regardless of Muslims or non-Muslims involvements. In addition, using interviews from 10 *Shariah* scholars, 7 Takaful operators and 5 consultants, they find that the most Takaful model dominated in India is the hybrid model. In another study, Samad and Siddiqui (2014) examine the challenges of Takaful in India and find that 95% of Muslims are holding the insurance policy for vehicle due to the government rule, and only 5% of Muslims are willingly to demand it. They also find that 20% of non-Muslim sample are willing to have Takaful products if they are affordably, and they similarly perceive Takaful products as the cooperative and mutual insurance. In contrast, for Muslim sample, only 20% are willing to demand Takaful products regardless of their prices. Masud (2011) examined the impact of modern Islamic financial system on Takaful products in Malaysia and USA. The study found no evidence supporting the implementation of Takaful in the USA market due to no difference in statutory authorized regulatory framework between the Islamic and conventional.

*INSERT Table 1 here*

In a related study, Htay et al. (2014) highlight the opinions of the *Shariah* scholars on the determinants of Takaful operators using Delphi technique and the interview from the five *Shariah* scholars, and suggest that the most significant factors are those related to the underwriting and risk rating practices of family Takaful. In line with Akhter and Hussain (2012) and Htay and Salman

(2013), Noordin et al. (2014) and Dikko (2014) examine the practices of Takaful related to sharia concepts (Tabarru and Ta'a wun). They suggest that the most specific Takaful contracts that reflect *Shariah law* are *Hiba* (gift), *Hiba Bi Shart'iwad* (gift with reward), *Al-Nahd* (co-operative partnership), *Waqf* (endowment) and *Sadaqa* (voluntary charity) to represent two main concepts of Takaful. Also, Miniaoui and Chaibi (2014) examine, using data Envelopment Analysis (DEA), the differences between the technical efficiency of Takaful industry in Malaysian and the Gulf Cooperation Council (GCC) countries, and find that Takaful operators in GCC countries are more efficient than those delivered in Malaysia. In another study, Abdou et al. (2014) examine the performance levels of Takaful and conventional insurance in emerging markets and reported that conventional insurers perform better than Takaful companies using accounting measures such as profitability and risk measurement, but the latter outperforms conventional insurance when using the premium to surplus ratio. Similarly, Fisher and Taylor (2000) argue that numerous Takaful schemes and re-Takaful (reinsurance) products have appeared in many developing and developed countries as ethical alternatives to conventional (re) insurance.

Equipped with the above-mentioned literature, it can be indicated that most studies have aspects influencing family Takaful consumption in non-MENA countries in general. Further, quite a number of factors that could influence the demand for Takaful consumption are yet to be investigated. This reflects the research gap for which our study attempts to discuss and make genuine contributions.

### 3 Methodology and Models

The regression model employed in our study has the following functional form:

$$CONF = f[INC, INFL, RIR, IBD, FD, ED, DR, LF, LM, MUSP] \quad (1)$$

where *conf*, *inc*, *infl*, *rir*, *ibd*, *fd*, *ed*, *dr*, *lf*, *lm*, and *musp* denote family Takaful demand, income, expected inflation rate, the real interest rate, the Islamic banking development, financial sector development, education, dependency ratio, average life expectancy (female), average life expectancy (male), and Muslim population respectively. The above-mentioned potential determinants of the demand on family Takaful in MENA region are discussed below. The hypothesised relationship between dependent variable and independent variables are shown in Table 2.

*INSERT Table 2 here*

#### a) Personal and Demographic Determinants

##### i) *Average Life Expectancy*

*“The average life expectancy is the average number of years to be lived by a group of people born in the same year, if mortality at each age remains constant in the future”*

(Central Intelligence Agency [US], 2014)

There is an arguable relationship between average life expectancy and demand for life insurance in the related previous studies.<sup>5</sup> Examples are the studies by Lewis (1989), Lim and Habberman (2004), and Hussels et al. (2005), who argue that the longer people expect to live, the greater their demand for life insurance will be. While a long-life span decreases the price for insurance it leads to greater incentives for human capital accumulation. In contrast, Browne and Kim (1993) and Li et al. (2007) found a negative relationship between the average life expectancy and the consumption of life insurance. In a related study, Beck and Webb (2003) suggest that higher average life expectancy will lower the coverage costs of mortality and the perceived necessity for mortality cover but in turn increases life insurance savings; this clearly highlights the theoretically ambiguous relationship. However, in the studies conducted by Beenstock et al. (1986), Outreville (1996) and Beck and Webb (2003), the effect of life expectancy is found to lack statistical significance. One explanation may be that a longer life expectancy also decreases the price of life insurance products and therefore tends to stimulate its consumption (Li et al., 2007). Overall, due to the high correlation existing in average life expectancy as well as being associated with wealth and income of the nation, it is difficult to inspect average life expectancy in its social perspective.

## *ii) Education*

A significant number of studies have argued that the level of education is related to insurance demand. Indeed, a great deal of previous studies that have examined the impact of education on the demand for life insurance have demonstrated a positive relationship (see Burnett and Palmer 1984, Truett and Truett, 1990, Browne and Kim 1993, Li et al., 2007; Sherif and Shaairi, 2013). Education is connected with a stronger aspiration to protect the ones dependent on them as well as safeguarding their living standard (Li et al., 2007). As highlighted by Beck and Webb (2003), a higher level of education may increase people’s ability to understand the benefits of risk management and long-term savings, and therefore increase their risk aversion and aid the demand for insurance. In agreement with Beck and Webb (2003), Li et al., (2007) suggest that education enhances the understanding of the benefits associated with life insurance such as better management of risk and the savings that are made long-term which inspire risk aversion. In another study, Outreville (1996) analysed the issue in the developing countries and claimed that education provides a better knowledge of financial services, as the educated individual is more likely to distinguish between different types of insurance that exist. In agreement with Outreville (1996), Hwang and Gao (2003) report that educated individuals are more

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<sup>5</sup> In many cases this is used as a proxy for the probability of death.

likely to recognize the available life insurance products. Also, Browne and Kim (1993) claimed that the well-educated individuals require more life insurance to ensure that their dependents can finish their education if the breadwinner dies or becomes disabled due to a catastrophic event. On the other hand, Beenstock et al. (1986) found that education lengthens the period of dependency. This implied that those with dependents with a greater number of years of education may have a greater need and purposes for life insurance in order to ensure that the dependents would be able to complete the education upon premature death or permanent disability of the wage earner. In summary, the demand for life insurance is significant in the countries where individuals are completing their education over a longer period of time.

