



Research Article

Nonlinear effect of Islamic financing on economic stability: A case of equity and debt financing

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ABSTRACT

The main purpose of this study is to differentiate between the effects of two major categories of financing of Islamic banks on the economic stability of the selected countries. This study determines the nonlinear effect of equity-based and debt-based financing of Islamic banks to assess how the stability of the economy can be achieved. This study acquires the data on Islamic banking product-wise financing at a national level from the Islamic Financial Service Board (IFSB), and the data on industrial production index is selected from International Financial Statistics for selected countries. The sample size comprises of all the countries included in the IFSB. The data ranges from 2014Q1 to 2019Q4. The economic stability is estimated using the GARCH volatility approach, and the nonlinear ARDL model is used to determine the causal effect of Islamic banking product wise financing. This study clarifies the empirical relationship between Islamic banking equity-based financing and debt-based financing and whether macroeconomic stability is linear or quadratic in terms of the marginal effect of financing, which helps policymakers to constitute strategies for expanding the size of Islamic banking financing. The results identified the inverted U-shaped effect of equity-based financing types on output instability. At the same time, both financing types are not causing price instability. The outcomes are instruments for the central bank to optimize the Islamic banking financing structure to achieve the goal of product-wise financing of economic stability.

Keywords: *Equity-Based Financing; Debt-Based Financing; Quadratic Functions; Islamic Finance; Economic Stability*

1. INTRODUCTION

Literature has pointed to many established factors that can lead to economic growth, but financial system development is one of the most important factors. Financial institutions are the most critical part of the economic system regarding their effect on economic growth and development (Bist, 2018; Chen & Sivakumar, 2021; Colombage, 2009; Usman, Jahangir, et al., 2022; Usman, Kousar, et al., 2022). A country with a stable financial system leads to a smooth transition to economic growth as compared to an unstable financial system. A country with a developed financial system leads to higher growth and attains higher per capita income than less developed financial countries (Mitchener & Wheelock, 2013; Narayan & Narayan, 2013), as it provides financial support to the private sector and

government (Akdogu & Umutlu, 2014; Gulzar, 2018; Mutlugün, 2014). The financial sector mobilizes saving, facilitates resource allocation, allows risk diversification, and ensures returns stability. In Central and Eastern Asian countries, banking is one of the most important sectors contributing to financial development (Ginevičius et al., 2019). The growth in the banking sector increases saving mobilization and enhances capital growth (Bernard Azolibe, 2022; Berthelemy & Varoudakis, 1996; Hammami & Smida, 2022; OSUJI, 2020) as it provides financial services to the general public, creates new capital, and removes capital deficiency through investment and saving in the country. Thus, it helps to ensure social and economic stability and development. It is also an important source of finance and credit for industry and trade (M. S. Hassan et al., 2019). A study of 18 OECD countries found a positive and significant link between banking sector stability and real output growth (Jokipii & Monnin, 2013). A similar outcome is shown by (Bayar et al., 2021).

There are two banking systems worldwide: (1) conventional and (2) Islamic. The conventional banking system is based on interest, and the major purpose is to maximize wealth through interest (Qian & Velayutham, 2017). The Islamic banking system is based on divine commerce law known as Fiqh ul Muamalat (Ishak & Asni, 2020).

The Islamic financial system is less risky and financially stronger than the conventional system (Čihák & Hesse, 2008) because it engages real assets. In the long run, Islamic banking and economic growth are positive and significantly correlated (Furqani & Mulyany, 2009; Lebdaoui & Wild, 2016a, 2016b). This is because Islamic financial expansion is only possible with the expansion of new assets or existing asset performance (Usmani, 2021). Islamic banks have a profit-sharing agreement with depositors, and their earnings from investment in businesses are based on growth and success. While in conventional banks, depositors get returns on their predetermined interest rate irrespective of the investment outcome (Arshed & Kalim, 2021). This makes Islamic deposit returns more integrated with economic activity, whereby depositors earn more when the economy is booming and contributes to easing economic depression (T. Hussain et al., 2020). Unlike conventional banking, where lending and leasing instruments are commonly used for all financing purposes, Islamic banks have specialized tools with their own product space (Arshed & Kalim, 2021). The main products of Islamic banks are different (Murabaha Musharakah, Mudarabah), and every Islamic product has a different target market (Ahmed, 2011).

Islamic banks have products that are Shari'ah compliant. Such products (Murabaha, Salam, and Ijarah) have predetermined and fixed returns for banks but comply with Shari'ah rulings. The tools which harmonize the working of Islamic banks with conventional banks are cost plus profit sale (Murabaha); a rental agreement (Ijarah); spot payment for future delivery (Bai Salam); sale on deferred payment (Bai Muajjal); order to manufacture (Istisna); house financing with gradual transfer of ownership (Diminishing Musharkah); a partnership in the capital (Musharkah); and a partnership of capital and skill (Mudarabah). Following the rule of substance over form, it can be concluded that the chief difference between conventional and Islamic financing is Shari'ah-based (Hanif, 2014).

Hence based on the economic needs, the effects of different Islamic banking products are different on growth (Arshed et al., 2020). In the case of Pakistan, there is a supply-side

relationship between product-wise Islamic banking and economic growth and specific Islamic products and macroeconomics variables (gross fixed capital formation, regulation, skilled labour force, tax rates) have a positive and significant effect on poverty reduction and enhance economic growth (Arshed & Abduqayumov, 2016; Cham, 2018; Siddique et al., 2020). In Asian countries, all Shari'ah-compliant products, particularly salam financing, have the highest impact on economic growth (Pratami et al., 2022). The concept of interest rate can be replaced with Musharakah. Using the return rates of Musharakah, a central bank can control the monetary policy, allocation of resources and economic activities (Adela, 2019). This study divides the shari'ah compliments products into two groups (Equity-Based and Debt-Based Financing). Equity-Based financing is (Risk Sharing, i.e. Risk to Banks Equity) and Debt Based Financing (Usufruct Based and Risk Transfer, i.e. equity risk taken by the customer). They are shown in Figs 1 and 2.

