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EXPLORING THE APPLICABILITY OF CHOICE EXPERIMENT IN ISLAMIC BANKING AND FINANCE PRODUCT ENGINEERING

Shehu Usman Adam[1*2]

Abstract

Product engineering in Islamic banking and finance (IBF) is a continuous task as experts keep introducing newer products that suite the changing preferences of bank customers. In doing so, besides sharia compliance, understanding the marketability of IBF products is key to product engineers in the sub-sector. Product engineers are thus concerned about modeling the preferences and potential prices of such products like the cost-plus-profit margin (Murabahah). Choice experiment (CE) constitutes one of the potent techniques rooted in economics and econometrics that could be used to model preferences and estimate willingness to pay (WTP) for IBF products. Product engineers can use CE to estimate market values for product or services as well as their characteristics in advance of their availability in the market. Despite the heightened potential for the use of CE as a non-market valuation method in IBF product structuring, there seem to be dearth of knowledge on its application. The objective of this paper is to demonstrate how CE technique could be used in determining customers' preferences and WTP for the characteristics which when understood will trigger subscription choice for IBF products. This is demonstrated particularly, for risk-sharing IBF products, which has relatively received the least patronage in the industry.

Keywords: Product engineering, Islamic banking, Finance, Customers.

Introduction

Albeit lingering issues, Islamic banking and finance (IBF) products and services have emerged as a competitive banking alternative to conventional banking model. According to the Islamic Finance Development Indicator (IFDI), based on statistics from 135 countries around the world, IBF recorded a double-digit growth rate of 14% in 2019, despite covid 19, raising its total global asset to US$2.88 trillion, manifesting rarely impressive resilience despite continuous low oil prices that characterised major Islamic finance economies (IFDI Report, 2020). This total IBF asset is projected to rise to US$3.69 trillion by 2024.

IBF's major departure from the conventional banking and financial services takes a fundamental import from Islamic finance non-compromise of Sariah-noncompliance (Furqani, 2013; Jumat, 2013). Among the major reflections of Sariah-compliance apparent in Islamic banking model, include the prohibition of interest (*riba*), gambling (*gharar*) and uncertainty (*maysir*) or excessive risk (Abdul Hamid et

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[2] *An earlier version of this paper was improved based on inputs following its presentation at the 4th ISRA Colloquium organised by Central Bank of Malaysia from 11th –15th October, 2014.*

al., 2010; Dusuki & Abullah, 2007). Since the resurgence of Islamic finance, Islamic banking has remained the major player in the global Islamic finance industry. Its assets constitute 69% of total Islamic finance assets (IFDI Report, 2020). Some feel the impressive growth of Islamic banks is because of global Islamic resurgence (Chong & Liu, 20009). Others had shown that customers' choice of patronising Islamic Banks is not motivated by religious consideration alone, but economic considerations (Dusuki & Abullah, 2007).

Thus, such economic considerations would imply the relevance of considering customers' preferences and WTP for new IBF products. Product engineering in IBF is therefore, a continuous task as experts keep introducing newer products that suite the changing preferences of bank customers. In doing so, besides shariah compliance, understanding the marketability of IBF products is key to product engineers. They are thus concerned about modeling the preferences and potential prices of such products like the cost-plus-profit margin (Murabahah) and the risk-sharing alternatives.

The hurdle recently encountered is the risk of customers shifting their choice of patronage from this bourgeoning industry. This has made Islamic banks to maintain profit smoothening reserve. It is instructive to emphasise that Islamic banks rely heavily on debt-like financing instruments that are pegged against interest indicators such as LIBOR (Cevik & Charap, 2011; Ebrahim & Sheikh, 2016; Albalooshi, 2020). This is despite the fact that risk-sharing contracts such as profit and loss sharing-based products (Mudharabah or Musharakah) are core to Islamic finance. Yet, they constitute the least used financing products (Chong & Liu, 2009; Cevik & Charap, 2011; Ebrahim & Sheikh, 2016; Grassa and Miniaoui 2018).