### iii) *Religion*

Takaful is a unique way of managing the insurance needs of the Muslim community in a manner consistent with religious beliefs. Therefore, the principal religion followed is essential to understand the demand on life insurance due to its impact on the level of risk aversion. According to Zelizer (1979), religion has historically provided a strong source of cultural opposition to life insurance as many religious people believe that a reliance on life insurance is against the trust in God's protecting care. Some other scholars have debated on this relationship due to the nature of life insurance as well as the non-ethical elements of *Maisir* (gambling) and *Gharar* associated with life insurance (Black et al., 2000). This is further highlighted by the study of Beck and Webb (2003), who reported that Muslims are found to object the life insurance as it is against the will of Allah. It is worth noting that the consumption of life insurance was relatively low in the Muslim-predominantly countries (Browne and Kim, 1993). Moreover, it was proposed by Outreville (1996) that Muslim population as a percentage can be used as a proxy to test the relationship between the religion of Islam and the consumption of life insurance, in which they found a negative relationship.

### iv) *Dependency Ratio*

*“Age dependency ratio is the ratio of dependents-people younger than 15 or older than 64-to the working-age population-those ages 15-64”*

(The World Bank, 2014)

The dependency ratio is defined as the demographic structure of the average household in terms of the number of family members dependent on the main source of income (Lenten & Rulli, 2006). According to Chui & Kwok (2008), the increasing number of dependents implies that the person demands more life insurance. Furthermore, Ye et al. (2009) found that the dependency ratio has a positive impact on foreign life insurance participation and the demand for life insurance (Ducker, 1969; Anderson and Nevin, 1975; Burnett and Palmer, 1984; Lewis, 1989; Brown and Kim, 1993; Chui and Kwok, 2008; Curak and Kljakovic, 2011). For Li et al. (2007), the demand for life insurance

increases to protect dependents against financial hardships if a disastrous event was to occur. However, Beck and Webb (2003) indicate that a significant and positive relationship was found for the old dependency ratio, but uncertain relationship for young dependency ratio was reported. Moreover, Hammond et al. (1967) highlight that the structure of a family as well as the life-cycle is related to the premium expenditure of the insurance. They argue that if an individual has no dependent on his earnings for support, then there would be less need for life insurance or it may not exist at all.

b) Economic and Financial Determinants

i) *Real Interest Rate (RIR)*

*“Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator”*

(The World Bank, 2014)

Real interest rate has not been systematically included in all studies. For example, Browne and Kim (1993) neglected the influence of interest rate on life insurance demand, whereas Beenstock et al. (1986) and Outreville (1996) found that the correlation between RIR and life insurance demand is almost insignificant. One significant justification for these findings was indicated by Li et al. (2007) that the high real interest rate may decrease the cost of insurance, thus stimulating its demand. On the other hand, they may cause consumers to reduce their purchases given the anticipation of higher returns from other investment avenues. Among previous studies, only Beck and Webb (2003), and Sherif and Shaairi (2013) appear to detect a positive relationship between real interest rates and the life insurance consumption by using average bank lending rates. In a related study, Li et al. (2007) investigate this relationship and find that when real interest rates are high, the amount of insurance purchased decreases. This is in line with Black et al. (2000), who found that consumers in the United States inquire about their existing policies due to the high volatility involved in the real interest rates. On the contrary, Beck and Webb (2003) used the average lending rates of banks and found a positive relationship between the consumption of life insurance and real interest rates. However, Outreville (1996) and Beenstock et al. (1986) argued that the relationship is not significant.

ii) *Inflation*

*“Inflation as measured by the consumer price index reflects the annual percentage change in the cost of the average consumer of acquiring a basket of goods and services that may be fixed or changed at specific intervals, such as yearly”*

(The World Bank, 2014)

Many studies have suggested a negative relationship between life insurance demand and inflation (see for example, Fortune, 1973; Babbel, 1981; Browne and Kim, 1993; Outreville, 1996; Beck and Webb, 2003; Li et al., 2007; Sherif and Shaairi, 2013). Inflation is seen as having a ‘dampening effect’ on the demand for insurance products (Lenten and Rulli, 2006). In agreement with Lenten and Rulli (2006), Li et al. (2007) also found inflation to wear away the value of life insurance which in turn makes it unappealing to consumers. Moreover, Browne and Kim (1993) indicated that the indexed policies of life insurance are offered to reduce the value of life insurance policies whose face values are adjusted over a period of time by the same price index. In contrast, Babbel (1985) demonstrated that even when the inflation-adjusted life insurance products are conducted, the demand for them was still affected by the detrimental effects of inflation. According to Outreville, (1996) inflation rates of a country has a negative impact on the consumption of life insurance, indicating that inflation could modify the product of insurance using different patterns of consumptions.

### *Financial Development*

The impact of financial/banking sector development on life insurance demand has been a subject of much discussion and empirical analysis. For example, Beck and Webb (2003) found that the banking development is positively correlated with life insurance consumption. The findings show that financial and banking sector development facilitates the development of life insurance and its contractual savings functions. Further, Beck and Webb (2003) highlight that the well-functioning financial system and banks may increase the confidence of consumers in other financial institutions such as life insurers and provide life insurers with an efficient payment system. These results do not contradict the positive effect of life insurance on financial development advocated by Outreville (1996), Li et al. (2007) and Sherif and Shaairi (2013), who found that financial development is connected with cash flow securitization that allows many households to protect future income through acquiring financial products. Therefore, overall, the life insurance sector will sell more policies in countries associated with an increase in financial development.

### iii) *Disposable Income*

It is often argued that the income is a central variable in insurance demand models and has been identified to significantly affect family Takaful demand (Hammond et al., 1967; Duker, 1969; Fortune, 1973; Cargill and Troxel, 1979; Ferber and Lee, 1980; Burnett and Palmer, 1984; Babbel 1985; Lewis 1989; Truett and Truett 1990; Showers and Shotick, 1994; Gandolfi and Miners, 1996; Browne and Kim 1993; Outreville 1996; Beck and Webb 2003; Hwang and Gao 2003; Savvides, 2006; Li, et al. 2007; Redzuan et al., 2009; Liebenberg, et al. 2010; Sherif and Shaairi, 2013).

It is well documented that when income increases, life insurance becomes relatively more affordable and the demand for family Takaful increases (Brown and Kim, 1993; Redzuan et al. , 2009). Interestingly, the findings of Fitzgerald (1987) highlighted that as the future earnings of the husband increase, the demand for life insurance increases. Whereas the future earning of the wife has a negative impact on the demand for life insurance. According to Savvides (2006), for every C£100 million increase in GDP there would be a C£10 million increase in life insurance premiums. Furthermore, Hwang and Gao (2003) claimed that the whole rapid economic growth over the past decade has played an important role in encouraging people to purchase life insurance products. Notably, individuals with higher income are considered more responsible when it comes to financial management such as money saving and investing (Delafrooz and Paim, 2011). In addition, the higher income was also assumed to make the life insurance products more affordable thereby stimulating the consumption. On the other hand, while most of the previous empirical findings found a significant positive relationship, Beck and Webb (2003) reported a weak correlation between of the variable income and demand on Takaful consumption.