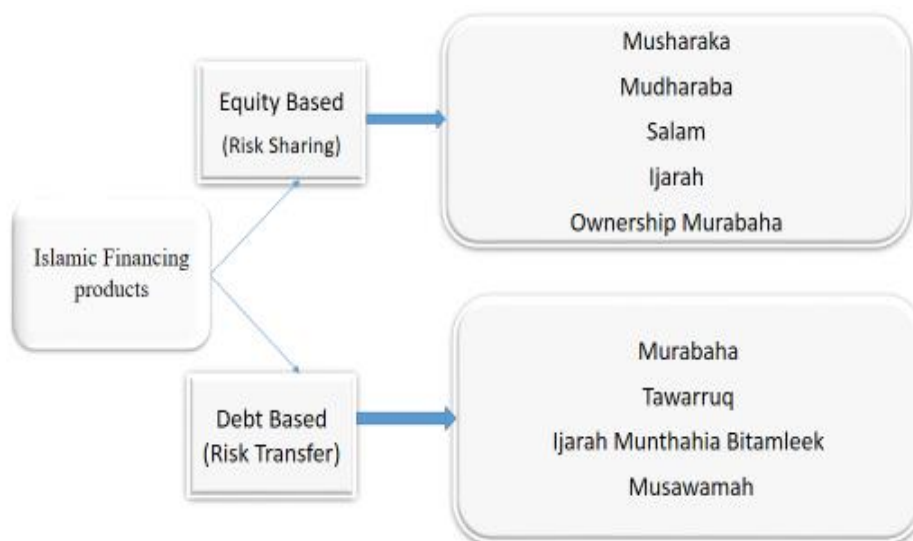


Fig. 1. Product wise Financing (Equity Base and Debt Based). Source: Usmani (2021)

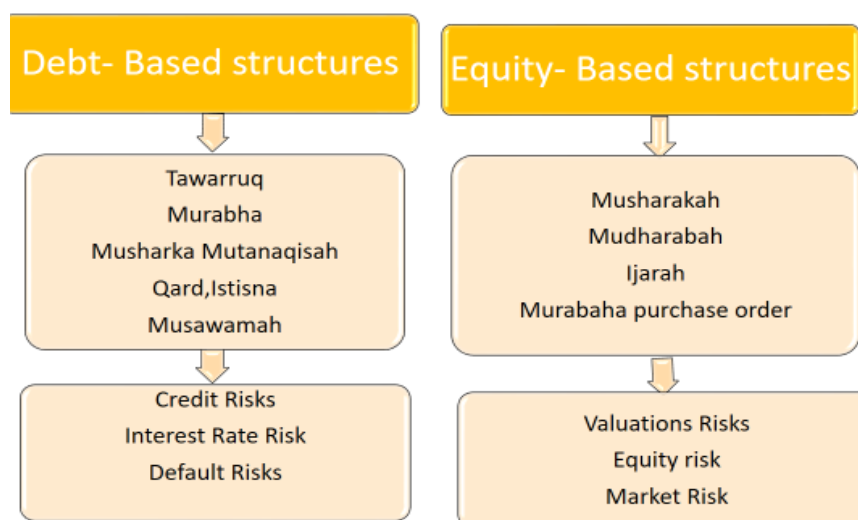


Fig. 2. (Equity Based Structure and Debt Based Structure)

Source: <https://islamicbankers.me/2015/01/28/equity-based-financing-vs-debt-based-financing/>

Equity based financing and debt based financing are two modes of financing which are used in Islamic and conventional financial systems. In debt financing, one can borrow usufruct without transferring ownership rights; in equity financing, someone invests in a business in exchange for some percentage of ownership (Maikabara et al., 2021). Equity based financing (risk sharing) and debt based financing (risk transfer) are the main models in Islamic intuitions to help small and medium entrepreneurs to facilitate them in their business based on shariah compliance (Dolgun & Mirakhor, 2021; Jatmiko et al., 2022). Islamic debt-based financing is used for home financing, vehicle financing and many others. Debt based Islamic financing includes (Murabaha, Salam, Istisna, Ijarah, Musharakah Muthanaqisah) and equity financing is based on partnership (profit and loss sharing). Equity based contracts are (Mudarabah, Musharakah, and ownership Murabaha). In equity-based financing, two or more parties are involved in real economic activities, share capital, management partnership, and share profit and loss according to the proportional ratio as in Musharakah and Mudarabah contracts. Both types of financing (Equity and Debt based) can differently affect the economy because they have different natures of risk in them (R. Hassan, 2011; Ryandono & Wahyudi, 2021; Sapuan, 2016). The main purpose of the study is to explore the causal role of the supply of Islamic financing in the economy of selected countries (in table 1), whose data is provided by IFSB for Islamic financing. This study finds the differences in the effect of equity-based and debt-based Islamic banking financing on economic stability in terms of production and prices in the long run.

To achieve the objective, the following questions will be addressed in this study:

1. Is there a difference between the effects of equity-based and debt-based financing of Islamic banks on economic stability using the multinational quarterly panel data of 12 selected countries?
2. Do both financing types have a quadratic effect on the economic stability using the multinational quarterly panel data of 12 selected countries?

Following the introduction, this study is organized as follows: the 2nd section discusses the literature review related to product-wise Islamic Financing and economic stability, problem statement, questions, study motivation and research gap. The 3rd section discusses the theoretical model, followed by methods in section 4. In the 5th section, a conclusion is drawn, and some policy implications are highlighted.

2. LITERATURE REVIEW

The banking sector is considered as a major segment of all the world economies. The bank's main objective is to provide community loans and other financial services (Kuswara et al., 2019). Islamic finance has become an integral part of the financial system in many countries. The Islamic finance market is growing day by day globally because of strong and halal investment in different sectors of the economy like industries and infrastructure, Sukuk and bonds, which lead to economic growth (Kuswara et al., 2019; Majid & Kassim, 2015; Rosylin & Bahlous, 2013). Its resilience and performance have led to its recognition and demand in non-Muslim countries too. Tohirin and Ismail (2011) discuss two types of

financing, equity-based financing (PLS) and debt-based financing (rental/market based). Equity-based financing is more significant as it pushes economic growth to a higher level by engaging capital in new ventures and ideation. Tabash and Dhankar (2014) examine that Islamic financing helps to increase economic growth and helps achieve social justice, and reduce poverty and inflation. Bakhita's (2017) study shows a significant relationship between the Islamic mode of financing and economic growth.

Islamic bank has specialized tools which have their own product space. Every Islamic product has a different target market and hits different sectors of the economy (the agriculture sector, industrial sector and services sector) of the economy. The hybrid product versions can create a higher linkage effect by engaging several sectors. Islamic contracts provide farmers with financing on a Shari'ah-compliant basis (bay-al Salam)(Atah et al., 2019; Rasheed & Mudassar, 2010). Hassan et al. (2011) discuss that Salam financing is the most important Islamic mode of financing in Malaysia and plays an important role in economic growth in Malaysia. Noordin and Saiti (2018) analyze that Salam-based crowd funding is Shari'ah compliant investment and provides funding to farmers and investor, and boost the agricultural sector and economic growth in Afghanistan. Sardar et al. (2013) study that Islamic banks provide financing to all groups of farmers, especially small farmers, to enhance the productivity of their farms. In Indonesia, Islamic banks manage financing to promote the agriculture sector through waqf funds and provide farmers subsidies (Mustain & Fakhrunnas, 2017). Huda (2012) discussed the small enterprise issues in developing countries and found that one main issue is the lack of financing. For this, Islamic banks offer products like Musharakah and Mudarabah to facilitate SMEs in long-term projects with high-risk return projects and support economic growth in developing countries.