In a related account, Chong and Liu (2009) and Albalooshi, (2020) reported that Islamic bank products structured based on risk-sharing contracts of Mudharabah (profit-sharing) and Musharakah (joint venture) are the least subscribed financing products relative to debt-based such as Murabahah (Tharker et al., 2020; Albalooshi, 2020). Meanwhile, on the deposit side of Islamic banks, Mudharabah deposit (profit sharing) and Mudarabah negotiable instrument of deposits (INID) are the only available risk-sharing products. Yet, these risk-sharing products constitute more than half of total deposits. It then implies risk-sharing products are attractive to depositors but unattractive to entrepreneurs.

The above divergence in product patronage between depositors and entrepreneurs is challenging. This is because both are expected stakeholders within the two-tier Mudharabah model endorsed by several scholars in the early seventies (Khan, 2003). Meanwhile, the two-fold Mudharabah model as first proposed by Uzair and later elaborated by siddiqi, is aimed at financial intermediation by the bank where both resource mobilisation and allocation will be designed based on risk-sharing principle (Kahf & Khan 1992). Contrarily, evidence had shown a lop-sided application in Islamic banks' intermediation. The risk-sharing principles are dominant in resource mobilisation (supply-side) while on the demand-side, debt-like products are dominant in resource allocation (Cevik & Charap 2011).

Therefore, as the most patronised resource mobilisation product, there is the need to assess sustainability in Mudarabah deposit product patronage. This could be done by knowing the product's-own attributes that trigger patronage. Likewise, on the resource allocation side, the banks need to be aware of risk-sharing Mudarabah

financing attributes that could serve as baits to trigger patronage. Such trigger factors will thus be taken with priority in engineering Mudharabah deposit and financing products. This is not only important in Islamic money-market sub-sector, but also, Islamic capital market.

Previous studies that have attempted examining the determinants of customers' patronage for Islamic finance product such as Dusuki and Abdullah (2007) examined external factors, not product-specific attributes that are internal to each of the structured products. An understanding of such is relevant to determining which of the product's attributes underlie patronage. There is therefore the need to examine Mudharabah deposit and financing-specific characteristics to determine which of its internal attributes are significant determinants of customers' Islamic bank patronage choice. Researching into such is even more timely with the gradual global easing of Covid-19 pandemic which Mansour et al (2021) noted has adversely affected the volume of transaction and profitability of Islamic banks around the world.

Besides, knowing the marginal rate of substitution (MRS) between attributes obtainable via choice experiment analysis of Islamic banking and finance products, will guide product engineers on which customers could enhance attributes to trigger patronage. There currently exists dearth of knowledge on how this micro-econometric tool of non-market valuation could be applied in Islamic finance product structuring. As such, the aim of this paper is to present the applicability of choice experiment to product engineering in Islamic finance, particularly for Mudharabah-structured products.

Proposed Method for IBF Product Engineering

Choice experiment technique is a micro-econometric tool for estimating preferences and WTP for products or services. For instance, in the context of Mudharabah financing, such non-market value could include estimating the worth of a contract assessed in the context of the profit-sharing percentage that an entrepreneur (Mudharib) is willing to give-up as a profit share to the investor bank (i.e., Rabul Maal). It is based on an alternative to conventional utility theory popularised by Lancaster (1966) as noted in Bamiteko and Adebiy (2020). This utility theory variant, most commonly referred to as the characteristic theory of value, asserts that the utility derived from the consumption of goods or services does not depend on the object of consumption itself, but its characteristics or attributes which distinguishes it from others. To estimate parameters under this utility framework, the econometric model employed is based on the random utility theory −RUT (Manski, 1977; McFadden, 1974; Bamiteko & Adebiyi, 2020).