Based on the above, we have developed three different demand functions for both linear and log-linear variables as presented in Table 3. In our study, we use different methodologies to examine their effect on the empirical results. Consequently, we first estimate a pool regression in which neither the unobservable heterogeneity nor the endogeneity is considered. The pooled model is estimated simply by Ordinary Least Square (OLS). However, OLS is only appropriate if no individual firm or time-specific effects exist. If they are, then the unobserved effects of unobserved individual and time specific factors on dependent variables can be accommodated for by using different methodologies. Accordingly, GMM technique was used to substantially minimise the problems associated with omitted variables. GMM is a robust estimator dealing with variables consisting of errors, multicollinearity and also endogeneity problems (Hayes and Cai, 2007).

*INSERT Table 3 here*

In order to use GMM, we manipulate the conditions of moment:

$$E \left[ (Y - X' \beta)' Z \right] = 0 \quad (2)$$

We acquire the estimation of GMM by the minimization of  $Q(\cdot)$  associated with parameters in questions:

$$Q(\cdot) = \varepsilon' S T^{-1} S' \varepsilon$$

(3)

where  $S$  is the instruments matrix and  $T$  represents the weighting matrix.

For this study, we achieve the efficient estimates by solving for coefficients using GMM estimations:

$$\beta(GMM) = [X' S(S' \Omega S)^{-1} S' X]^{-1} X' S(S' \Omega S)^{-1} S' Y \quad (4)$$

and

$$Var[\beta(GMM)] = (S' X)^{-1} S' \sigma^2 \Omega S(X' Z)^{-1} \quad (5)$$

Furthermore, the White variance-covariance is employed to estimate  $Q(\cdot)$  Seen in equation 3, which investigates and tests heteroskedasticity. To fix problems associated with of endogeneity and error of other measurements, we employ the Hansen *J-test* (Hansen, 1982), that evaluates if the moment conditions are considerably different from *zero* and the test includes an asymptotic  $\chi^2$  distributions with the level of freedom equal to quantity of condition of moments less the number of parameters. The GMM estimator relies on internal instruments that are based on lagged values of the explanatory variables that may present problems of endogeneity such as firm growth, leverage, size, and firm age are considered as exogenous. To be exact, we use all the endogenous right-hand-side variables in the model lagged from  $t-1$  to  $t-2$ . Finally, Durbin-Watsin Statistic is employed to test for serial correlation at first order.

### *Bootstrapping*

In Islamic accounting and finance-based studies one often needs to estimate the empirical model and determine the relationship between variables over a long-run given a sample of observations over a short-run. One common obstacle in these estimations is a lack of sufficient data. To tackle this problem, the researches rely on statistical bootstrap methods. A bootstrap is a computer-intensive method of estimation of parameters and distributions by resampling the original data (see for example, Cogneau and Zakamouline, 2010; Treerattanapun, 2011).

First introduced by Efron (1979), theorising about bootstrap method has been developed. It is implemented based on sampling the data randomly with replacement using as many resamples as possible, which is mainly limited by available computing power and time. More specifically, bootstrap method consists in drawing random resamples, where:



$$X = (X^* 1, X^* 2, \dots, X^* n)$$

It is worth noting that we do not get a permutation because the values of  $X$  are selected with replacement. In addition, the number of data points in a bootstrap resample is equal to the number of data points in the original sample. We construct an approximate probability distribution of the estimator  $\hat{\theta}(X)$  by doing resampling several times and computing for each resample  $\hat{\theta}(X)$ .

## 4. Data and Empirical Results

### 4.1 Data

The data adopted in this study are annual data on MENA region from the period 2000 to 2013. The data obtained for fifteen MENA countries namely; Algeria, Libya, Tunisia, Egypt, Lebanon, Jordan, Syria, Iran, Kuwait, Bahrain, Saudi Arabia, Qatar, United Arab Emirates, Oman and Yemen. We use nine socioeconomic factors for which the data that could explain the demand for family Takaful in MENA are available and identified. Income, inflation rate, real interest rate, Islamic banking deposits and financial development have been selected as the potential economic determinants, whereby life expectancy, dependency ratio, education level and total Muslim population have been chosen to explain the social factors. The annual total family Takaful contribution, across the sample countries as seen in Figure 6, was identified as the dependent variable that explains the demand for family Takaful.

*INSERT Table 4 here*

*INSERT Figure 6 here*

The data is collected from and provided by various sources. For the industry of Takaful, the total family contributions are obtained from various annual reports of Takaful Re<sup>6</sup> as well as various MENA-based banks.<sup>7</sup> Islamic Banking deposits are obtained from Bank Scope and DataStream. We use QuasiMoney (M2 %) to proxy financial developments and obtained from DataStream. The real interest rate percentage is obtained from the World Bank. For Saudi Arabia and due to unavailability of data, we use Trading Economics database to obtain data on real interest rate. Gross Domestic Product per capita (GDP) is considered as a satisfactory proxy for income and was obtained from the World Bank.<sup>8</sup> Life expectancy ratio, inflation rate, average life expectancy, total population and

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<sup>6</sup> Takaful Re provides a complete range of Retakaful services and products to Takaful and Islamic companies in order to meet their business requirements. They have extensive details of family Takaful contributions in MENA region.

<sup>7</sup> Morocco, Iraq, and other countries based in MENA had to be eliminated due to unavailability of data.

dependency rate are collected from the World Bank. The Muslim population percentage is acquired from the Pew Research Center. Table 4 summarizes the sources and measures of data.

#### 4.2 Empirical Findings

The empirical analysis here begins with the descriptive statistics. Table 5 presents the statistics of the dependent and explanatory variables. The mean, standard deviation, skewness, and kurtosis, are presented for each variable. Table 5 presents the statistics of the dependent and explanatory variables used in this study. It is highlighted that Takaful demand shows a large dispersion based on the mean and standard deviation over the period of study. Large dispersion is also demonstrated by income, education, Islamic banking deposit and total Muslim population. In contrast, inflation rates, financial development and real interest rates show small dispersion across the sample. Most variables are characterized by relatively small (in absolute value) skewness and kurtosis, which are clearly non-gaussian, as signalled by the rejections of the null of normality delivered by the Jarque-Bera test.