Further, Adela (2019) investigates the impact of Islamic Financing Musharakah as an alternative to the interest rate in the Islamic economy and finds out that the central bank can control monetary policy, economic activity, and resource allocation by the return of Musharakah financing. Chowdary et al. (2018) discuss that risk sharing instruments significantly affect economic growth. Also, Masrizal and Trianto (2022) examine that profit, and loss-sharing financing positively affects economic growth. Shaikh (2011) discusses that the Murabaha mode of financing is more acceptable and useable Islamic financing for financial development. Millanei et al. (2016) examine that Istisna financing enhances economic efficiency. Hussin et al. (2012) studied Islamic instruments like Sukuk Al-Ijarah as a source of financing funds and capital liquidity for economic growth in Malaysia. Yildirim et al. (2020) investigate that the relationship between the Sukuk market and economic growth is positive, and a 1% increase in Sukuk market development also increases economic growth.

Stability is very much significant for economic systems and growth therein. Previous literature has generally compared Islamic banking product-wise financing with growth (Indrawan & Rahman, 2020; Kuswara et al., 2019; Majid & Kassim, 2015). A lack of studies exist evaluating the effects of countries' Islamic banking product-wise financing on economic stability and prices. Assessing the stabilization effect is crucial for developing countries to help them reduce the cost of deviation from the plans and targets (Stiglitz, 2018). In

empirical studies, the positive effect of interest rate policy depends on the real money balance (Schabert, 2009; Schabert & Stoltenberg, 2005), which can be increased if the monetary policy is extended using Islamic financing, which is asset based.

Changes in the economic interest rates are the outcomes of changes in the monetary market that ought to achieve certain targets. Most of the banking products are pegged with interest rates as a benchmark. Hence whenever there is an increase in interest rate, there is an increase in the cost of capital. Under this scenario, the businesses and countries with a higher ratio of debt or longer tenure of debt, an increase in interest rates increases the burden, slowing their production. Hence this study has used interest rate as a controlling factor which explains how an increase in financing influences the economy (Abbassi & Linzert, 2012; Kaen & Hachey, 1983; Tadle, 2022). In 1990s, the high real interest rate constrained the economic growth in South Africa (Aron & Muellbauer, 2002). The conventional financial system relies on interest rates in order to conduct its monetary policy (Rani & Kumar, 2018), but studies have shown that consistent use of interest rates leads to interest rate volatility, which has a significant effect on economic performance, monetary policy (Choudhry, 1999; Nkwede et al., 2019) and it reduces the economic growth (De Cesare & Sportelli, 2005; Gavin, 2012; Serrano & Summa, 2015). Previous studies done are regionally based (Aziz et al., 2020; M. A. M. Chowdhury & Haron, 2021; Mateev et al., 2021), while this study expands the horizon to a multinational quarterly panel data of twelve countries (Bahrain, Brunei Darussalam, Kazakhstan, Jordan, Oman, Pakistan, Sudan, Saudi Arabia, Indonesia, Malaysia, Saudi Arabia, United Arab Emirates, and United Kingdom. The data is acquired from 2016Q1 to 2019Q4, including product-wise Islamic financing data divided into two financings (debt financing and equity financing). This study adds to the literature by checking the empirical causal contribution of Islamic banking equity-based and debt-based financing to economic output and price stability.

3. THEORETICAL MODEL

The empirical literature has ignored to explore the nature of causality between Islamic banking overall financing and economic stability. According to supply leading theory, the financial sector growth increases the development of the banking sector. And if economic growth increases financial sector growth, it is known as demand following theory (M. S. Hassan & Kalim, 2017). Both studies are available, but the majority advocate supply leading theory. Whereby the financial sector development exogenously increases the productivity of capital, causing growth.

The asset engagement, integration of returns to investment with returns to deposits and harmonization of the rate of returns in the economy using Islamic banks help the economy to achieve higher targets and ensure saving mobilization and real capital productivity. Islamic banking promotes a system of participative form of saving of households and asset performance oriented conclusion of debt agreements in firms (Alam et al., 2017; Alamad, 2019; Ariff & Iqbal, 2011; Diallo & Gundogdu, 2021; El-Gamal, 2000; Kettell, 2010; Warde, 2010) lead to mitigation of several forms of economic and financial risks (El-Gamal, 2000; Masruki et al., 2011). Timely availability of financing also helps businesses to engage in long term planning to acquire raw materials, do R&D investments and build required inventory to

meet the present and future demand for their products (DeCampos et al., 2022; Huang et al., 2015; A. Hussain & Taqi, 2014; Kim & Zhao, 2021; Schmidt & Wilkins, 2013; Song et al., 2018). Further higher level of financing means increased financial development and efficient monetary policy transmissions, which can help intervene against macroeconomic shocks. Hence it is hypothesized that an increase in Islamic financing may lead to an increase in output and general price stability (Ahiadorme, 2022; Jiang et al., 2022; Neaime & Gaysset, 2022).

Since banking financing is booked in the firm's accounts in the form of debt, very high reliance on it may also be costly to businesses. Studies have shown that an increase in the debt-to-GDP ratio is initially beneficial for businesses and growth, but after a certain threshold, it creates a debt burden which reduces the profits and GDP. This inverted U shaped/nonlinear relationship is called Debt Laffer Curve (Abbas & Christensen, 2007; Bayer et al., 2020; Tahar et al., 2022). This study incorporates this nonlinear behaviour using the variable returns to scale of financing with respect to economic growth, in which Islamic banks' equity and debt financing are proposed as Solow inputs. Figs 2 and 3 posit the exploration of quadratic/nonlinear effects of an independent variable on a dependent variable, which is discussed in detail by (Haans et al., 2016). Previously several studies have explored the quadratic effect of financial market development on economic growth (Deidda & Fattouh, 2002; Doumbia, 2016; Soedarmono et al., 2017), inflation (Manzoor & Arshed, 2021) and business growth (Sohail & Arshed, 2022).

Here this study proposes that the effect of financing on growth could be U-shaped or inverted U-shaped with respect to output and price stability explained via Debt Laffer Curve (Claessens, 1990). In literature, both types of nonlinear relationships are discussed. For discussing the curvilinear relationships, literature has also used the derived versions of the Kuznets curve, which showed the inverted U-shaped relation with income inequality (Kuznets, 2019). Later on, many studies extended it to Environmental Kuznets Curve. The investigation of both U-shaped or inverted U-shaped relationships are denoted by this study as the Financing – Output Stability Kuznets curve and Financing – Price Stability Kuznets curve. This study further adds to this theory by exploring the role of Islamic financing in the forms of equity or debt financing, verily, both could have a different role to play in different economies based on their structure.