Choice experiment technique developed from Conjoint Analysis in marketing and transport economics literature (Adamowicz et al., 1998). It has since the fairly recent past, attracted the attention of experts in environmental economics, health economics, and agricultural economics who are interested in estimating economic value for non-market goods and services. Bennett and Birol (2010) noted that the application of choice experiment technique in other disciplines is gaining popularity due to its relevance in unlocking markets hidden potentials. Yet, there seem to be no study applying this method in Islamic finance, despite its relevance.

Stages in Conducting Choice Experiment

Generally, analysis in choice experiment studies is done in six main phases. These include attribute selection stage (Adam et al., 2020), attribute levels assignment stage, experimental design method determination stage, choice set construction stage, preference measurement stage, and estimation stage (Hanley et al., 2001). In addition, applications that are more recent include post-estimation analysis, comprising the simulation of MRS and elasticities based on changing scenarios (Grosjean et al., 2010; Hensher et al., 2005). In the analysis phases enumerated above, the five phases that precede the estimation stage are done before survey data collection. Due to limited space, the five enumerated pre-survey analytic phases are not discussed in the current paper.

Analysis Phase in Conducting Choice Experiment

This phase succeeds the preference measurement phase of analysis which entails the presentation of myraids of different configuratons of Mudharabah product characteristics or other products and services. In the estimation phase, the RUT, which is the econometric basis of choice experiment technique, assumes the utility function of a good or service to be disaggregatable into two parts namely, deterministic and stochastic components. In the context of Islamic banking products such as the Mudharabah finacing, it could be contended that banks' clients' utility for shariah-compliant structured product *i* depends on the product's attributes (Z) as well as the socio-economic characteristics (S) of the client (Hanley et al. 1998). This is as represented in equation (1).

$$U_{in} = V(Z_{in}, S_n) + \varepsilon(Z_{in}, S_n) \qquad (1)$$

From the above equation, the probability that client *n* will choose shariah-compliant structured product *i* over other shariah-compliant structured products *j* is given by:

$$\text{Prob}(i/K) = \text{Prob}\{V_{in} + \varepsilon_{in} > V_{jn} + \varepsilon_{jn}; j \in K\} \qquad (2)$$

where K is the universe of alternative structures, called choice set. It is assumed that the error terms of the utility function are independently and identically distributed (IID) (Hensher et al., 2005). Although there exist several methods, this model is commonly estimated using the multinomial logit (MNL) regression procedure. A consequence of this modeling alternative lies on its assumption in respect to the property of independence of irrelevant alternatives - IIA (Louviere et al., 2000). The IIA stipulates that the probability of choosing an alternative (product or contract) over the others depends entirely on the utility peculiar to the alternatives. This implies that the removal of any other alternative from the complete set of feasible alternatives will not alter the choice of individuals for a given alternative or product.

In reality, this property peculiar to MNL is easily violated when alternatives considered are close substitutes. This may also be the case where there exist heterogeneity in preferences among decision-makers or bank clients (Hensher et al 2005; Othman, 2002). If such occurs, more sophisticated techniques such as the random parameter logit model (RPL) or the nested logit model (NLM) is used in place

of the commonly used MNL (Hensher & Greene, 2003; Hensher & Greene, 2002). Based on this framework, the probability of a client choosing a structured product *i* is given by:

$$\mathbf{Pr}(i) = \frac{\exp^{\mu V_i}}{\sum_{j \in K} \exp^{\mu V_j}} \qquad \text{(Greene, 2003)} \qquad (3)$$

where $V_i = V(Z_i, S)$; a utility function similar to equation (1). Z_i is a vector of the Islamic bank's product (Mudarabah) attributes while S is a vector of clients' choice-influencing socio-economic characteristics. Meanwhile, μ is a scale parameter. It is usually assumed to be equal to 1 to denote constant error variance.