As a first attempt to identify the strength and direction of the relationship between the variables, the correlation matrix is presented with the results also shown in Table 5. The table illustrates that the inflation, Islamic banking deposits, education and average life expectancy are positively related to the demand for family Takaful in MENA. In particular, Islamic banking deposits have significantly strong impact on the consumption of family Takaful. In contrast, although real interest rates have a negative relationship as expected, the correlation coefficients are relatively small, indicating a weak negative relationship with the family Takaful contribution. Interestingly, income, financial development, Muslim population and dependency ratio unexpectedly have negative relationship with the family Takaful contribution.<sup>9</sup>

Since the correlation matrix examines only one-to-one relationships, without detecting any significance level, we need a better estimation that would allow us to understand how various variables collectively and significantly influence the overall performance of the dependent variables. We mainly conclude and focus on GMM estimations because it improves the simple OLS calculations and corrects some of its inconsistencies. It allows for consistent and efficient estimates to be derived even if some of the OLS assumptions do not hold.

*INSERT Table 5 here*

Starting with the OLS estimations of the full linear and log-linear models, Table 6 demonstrates that inflation, Islamic banking deposit and education have a consistent direction of relationship with

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<sup>8</sup> The GDP per capita is preferred as it reflects the income generated from the production of goods and services by household residents.

<sup>9</sup> The Pearson correlation coefficient is the most widely used approach. It measures the strength of the linear relationship between normally distributed variables. When the variables are not normally distributed, as in our case, or the relationship between the variables is not linear, it is more appropriate to use the Spearman correlation method (Hryniewicz and Karpinski, 2014).

family Takaful demand. As hypothesised, Islamic banking deposit and education show a positive relationship with Takaful consumption whereby real interest rate is inversely related to the family Takaful demand. However, contrasting results are observed for financial development and Muslim population variables whereby the results show that the two variables negatively influence the demand for family Takaful, contradicting the initial expected positive relationship. On the other hand, while the real interest rate does not support the expected negative relationship, the positive coefficient exhibited by the variable is consistent with the findings of Beck and Webb (2003) and Sherif and Shaari (2013). Furthermore, there was an expected positive coefficient of the aggregate per capita income as when household income increases, individuals are more likely to purchase life insurance. However, for the full linear model we find negative relationship with family Takaful demand which is inconsistent with the previous studies (see for example, Truett and Truett (1990), Sherif and Shaari, 2013 and Li et al. 2007) though, the log-linear model showed a positive but insignificant relationship.

*INSERT Table 6 here*

With regard to life expectancy, the direction of relationship between male and female life expectancy is observed differently as can be seen in Lim and Haberman (2004) in which they use male life expectancy as the best proxy to represent the total life expectancy. Under the log-linear and linear demand function our results show a significant positive relationship between the demand for family Takaful and life expectancy female, however, a negative coefficient is found for the variable life expectancy male. These results are consistent with Browne and Kim (1993) who find life expectancy to have a negative relationship with life insurance demand, as there is a positive hypothesized relationship between life insurance and probability of death. Our findings also are in line with Li et al. (2007) and more importantly due to the high correlation existing in average life expectancy as well as being associated with wealth and income of the nation. In terms of the dependency ratio, we find inconsistent results between the linear and log-linear model making it impossible for us to investigate its relationship with demand of family Takaful. Inconsistent results shown by the inflation and dependency ratio for linear and log-linear models, on the other hand, do not allow us to detect the direction of its relationship with demand for family Takaful. In order to increase the reliability of OLS estimations, we have also adopted Durbin-Watson Statistic. As seen in Table 6, the models of log-linear and linear show a Durbin-Watson Statistic of around 2 which indicates no serial correlation. Additionally, linear model 1 has  $R^2$  of 63%, indicating a reasonable good fit. Notably, the log-linear model has a better fit ( $R^2=67\%$ ).

Shifting our attention towards the approach advocated by Li et al. (2007) which controls for product market characteristics in their models, Table 7 shows that Islamic banking deposits consistently have a significant positive relationship with family Takaful demand. However, and importantly, the Inconsistent results shown by the inflation, income, interest rate and financial development for linear

and log-linear models, on the other hand, do not allow us to detect the direction of its relationship with demand for family Takaful. The negative direction of the relationship between financial development and family Takaful demand is however still observed in the second model with a significant inverse relationship shown under the log-linear model. This result, though inconsistent with the findings of Outreville (1996) and Li et al. (2007), suggests a new argument that enhanced the development of the financial system (which is dominated by the conventional financial system) might inversely affect the growth of Takaful business as it heightens the competition between the conventional and Islamic financial institutions. Nevertheless, this result might also be affected by the proxy employed for financial development whereby the total M2 is taken as a proxy, instead of the accurate amount attributable to the Islamic financial system. This result, coupled with the homoscedasticity of residuals found by the White test, suggests that the models have the ability to describe efficiently the relationship between the dependent and the product market variables.

*INSERT Table 7 here*

Next is the third demand function, which controls for the socio-demographic factors of the population. Table 8 presents the OLS estimates of the third demand function. Consistent with the previous findings, income continues to show inconsistent direction for linear and log-linear models, but shows significant relation to family Takaful demand with log-linear demand function. In addition, education appears to be one of the significant factors that stimulate family Takaful consumption in MENA region. Its direct positive relationship with demand for family Takaful appears to reflect the increased level of risk aversion as suggested by Browne and Kim (1993). It also reveals a greater awareness and understanding of the importance of Takaful and Islamic finance as a whole. This result also suggests that with more individuals receiving longer education in MENA, there would be a greater demand for family Takaful so as to ensure that the dependents are able to complete their education in the event of premature death or permanent disability of the wage earner.

*INSERT Table 8 here*

As for the other demographic variables, life expectancy continues to show conflicting results between male and female life expectancy, with male life expectancy indicating a negative relationship with demand for family Takaful under both linear and log-linear demand functions. Female life expectancy, on the other hand, shows a positive influence on the demand under the linear model. Similar contrasting results are also shown by the dependency ratio and Muslim population. Interestingly, since most of the above results have significant relationship, definite conclusion could be derived regarding the effect of these variables on the demand for family Takaful in MENA. The significant results of all variables included under the log-linear demand function could indicate non-serial correlation problem detected by the DW test and supported by the LM test. The results of the

two tests indicate that there is no serial correlation in the errors of the regression models at the first and higher orders.

In order to support our earlier findings, control for heterogeneity and multicollinearity across firms, we employ alternative econometric technique GMM, which is used in parallel with OLS as it improves the simple OLS calculations and corrects some of its inconsistencies. It allows for consistent and efficient estimates to be derived even if some of the OLS assumptions do not hold. As a result, further analysis is based on the GMM estimation method for Models 2 and 3 as shown in Table 9.