This study has used the framework of (Haans et al., 2016) to explain the nonlinear relationship. For the case of an inverted U-shaped relationship, initially, with an increase in financing is hypothesized to reduce stability. Fig 3(a) shows that an increase in financing reduces the cost of capital, increasing firms' supply of goods and services and stabilizing the output and market prices. While in Fig 3(b), the diagram shows an increase in financing via risk sharing or on rent, there is increased liability risk of debt repayment, and there is an increase in the cost of capital because of an increase in the proportion of partnership. This increases the cost of production, leading to a reduction in supply and an increased cost-push in prices. Since this increased risk occurs in different sectors at different times because of the flow of funds from the financial sector, there is a visible increase in volatility/instability of output and prices. Integrating both positive and negative effects together forms an inverted U-shaped relationship (as discussed by (Haans et al., 2016)).

Joining both linear relationships, Fig 3 proposes that the increase in financing follows diminishing returns to scale with respect to the stability of output and prices in the economy. This inverted U-shaped relationship points to the fact that economies must optimize the debt generated from Islamic financing to maximize stability which is the highest point of the inverted U shape relationship between phase 1 and phase 2. Sohail and Arshed (2022) analyzed the debt financing share with new business registration and confirmed an inverted U-shaped relationship for 16 countries.

Conversely, financing can have a U-shaped effect on output and price stability. This type of relationship can only exist in a scenario where the economy has an immature financial system, whereby an increase in financing leads to an increase in fixed capital investments in infrastructure development, which reduces the liquid assets available for output production (Song et al., 2018). This way, when the economy perceives an increase in financing, it initiates infrastructure development for a long-term increase in production. This reduces the output and increases the prices, causing instability (Fig 4a).

Further, with a consistent rise in financing, the maturity of the financial sector is achieved. After this stage, financing increases production because of economies of scale, as firms engage credit in the running business. Hence one may experience an increase in output stability and prices in response to the expansion of financing (Manzoor & Arshed, 2021) (Fig 4b). Joining both linear relationships together (Fig 4), we can conclude that a labour-intensive or low financially developed economy has first to develop the appropriate fixed capital when there is an increase in financing and after the gestation period, financing can help in increasing production and stabilizing prices in the economy (Acemoglu & Zilibotti, 1997; Aghion et al., 2007; Rousseau & Wachtel, 2011; Song et al., 2018).