The most basic econometric specification of the utility function in equation (1) assumes an additive structure which includes only the attributes of alternative products or services.

$$V_i = \beta_0 + \Sigma\beta_i X_i + \varepsilon \qquad (4)$$

From equation (4), β_0 is an alternative specific constant (ASC), β_i is a vector of coefficients for the vector of attributes X_i. The effect of attributes on the choices are measured by the *X* variables while β_0 denotes part of the influence of unobserved variables on choices. Equation (4) could then be extended to include decision-makers' socio-economic characteristics. That allows for interactive influences to be observed (Greene, 2003).

Post-Estimation Analysis; Computing MRS in Choice Experiment

Choice experiment model allows for the computation of MRS among the characteristics of an Islamic finance products. For instance, this technique allows a product engineer to determine how much profit sharing ratio clients will be willing to accept in a bank's Mudharabah financing contract as against a Musharakah financing contract. On the Bank's deposit side, the computation of MRS could help a product engineer to determine the minimum amount of compensation depositors will require leaving their deposits in a particular account relative to another. The MRS is computed based on the implicit worth (price) of a contract's or finance product's characteristics or attributes.

When the attribute sacrificed is compensation amount, the trade-off computed is described as 'implicit price', in this case, marginal willingness to accept compensation. This reflects the amount of money clients are willing to accept for leaving their deposits in a particular account (deposit product). The MRS for attributes with three levels could be computed using equation (5) (Adamowicz et al., 1993; Scarpa et al., 2003; Karousaki & Birol 2008: Agimass & Mekonnen, 2011).

$$MWTA/MWTP = -1 \times \left(\frac{\hat{\beta}_{Non-Monetary\ Attribute\ of\ a\ contract}}{\hat{\beta}_{Monetary\ Attribute/Sacrifice\ attributes}}\right) \qquad (5)$$

Meanwhile, if the non-monetary attribute of interest has just two attribute levels, the relevant formula for computing MRS becomes:

$$MWTA/MWTP = -2 \times \left(\frac{\hat{\beta}_{Non-Monetary\ Attribute\ of\ a\ contract}}{\hat{\beta}_{Monetary\ Attribute/Sacrifice\ attributes}}\right) \qquad (6)$$

However, in cases where the IIA assumption is not achieved, necessitating the use of RPL model, the MRS formula for attributes with three levels become:

$$MWTA/MWTP = -1 \times \left(\frac{\hat{\beta}_{Non-Monetary\ Attribute\ of\ a\ contract} + \sigma \cdot \theta}{\hat{\beta}_{Monetary\ Attribute/Sacrifice\ attributes}}\right) \qquad (7)$$

where $\hat{\beta}_{Non-Monetary\ Attribute\ of\ a\ contract}$ is the estimated random parameter, σ is its estimated standard error, θ denotes the probability density function (*pdf*) of the distribution assumed for the random parameter. Meanwhile, denotes the reference monetary attribute of attribute sacrificed. Depending on what measure of MRS (MWTP/MWTA) is used, the computed value prior to the provision of a product in the market will guide product engineers on what specific attributes in the product structure could be manipulated as a bait to trigger patronage.

Conclusion

Risk-sharing financing products of Islamic banks are currently the least subscribed in the market, relative to alternative financing products. This paper presents a micro-econometric utility-based tool of product structuring which is yet to attract popularity among Islamic finance experts. The paper demonstrates how choice experiment technique could be used to determine Islamic finance product-attributes that are significant determinants of clients and depositors' product subscription choice. In an explanation specific to risk-sharing Islamic Banks financing products, the study emphasises the ability of the technique in providing estimates of Islamic banks' depositors' and clients' minimum profit-sharing ratio bid. In addition, the technique also provides a measure of relative importance of Mudharabah contract's attributes via its ability to provide estimates of MRS among products characteristics. This information is important to product engineers in determining the feasibility of introducing products to the market. If the product engineer knows the contract or product with the largest MRS, such could be used as baits to trigger subscribers' choice of the product in the market, most especially now as covid-19 challenges wane.

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