*INSERT Table 9 here*

Consistent with the previous results (model 2), we find a positive relationship between high real interest rates and the demand for family Takaful. Although this does not prove our initial hypothesis is consistent with the findings of Beck and Webb (2003). In addition, financial development has a negative relationship with the demand for family Takaful using both OLS and GMM regression analysis. This clearly demonstrates that if the conventional financial institutions are to carry on expanding; it would lead to a fall in the demand for family Takaful due to the competition imposed on the conventional system. Notably, as hypothesised, Islamic banking deposit shows a positive and strong relationship with Takaful consumption. The same pattern of results still holds for the remaining variables.

As for the demographic or socioeconomic factors, our GMM analysis shown in Table 9 indicates that all socio-demographic factors significantly influence the demand for Takaful in MENA region. As hypothesised, increased education levels, dependency ratios and the total Muslim population enhance Takaful consumption. The positive relationship of education is consistent with the OLS estimates. However, the positive effect of dependency ratio on the demand for family Takaful is not consistent with the findings in the OLS estimation. Though, it is consistent with the findings of Lewis, (1989), Anderson and Nevin (1975), Burnett and Palmer (1984) and Ducker (1969) and Sherif and Shaari (2013) who find life insurance demand to increase when the number of dependents rise in a household thereby, increasing the demand for family Takaful. Additionally, the initial findings relating to Muslim population are negative as countries that are predominantly Muslim, the consumption of life insurance is low (see such as in Black et al. 2000; Beck and Webb 2003 and Outreville, 1996). However, as majority of the countries in the MENA region are mainly Muslims, it suggests that the demand for family Takaful is higher in such countries. Family Takaful is a substitute for conventional life insurance, thus, it makes sense for family Takaful demand being higher in a country where there

are mainly Muslims. In addition, education is found to be significantly positive, indicating that there is an improved awareness of the benefits associated with family Takaful, which leads to an upsurge of the consumption of family Takaful in the MENA region. Contrary to the findings of OLS regression, we find a positive relationship between life expectancy male and demand for family Takaful and female life expectancy being inversely related to the consumption of family Takaful.

Table 10 shows the results of Takaful Insurance from the bootstrapping technique. As seen from Table 10, the same pattern of results holds. Significant economic and institutional variables include Islamic banking development, education, dependency ratio, average life expectancy (female), and Muslim population. As expected, Islamic banking development, education, dependency ratio, average life expectancy (female), and Muslim population have a positive impact. The negative impact of the financial sector development indicates that a higher level of Takaful insurance consumption is observed in a region that has low financial sector development. It is not surprising that GDP is not significant. Interestingly, and in line with the previous findings, the bootstrap  $T^*$  statistics suggest that Income, inflation, and real interest rate are insignificant in determining Takaful insurance consumption. The quality of education is hardly measurable and comparable across countries. Tertiary education may not be a good proxy of one's understanding of sophisticated financial and insurance products as the knowledge of these products may not be taught in schools. Table 11 shows the summary of our empirical findings.

*INSERT Table 10 here*

*INSERT Table 11 here*

## 5. Conclusion

Although Takaful is still in its infancy, MENA region has shown great potential with illustrating staggering contributions in comparison to other regions. This indeed has encouraged us to understand the factors stimulating the demand for family Takaful in fifteen MENA-based countries over the period 2000 to 2012. We use various econometric techniques to estimate three different models: firstly, a full model that combines all factors; secondly, a model that controls for product market factors; and lastly, a model that controls for socio-demographic factors. All models are further separated into linear and log-linear demand functions.

We demonstrate that the relationship between the demand for family Takaful in MENA region and Islamic banking deposits, education, and dependency rate, male life expectancy and Muslim population is significantly positive. On the other hand, the significant factors that are inversely related

to the demand for family Takaful in MENA regions are inflation, financial development and female life expectancy. Notably, income was proven not to be a significant factor in explaining the demand for family Takaful in MENA region.

The context of our key findings offers insights for the public, governments, regulators and policy makers interested in family Takaful in both the emerging and developed market setting. With regard to education and female life expectancy, our findings have important implications for the public in general, as they will show signs of better education and understanding in Takaful. In addition, females will also be aware of the advantages that Takaful offers in dealing with their income and life expectancy. It can give more spirit to them to work harder and enhance their income and have preference to protect and improve their live through mutual help and cooperative spirit. Regarding the Islamic financial institutional developments and Muslim population, policy maker and regulators should be more dedicated in supporting the developments of Takaful industry and Islamic financial institutions. They should be more active in enhancing public awareness and knowledge about Takaful product in order to attain good customers, retention, loyalty and Muslim population support. In terms of MENA region, members of boards of directors and the Financial Supervisory Authority and other regulators can benefit from the results when considering a new system to evaluate the optimal use of family Takaful.

While this study goes a long way in filling gaps within the existing literature on the determinants of life insurance in general and in the Takaful sector in particular, it opens up numerous avenues for further research. The most possible immediate expansion would be to include certain variables omitted in this study due to the unavailability of the data, which may be influential in explaining the demand for family Takaful in MENA. Possible influential variables may include government social security expenditure, price of Takaful and competition level within the Takaful and insurance industry. Also, research should be conducted on the impact of legal system and government policies on the demand for family Takaful in the country. Finally, the supply-side of the equation should not be neglected and should be incorporated in future studies in order to provide researchers with a complete picture in regard to what determines the development of family Takaful products and services.