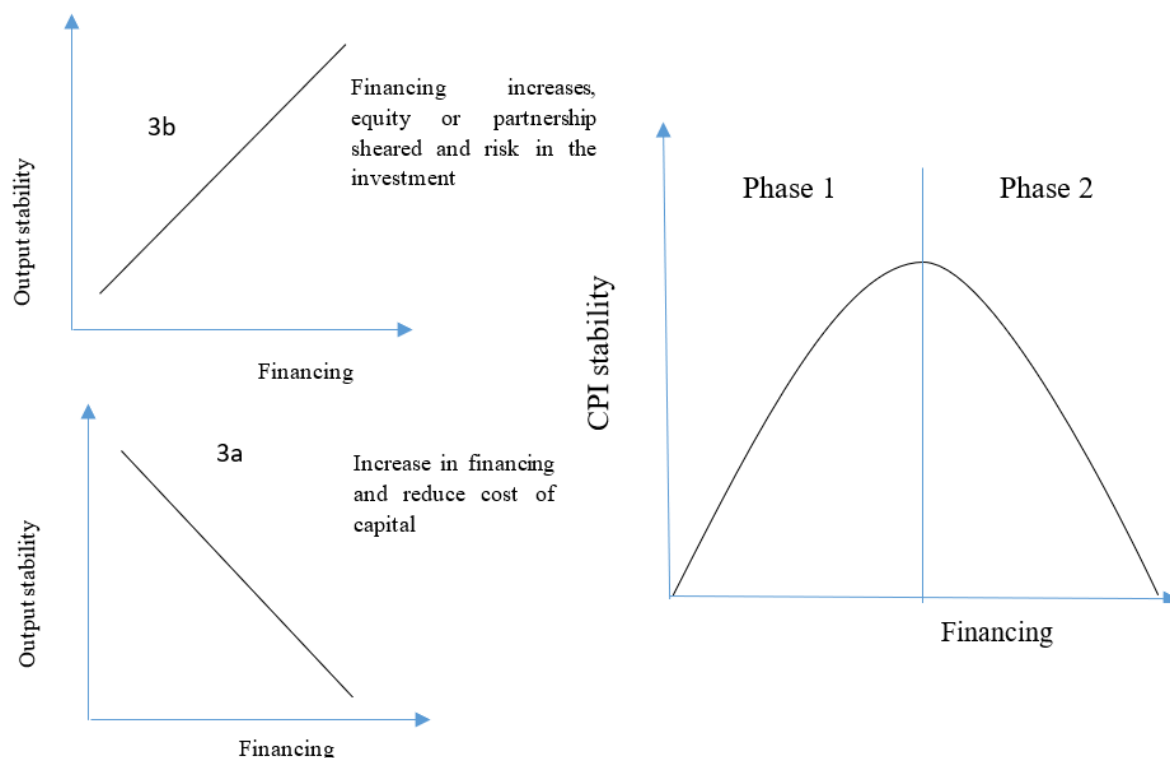


Fig. 3. Financing – Output Kuznets Curve

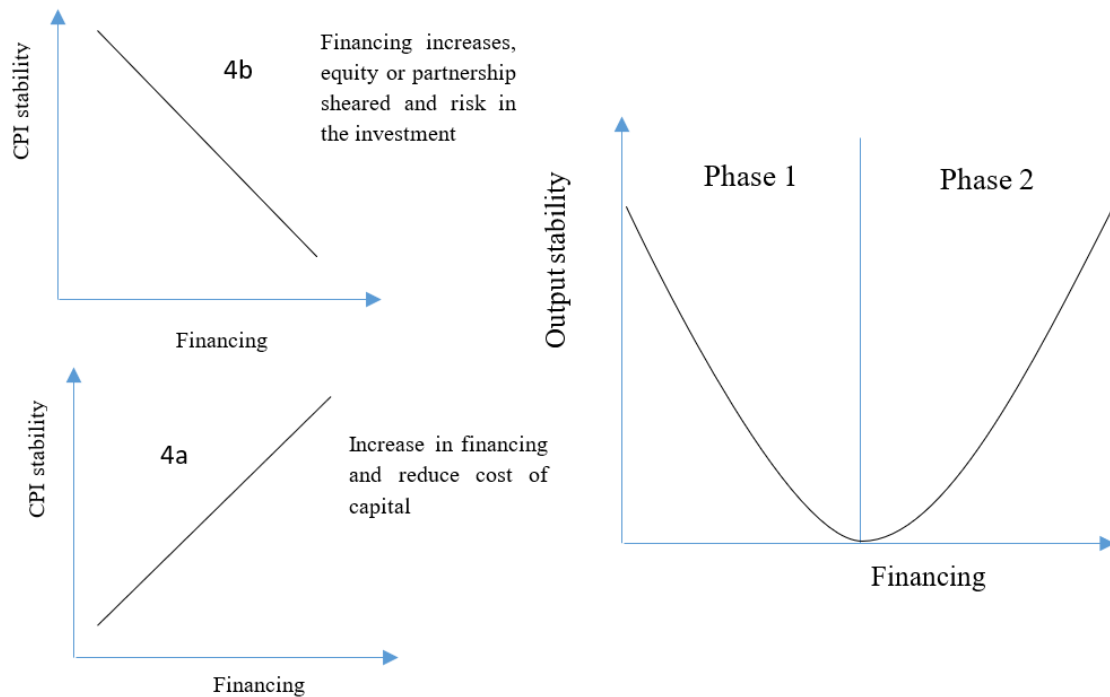


Fig. 4. Financing – CPI Kuznets Curve

4. DATA AND METHODS

4.1. SAMPLE SIZE AND POPULATION

This study acquires Islamic banking financing data at the national level from Islamic Financial Service Board. The data on manufacturing and CPI are collected from International Financial Statistics for selected countries. The quarterly data is accessed between 2014 Q1 to 2019 Q4 to form an unbalanced panel data of 12 countries shown in table 1.

Table 1. List of Countries

Country Name	Country Name	Country Name
Bahrain	Kazakhstan	Sudan
Brunei Darussalam	Malaysia	United Arab Emirates
Indonesia	Oman	Pakistan
Jordan	Saudi Arabia	United Kingdom

Table 2 provides the details of the variables used in the study. The data for IPI is used as an instrument of output and CPI as an instrument of general prices. Both are selected dependent variables of the study. While other variables include Equity and Debt as an instrument of Islamic Equity financing and Islamic debt financing in the economy. Lastly, INTR is used as a market interest rate to assess the capital cost change. Certainly, all forms of Islamic financing are benchmarked to market cost of capital, so the use of INTR assesses the role of external change in the cost of capital on the stability of the output and prices.

Table 2. Variables and data sources

Variables	Symbols	Units	Source	Expected Sign
Consumer Price Index	CPI	Index (2015=100)	IFS	Dependent variable
Industrial Production Index (IPI)	IPI	Index (2015=100)	IFS	
Equity Financing in local currency unit	Equity	% of domestic credit to private sector	IFSB & WDI	Negative
Debt Financing in local currency unit	Debt	% of domestic credit to private sector	IFSB & WDI	Negative
Interest rate	INTR	% Per annum	IFS	Positive

4.2. EQUATIONS TO BE ESTIMATED:

The following section develops the equations to estimate financing-output stability and financing-price stability Kuznets curves discussed in section 3. Consider a quadratic function in equation 1. Here the nature of the Kuznets curve is determined by the values of α_1 and α_2 , respectively.

$$Y = \alpha_0 + \alpha_1 X + \alpha_2 X^2 + e_t \quad (1)$$

Table 3. Nonlinear Relationship

Coefficient of Equity or debt financing (α_1)	Coefficient of Equity or debt financing squared (α_2)		
	Positive (+)	Negative (-)	Insignificant
Positive (+)	Exponential Increase	Inverted U shaped	Linear positive slope
Negative (-)	U shaped	Exponential Decrease	Linear negative slope
Insignificant	Linear Positive slope	Linear negative slope	No effect

Table 3 provides the nature of the relationship. Here if both α_1 and α_2 are positive, it exponentially increases, and if α_1 is positive and α_2 is negative, it is inverted U-shaped. If both α_1 and α_2 are positive and insignificant, respectively, it is a positive linear slope. If α_1 is negative and α_2 is positive, it is U-shaped. If α_1 and α_2 are both negative, it is exponentially decreasing, and if α_1 and α_2 are negative and insignificant, respectively, it is a linear negative slope, and if both are insignificant, then it has no effect (Chiang & Wainwright, 1984).

To determine the nature/shape of a linear or nonlinear relationship between equity and debt Islamic financing and the macroeconomic stability of output and prices using Table 3. This table specifies the shape of the curve based on other values of coefficients. This study estimates two equations with output stability and price stability using the specification provided by (Haans et al., 2016).

In Figs 3 and 4, there is a theoretical explanation of a nonlinear relationship which can be U-shaped and inverted U-shaped types. A square form is added to check equations 2 and 3.

$$Stab_o = \alpha_0 + \beta_1 equity_{it} + \beta_2 equity_{it}^2 + \beta_3 debt_{it} + \beta_4 debt_{it}^2 + \beta_5 INTR_{it} + e_t \quad (2)$$

$$Stab_p = \alpha_0 + \beta_1 equity_{it} + \beta_2 equity_{it}^2 + \beta_3 debt_{it} + \beta_4 debt_{it}^2 + \beta_5 INTR_{it} + e_t \quad (3)$$

Here $Stab_o$ is output stability, $Stab_p$ is price stability and e_t is random residuals.

4.3. ESTIMATION APPROACH

The output and price stability are estimated using the GARCH volatility approach. This method estimates the time varying portion of the variance of the output and prices, representing the deviations of the output and prices from their equilibrium. The nonlinear panel quantile ARDL model determines the Islamic banking product wise financing causal relationship with manufacturing and CPI in the long and short run (Asghar & Hussain, 2014; Bildirici, 2014; Esmaeil et al., 2020; Simionescu et al., 2021).

5. 5. RESULT AND DISCUSSIONS

Table 4 provides the descriptive statistics and correlation among the selected variables. Here we can see that INTR has a mean value higher than its standard deviation showing that it is underdispersed while all other variables are overdispersed. Further, Equity and Debt are statistically non-normal. This study uses the central limit theorem to assume they are asymptotically normal, as the overall sample is above 30. Further from the correlation table, all variables are negatively associated with output instability and positively associated with price instability.

Table 4. Descriptives and Associations

Descriptive Statistics				Correlation Matrix				
Variables	Mean	Std dev	JB Test (Prob.)	Stab _o	Stab _p	Equity	Debt	INTR
Stab _o	0.000	3.285	2.406 (0.300)	1.000				
Stab _p	-1.285	3.307	4.523 (0.104)	-0.127	1.000			
Equity	8.552	13.081	12.436 (0.002)	-0.036	0.284	1.000		
Debt	54.615	35.956	6.161 (0.046)	-0.028	0.282	0.278	1.000	
INTR	8.444	4.208	3.713 (0.156)	-0.004	0.828	0.515	0.207	1.000

While discussing the financing indicators with the instability, Fig 5 presents the inverted U-shaped association between equity financing and output instability which corresponds to the hypothesis discussed for output stability in Fig 4. While Fig 7 shows that equity financing has almost no association with price stability.