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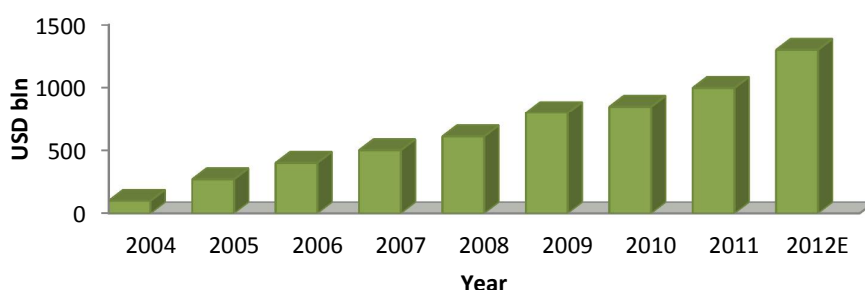
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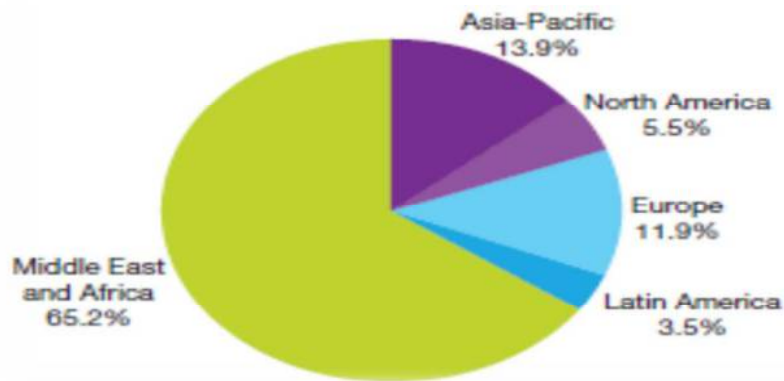
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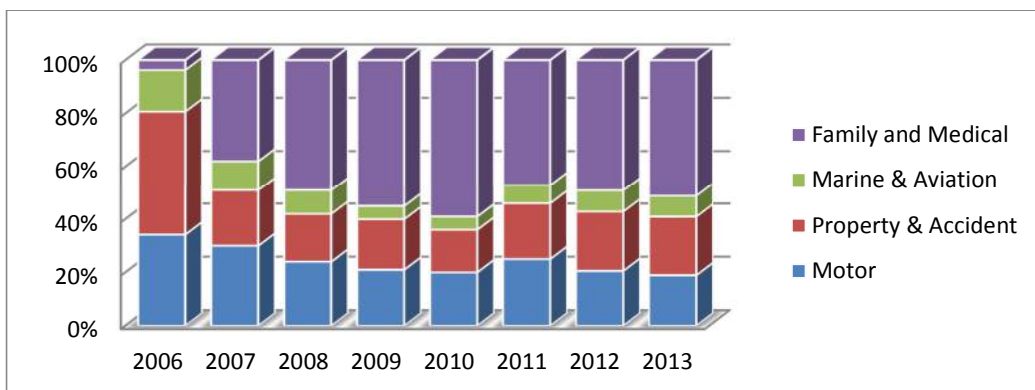
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**Figure 1**  
**Islamic Banking Assets Growth Trend<sup>10</sup>**

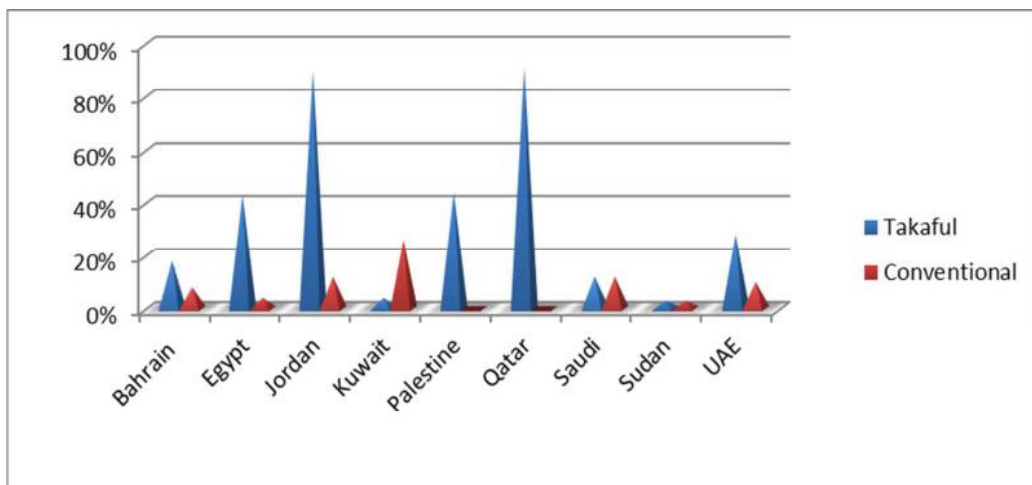


**Figure 2**  
**Geographic Wealth Allocation of Middle Eastern and African HNWI's**

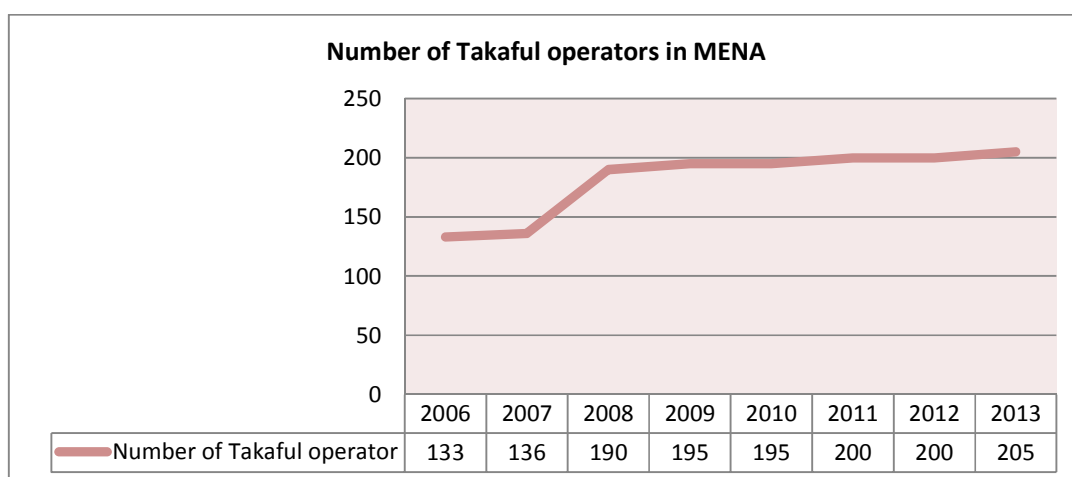


**Figure 3**  
**The Gross Contribution in the Region MENA**

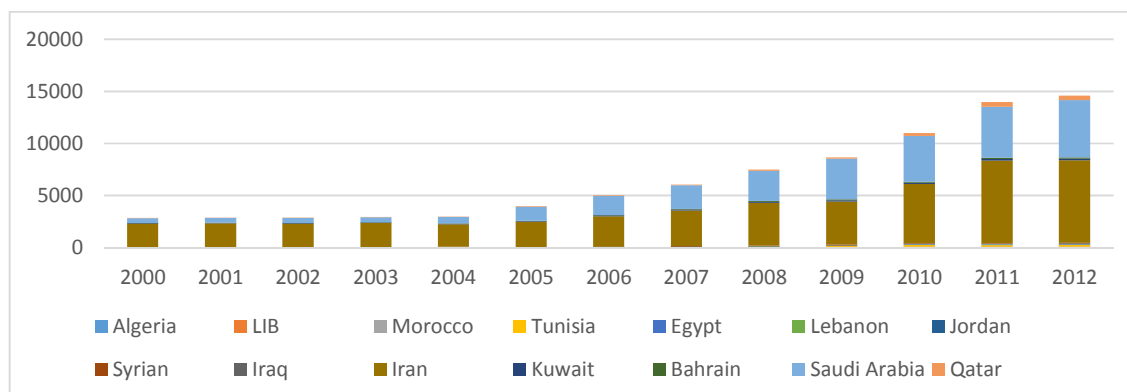
<sup>10</sup> For more information about Islamic Banking Assets Growth Trend and Takaful industry in MENA, see IFSB, World Wealth, and Takaful R Annual reports.



**Figure 4**  
Takaful and Conventional Insurance in MENA



**Figure 5:**  
Number of Takaful Operators in MENA



**Figure 6:**  
Family Takaful contribution across our sample countries and the study time period (m\$).



Table 1 Seminal Papers on Life Insurance

<i>Variables</i>	<i>Author(s)</i>	<i>Form of study</i>	<i>Reason for including the variable in their study</i>	<i>Relationship</i>
<b>income</b>	Yaari (1965)	Theoretical study	The reason given by author was income is expected to come to a halt when the holder of the policy passes away.	Positive
	Fortune (1973)	Theoretical and empirical analysis(Mixed)	In line with the theory of expected utility; there is loss of utility when the bread winner deceases.	Positive
	Levy et.al (1988)	Practical approach	Loss of income and life for family member.	Positive
<b>Inflation</b>	Fortune (1973)	Mixed	Inflation tends to change the confidence of the purchaser as well as having an impact on real rate of interest	Negative
<b>Wealth</b>	Lewis (1989)	Mixed	Elasticity of the demand for life insurance is high, as it signifies a slight amount of beneficiary's' wealth.	Negative
	Yaari (1965)	Theoretical study	When a household wants to maximize their consumption, wealth plays a vital role.	Negative
	Fortune (1973)	Mixed	According to Fortune (1973), when there is an increase in the amount of wealth of a household, there is a decline in risk aversion that results in the demand of life insurance to decrease.	Negative

<b>Risk Aversion</b>	Lewis (1989)	Mixed	The face value of insurance goes up if the relative risk aversion also increases.	Positive
<b>interest Rate</b>	Yaari (1965)	Theoretical study	Rate of interest on annuities must surpass regular notes' rate of interest	Positive
<b>Death Probability</b>	Lewis (1989)	Mixed	Life insurance is purchased by children when they have to face uncertainty of income due to the husbands lifetime uncertainty	Positive
<b>Price of Insurance,</b>	Lewis (1989)	Mixed	When the insured passes away, the insurance price has a direct impact on the wealth of the household.	Negative
<b>Social Insurance</b>	Levy et.al (1988)	Practical approach	Substitution for wealth	Negative

Table 2 Hypothesized Relationships

<i>Variable</i>	<i>Abbreviation</i>	<i>Expected relationship with CONF</i>
<i>Family Takaful Demand (Family Contribution)</i>	CONF	Not Applicable
<i>Income</i>	INC	Positive
<i>Inflation rate</i>	INF	Negative
<i>Real interest rate</i>	RIR	Negative
<i>Development in Islamic banking</i>	IBD	Positive
<i>Education</i>	EDU	Positive
<i>Dependency ratio</i>	DR	Positive
<i>Average life expectancy (Male)</i>	LM	?
<i>Average life expectancy (female)</i>	LF	?
<i>Muslim Population</i>	MUSP	Positive
<i>Financial development</i>	FD	Positive

Table 3 Proposed Models

Model One (All Variables)	
Linear	$CONF = \beta_0 + \beta_1(INC) + \beta_2(INF) + \beta_3(RIR) + \beta_4(FD) + \beta_5(IB) + \beta_6(EDU) + \beta_7(DEP) + \beta_8(LM) + \beta_9(LF) + \beta_{10}(MUSP) + \varepsilon$
Log-linear	$CONF = \beta_0 + \beta_1 LOG(INC) + \beta_2 LOG(INF) + \beta_3 LOG(RIR) + \beta_4 LOG(FD) + \beta_5 LOG(IBD) + \beta_6 LOG(EDU) + \beta_7 LOG(DEP) + \beta_8 LOG(LM) + \beta_9 LOG(LF) + \beta_{10} LOG(MUSP) + \varepsilon$
Model Two (Product Market Factors)	
Linear	$CONF = \beta_0 + \beta_1(INC) + \beta_2(INF) + \beta_3(RIR) + \beta_4(FD) + \beta_5(IB) + \varepsilon$
Log-linear	$CONF = \beta_0 + \beta_1 LOG(INC) + \beta_2 LOG(INF) + \beta_3 LOG(RIR) + \beta_4 LOG(FD) + \beta_5 LOG(IBD) + \varepsilon$
Model Three (Socioeconomic Factors)	
Linear	$CONF = \beta_0 + \beta_1(INC) + \beta_6(EDU) + \beta_7(DEP) + \beta_8(LM) + \beta_9(LF) + \beta_{10}(MUSP) + \varepsilon$
Log-linear	$CONF = \beta_0 + \beta_1 LOG(INC) + \beta_6 LOG(EDU) + \beta_7 LOG(DEP) + \beta_8 LOG(LM) + \beta_9 LOG(LF) + \beta_{10} LOG(MUSP) + \varepsilon$

Table 4: Measures and Sources for Data

<i>Variables</i>	<i>Measure</i>	<i>Source</i>
Family Takaful Demand	The total amount of family Takaful contribution	Various annual reports of Takaful companies and Takaful Re annual reports
Income	GDP per capita	The World Bank
Inflation Rate	Inflation as measured by consumer price index	The World Bank
Real Interest Rate	Lending interest rate adjusted for inflation as measured by the GDP deflator	The world Bank and Central Bank of Bahrain
Financial Development	Quasi Money (M2%)- GDP divided by M2	Data Stream
Islamic Banking Deposits	Total amount of Islamic banking deposits	BankScope
Education Level	Total enrolment in higher education	The World Bank
Dependency Rate	Ratio of dependents--people younger than 15 or older than 64--to the working-age population--those ages 15-64	The World Bank
Average Life Expectancy	Average number of years to be lived by a group of people born in the same year, if mortality at each age remains constant in the future	The World Bank
Population of Muslims	Percent of Muslims in each country	Pew Research Centre