Similarly, while comparing debt financing and stability, Fig 6 shows a positive association between debt financing and output instability. Lastly, Fig 8 shows a U-shaped association between debt financing with price instability.

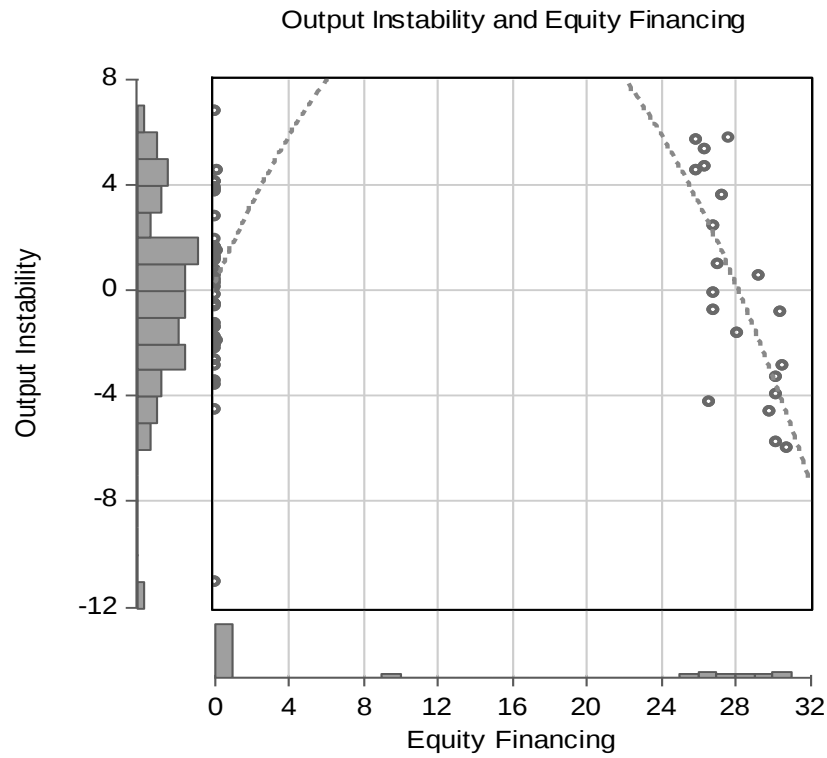


Fig. 5. Scatter plot and quadratic fit between equity financing and output instability

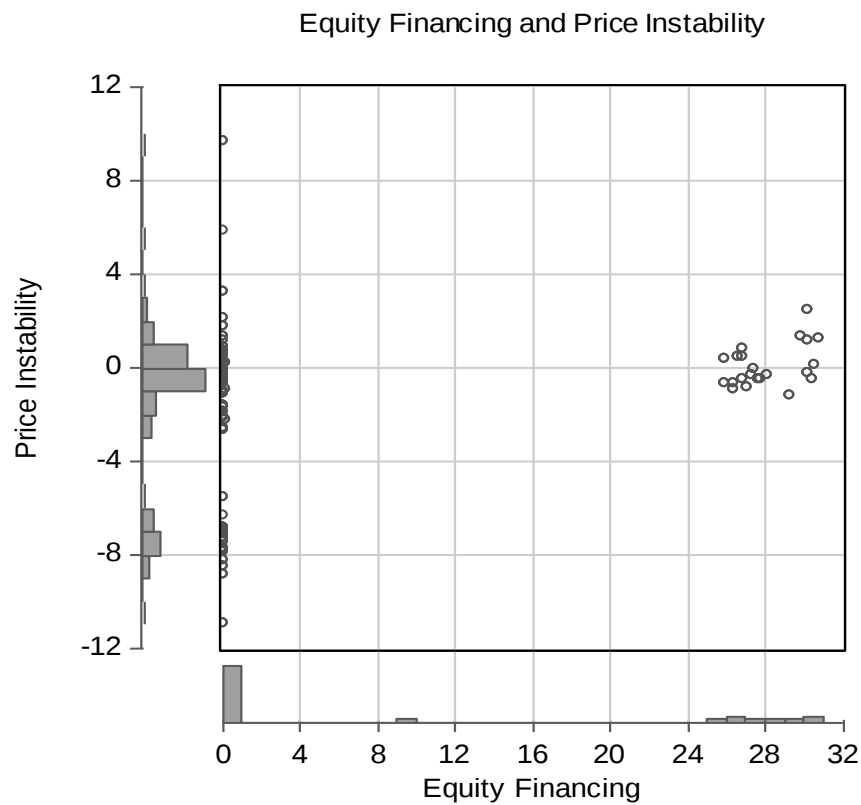


Fig. 6. Scatter plot and quadratic fit between equity financing and price instability

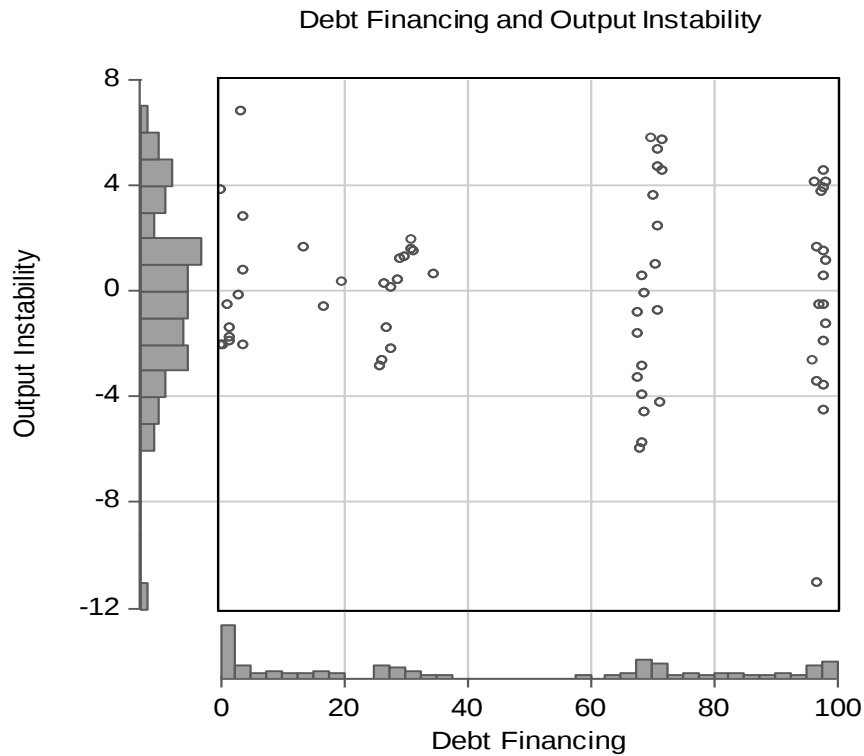


Fig. 7. Scatter plot and quadratic fit between debt financing and output instability