Table 5 Descriptive Statistics

	<i>CONF</i>	<i>INC</i>	<i>INF</i>	<i>RIR</i>	<i>FD</i>	<i>IBD</i>	<i>EDU</i>	<i>DR</i>	<i>LEM</i>	<i>LEF</i>	<i>MUSP</i>
Mean	469	141.73	5.73	3.47	71.4	22	948	52	75	72	727
Std.Dev.	1271.4	178	5.56	12.3	48.1	475	570	17.5	3.86	3.9	239
Skewness	3.70	2.02	1.9	1.87	2.20	4.1	-2.05	0.34	0.42	-1.34	3.47
Kurtosis	17.7	7.2	8.5	9.73	7.68	21	6.9	3.52	2.15	5.04	13.1
Jarque-Bera	2204	272	375	482	336	3096	267	6029	167	92.3	1216
Correlations											
<i>CONF</i>	1.000										
<i>INC</i>	-0.021	1.00									
<i>INF</i>	0.397	-0.091	1.00								
<i>RIR</i>	-0.037	-0.121	-0.085	1.00							
<i>FD</i>	-0.241	-0.158	-0.205	0.145	1.00						
<i>IBD</i>	0.7594	0.063	0.380	-0.069	-0.244	1.00					
<i>EDU</i>	0.174	0.298	-0.202	-0.038	0.207	0.209	1.00				
<i>DR</i>	-0.142	-0.708	0.128	0.062	0.016	-0.291	-0.581	1.00			
<i>LEM</i>	0.027	0.557	-0.306	-0.041	0.305	0.059	0.813	-0.759	1.00		
<i>LEF</i>	0.045	0.413	-0.275	-0.016	0.361	0.041	0.789	-0.664	0.966	1.00	
<i>MUSP</i>	-0.097	-0.083	-0.006	0.140	-0.159	-0.096	0.219	0.024	0.023	0.056	1.00

Table 6 Model One OLS Regression Results

Variables	Linear Model 1		Log-linear Model 1	
	Coefficient	Std. Error	Coefficient	Std. Error
INC	-12.23	5923.8	0.2392	0.1853
INFL	3.111*	1.237	0.1188	0.1129
RIR	5.032	4.805	0.2394***	0.0922
FD	-4.318***	15.27	-1.983***	0.2441
IBD	18.20***	1.584	0.2502***	0.0694
EDU	2.822*	2.144	29.26***	3.2247
DR	1.111*	6.659	-1.6885***	0.5359
LEM	-9.641	9.822	-41.830*	12.903
LEF	1.388*	7.512	29.56***	10.031
MUSP	-6.038**	27.64	-1.073***	0.1017
$R^2$	63%		67%	
F-statistic	31.44		38.24	
Prob (F-statistic)	0.0000		0.0000	
Durbin- Watson stat	2.182		2.068	

**Note 1:** Family contribution (CONF), income (INC), Inflation (INF), Real interest rate (RIR), financial development (FD), Islamic banking deposits (IBD), education (EDU), dependency ratio (DR), life expectancy female (LEF), life expectancy male (LEM) and population of Muslims (MUSP). **Note 2:** Significant at level of 1% (\*\*\*), Significant at level 5% (\*\*) and Significant at level 10% (\*).

Table 7 OLS Estimates of Model Two

Variables	Linear model 2		Log-linear model 2	
	Coefficient	Std. Error	Coefficient	Std. Error
INC	-4.4623	3387.348	0.7804***	0.1182
INFL	0.2551**	1.1777	0.3658	0.1467
RIR	2.2779	4.8524	-0.3611***	0.1227
FD	-1.5445	12.944	-1.3875***	0.2732
IBD	18.955***	1.3640	0.41871***	0.9091
$R^2$	60%		36%	
F-statistic	55.93		21.47	
Prob (F-statistic)	0.0000		0.0000	
Durbin- Watson stat	2.178827		1.991309	

Table 8 OLS Estimates of Model Three

Variables	Linear model 3		Log-linear model 3	
	Coefficient	Std. Error	Coefficient	Std. Error
INC	2.982	80.82	0.6479***	0.2108
EDU	1.442***	2.90	34.03***	3.902
DR	-3.202***	8701	-2.658***	0.6278
LM	-5.599***	1.322	-80.49***	14.71
LF	2.999***	1.071	42.75***	12.12
MUSP	1.266***	37.53	-1.035*	0.1176
$R^2$	19%		49%	
F-statistic	7.49		30.08	
Prob (F-statistic)	0.0000		0.0000	
Durbin- Watson stat	2.178827		1.782393	

Table 9 GMM Estimates

	<i>INC</i>	<i>INF</i>	<i>RIR</i>	<i>FD</i>	<i>IBD</i>	<i>EDU</i>	<i>DR</i>	<i>LEM</i>	<i>LEF</i>	<i>MUSP</i>	$\chi^2$
Model 2											
<i>Linear</i>	5.7405	-0.011**	4.145	-13.38***	2.119***						3.977 (0.6258)
<i>Log-Linear</i>	-0.0194	-0.7415*	2.489*	-3.715***	1.028***						5.324 (0.7418)
Model 3											
<i>Linear</i>						34.06***	3.084***	-0.5708**	27.42***	1.057***	2.976 (0.5853)
<i>Log-Linear</i>	1.633***					23.28***	0.6779***	-6.476*	24.33*	1.151***	4.267 (0.6418)

Note 1: Family contribution (CONF), income (INC), Inflation (INF), Real interest rate (RIR), financial development (FD), Islamic banking deposits (IBD), education (EDU), dependency ratio (DR), life expectancy female (LEF), life expectancy male (LEM) and population of Muslims (MUSP). Note 2: Significant at level of 1% (\*\*\*), Significant at level 5% (\*\*) and Significant at level 10% (\*)

Table 10  
Full Linear and Log-linear Models Estimations  
(Bootstrapping)

Predictor Variable	Model 1		Model 2		Model 3	
	Linear	Log Linear	Linear	Log Linear	Linear	Log Linear
INC	-12.88	1.48	-28.11	8.378	-13.99	1.301
INFL	6.10	-0.1225	2.54	.0871		
RIR	7.30	0.2340	2.61	-0.1245		
FD	-7.17***	-0.6349**	-1.55**	-1.269***		
IBD	4.86**	0.3072***	18.90***	0.4378***		
EDU	4.99***	20.94***			4.54***	14.92***
DR	2.26	-0.0010			5.398	1.285
LEM	6.44	74.60			5.83	169.2*
LEF	6.13***	62.05***			39.58***	18.54**
MUSP	32.16***	1.484***			4.54***	1.704***
Adj R <sup>2</sup>	44%	63 %	59 %	33. %	51%	32%

Table 11 Summarized Empirical Results for OLS, Bootstrapping and GMM

OLS estimations			
Variables	Significant Findings		Findings are Insignificant
	Positive	Negative	
INC			✓
INFL			✓
RIR			✓
FD		✓	
IBD	✓		
EDU	✓		
DR			✓
LEM			✓
LEF	✓		
MUSP		✓	
GMM Estimations			
Variables	Significant Findings		Findings are Insignificant
	Positive	Negative	
INC			✓
INFL		✓	
RIR			✓
FD		✓	
IBD	✓		
EDU	✓		
DR	✓		
LEM		✓	
LEF	✓		
MUSP	✓		
Bootstrapping Estimations			
Variables	Significant Findings		Findings are Insignificant
	Positive	Negative	
INC			✓
INFL		✓	
RIR			✓
FD		✓	
IBD	✓		
EDU	✓		
DR	✓		
LEM			✓
LEF	✓		
MUSP	✓		