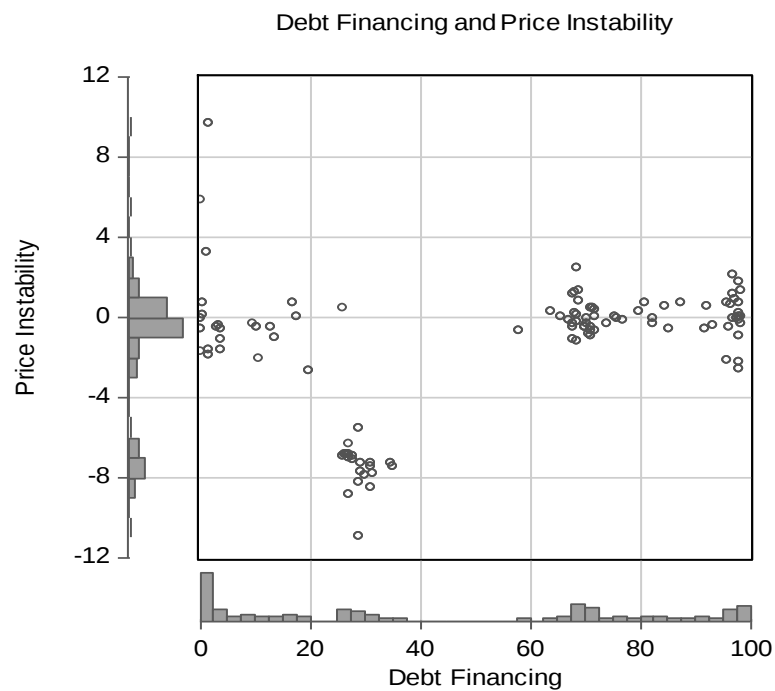


Fig. 8. Scatter plot and quadratic fit between debt financing and price instability

Table 5 provides the Pedroni panel cointegration test to check for the presence of cointegration among the selected variables in each model. The presence of cointegration is necessary to ensure the validity of the long run relationship and suitability for policy

intervention. Here for both models of equations 3 and 4, 4 out of 8 statistics are significant, confirming the presence of cointegration.

Table 5. Pedroni Residual cointegration Test

Model Name	Output Instability Model		Price Instability Model	
Statistics	Statistic	Prob	Statistic	Prob
<i>Alternative Hypothesis: common AR coefs within – dimension</i>				
Panel v- Statistic	-1.133	0.871	-1.183	0.882
Panel rho- statistic	0.896	0.815	0.354	0.638
Panel PP- statistic	-2.955	0.001**	-2.669	0.000**
Panel ADF- statistic	-1.598	0.055**	-2.431	0.000*
<i>Alternative hypothesis: individual AR coefs (between – dimensions)</i>				
Group rho- statistic	0.778	0.782	0.631	0.746
Group PP-statistic	-4.905	0.002**	-3.088	0.000**
Group ADF- statistic	-1.657	0.048**	-2.891	0.001**
<i>Independent variables Equity, Equity², Debt, Debt², Intr</i>			<i>** significant at 10%</i>	

Table 6 shows the ARDL estimates of equity and debt financing relationship with output instability and price instability. For the output instability model, 66 observations are used to generate estimates with a significant LR stat of 19.86. and for the case of price instability, 102 observations were used to generate estimates having a significant LR stat of 36.42. From the short run estimates of both models, it is observable that the ECM₁ value is negative and significant, confirming that models are cointegrated and converging (Altarawneh et al., 2020; Audu, 2012; Dube et al., 2018).

For the control variables, it can be seen that an increase in interest rates in the economy leads to an increase in price instability by 0.71% on a median (Gruber & Vigfusson, 2018; Svensson, 1994). This is because higher interest rates lead to higher costs of production and then general price levels. Similarly, many firms have borrowed capital of different types, proportions and tenures which may affect the cost of goods differently, leading to price volatility.

For the case of debt financing, since the level coefficient is positive and the squared coefficient is negative, it shows a significant inverted U-shaped effect with output instability which are similar to (Sohail & Arshed, 2022). Similarly, an insignificant inverted U-shaped effect with price instability in the long run because of the insignificant level and squared coefficient in the price instability model. This depicts the hypothesis presented in Fig 4.

For the case of equity financing, the level coefficient is negative, and the squared coefficient is positive. It shows a significant inverted U-shaped effect with output instability which is similar to (Pinto & Augusto, 2014; Raharja & Mranani, 2019). At the same time, an insignificant U-shaped effect with price instability in the long run because both level and squared coefficient are insignificant. This depicts the hypothesis presented in Fig 4. The results highlight one thing: debt and equity financing are asset based, not causing any changes in the prices.

Table 6. Non Linear ARDL Long run and short run

Variable	Output Instability (1,3,3)		Price Instability (1,1,1)	
	Coefficient	Prob*	Coefficient	Prob*
<i>Long Run Equation</i>				
Debt	0.1402	0.0530**	0.1098	0.1884
Debt ²	-0.0011	0.0832**	-0.0007	0.3150
Equity	1.9058	0.0000**	-0.3012	0.1337
Equity ²	-0.0704	0.0000**	0.0067	0.3540
INTR	0.1241	0.3386	0.7069	0.0000**
C	-2.7541	0.0909**	-8.8783	0.0007**
<i>Short Run Equation</i>				
D(Debt)	-0.1471	0.3374	0.009	0.9101
D(Debt ²)	0.0019	0.2161	2.16 10 ⁻⁰⁵	0.9801
D(Equity)	16.8817	0.3689	7.4309	0.5004
D(Equity ²)	-0.3034	0.3700	-0.1419	0.4776
D(INTR)	0.0256	0.9055	0.6634	0.6709
ECM(-1)	-0.7767	0.0000**	-0.2992	0.0523**
<i>Regression Statistics</i>				
	R Squared	0.20	R Squared	0.21
	Quasi LR Stat.	19.86	Quasi LR Stat.	36.42
	Prob.	0.00**	Prob.	0.00**
	Obs	66	Obs	102
		Long run thresholds for Output		Long run thresholds for Price
	Sample Average	Stability		Stability
Debt	38.52%	63.72%		78.43%
Equity	4.09%	13.53%		22.48%

** significant at 10%

Surprisingly equity and debt financing are not causing price instability in the selected economies. This outcome is different from what we could expect from conventional financing, which is the direct cause of inflation, here since the Islamic financing returns are synchronized with the gains/productivity from the assets which are engaged in the business venture hence changes in the financing utilization do not correspond to changes in the cost of production. Further, for both cases of equity and debt financing from Islamic banks, below a certain threshold of financing, it is not able to ensure stability, while at higher levels of financing, it ensures stability. Table 6 shows that the sample average of debt and equity financing is 38.52% and 4.09%, respectively, while the thresholds are 63.72% and 13.53%, respectively (Saleem et al., 2021; Shaikh, 2011). So, this model predicts that they increase output instability until the debt and equity financing do not cross the thresholds. Figs 9 and 10 present a similar trajectory of effect.

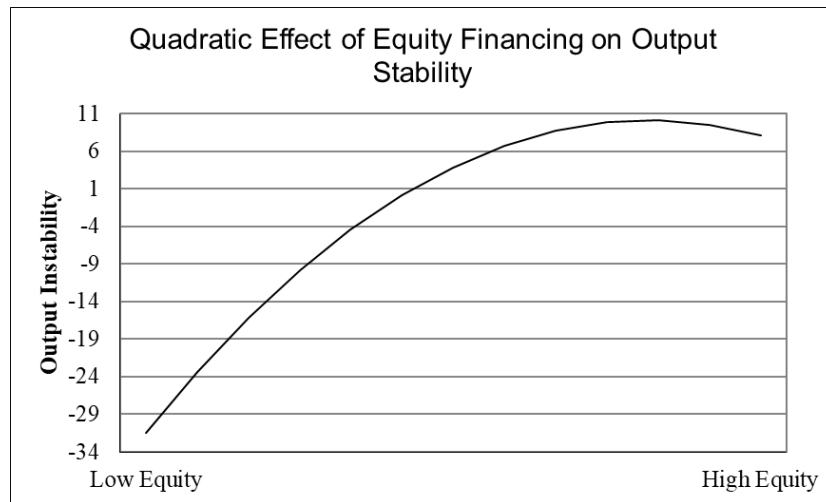


Fig. 9. Quadratic effect of equity financing on output instability.

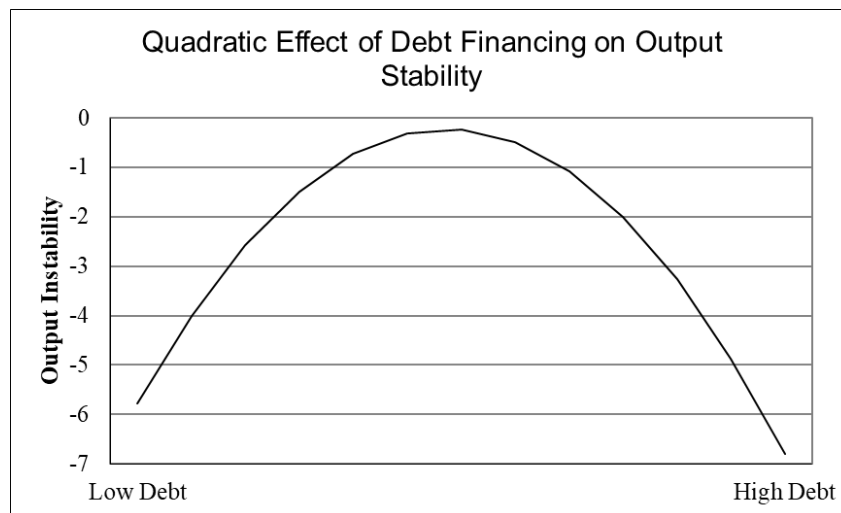


Fig. 10. Quadratic effect of debt financing on output instability

While discussing the post regression diagnostics, the Ramsey reset test ruled out an absence of higher order specifications, the partial autocorrelation function of residuals became insignificant after the first lag, and for squares residuals, all lags were insignificant, indicating constant variance and independent residuals. Lastly, the cointegration test for reverse models showed insignificant results, which ruled out the presence of endogeneity.

6. CONCLUSION

The main purpose of this study was to investigate the effects of two major categories of product-wise financing of Islamic banks on the economic stability of the selected countries. This study determined whether or not the nonlinear effect of equity-based and debt-based financing of Islamic banks has a different effect on the economic stability of a country.

This study acquires data on Islamic banking product-wise financing at the national level from Islamic Financial Service Board. The industrial production index data is selected from International Financial Statistics for selected countries. The data ranges from 2014Q1 to 2019Q1. The economic stability is estimated using the GARCH volatility approach, and the

nonlinear ARDL model is used to determine the Islamic banking product-wise financing relationship with output instability and price instability. The empirical relationship between Islamic banking equity-based and debt-based financing on output instability shows that the ECM_{t-1} value is negative and significant in the short run, which means models are cointegrated and converging. In the long run for case of debt financing, a significant inverted U-Shaped effect with output instability is found, while an insignificant U-shaped effect in the case of price instability is found. For the case of equity financing, a significant inverted U-shaped effect with output instability while an insignificant U-shaped effect with price instability is found.

Equity and debt financing are not causing price instability in the selected economies. This outcome is different from what we could expect from conventional financing, which is the direct cause of inflation, here since the Islamic financing returns are synchronized with the gains from the assets which are engaged in the business venture hence changes in the financing utilization do not correspond to changes in the cost of production. Further, for both cases of equity and debt financing from Islamic banks, below a certain threshold of financing, it is not able to ensure stability, while at higher levels of financing, it ensures stability. For the case of control variables, it can be seen that an increase in interest rates in the economy leads to an increase in price instability. This is because higher interest rates lead to higher costs of production, and then general price levels Islamic product financing creates more stability in the economy than a particular country (Table 1). Islamic banks should focus more on that product or improve other product structures for more stability. If Islamic financing creates stability in the economy, it will help the government improve monetary and fiscal policy. Islamic products are asset-based, which is why government can improve fiscal and monetary policies. The government should focus on asset creation by launching more projects under Fiscal policy and issuing Sukuk under monetary policy.

The results of the study are limited to the accepted definition of equity and debt financing by IFSB, the data of these financing could change if the country's own definitions are used. Future studies could explore the sub-types of equity and debt financing and their interactions with the stability of the country.

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Conceptualization, Sadaf Shaheen and Rukhsana Kalim; methodology, Noman Arshed; software, Sadaf Shaheen; validation, Rukhsana Kalim and Noman Arshed; formal analysis, Sadaf Shaheen; writing—original draft preparation, Sadaf Shaheen; writing—review and editing, Rukhsana Kalim; visualization, Noman Arshed; supervision, Rukhsana Kalim

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Conflicts of Interest:

There are no conflicts of interests.

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