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Evaluating Asymmetric Impacts of Islamic Bank Financing on Employment In Indonesia

Eko Fajar Cahyono[1*], Wan Azman Saini Wan Ngah[2], Siong Hook Law[3], Nur Syazwani Mazlan[4], Mohd Naseem Niaz Ahmad[5], Azali Mohhamed[6]

[1,2,3,5]School of Economics and Business, Universiti Putra Malaysia, Malaysia
[1]Faculty of Economics and Business, Airlangga University, Indonesia
[4]School of Business, Monash University Malaysia, Malaysia
[6]Universiti Keusahawanan Koperasi Malaysia, Malaysia
E-mail: [1]gs58757@student.upm.edu.my, [2]wazman@upm.edu.my, [3]lawsh@upm.edu.my
[4]nur.syazwani@monash.edu, [5]naseemniaz@upm.edu.my, [6]azali@ukkm.edu.my
[*)]**Corresponding Author**

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Abstract

Research Originality: This research examines the asymmetric impact of Islamic bank financing on employment in Indonesia

Research Objectives:. This research aims to test the non-linear impact of Islamic bank financing on employment in Indonesia

Research Methods: This research utilizes secondary data from 2006 to 2022 and employs non-linear ARDL (Auto Regressive Distributive Lag) and Conditional ECM (Error Correction Model) analysis methods

Empirical Results: In the short term, increases in Islamic bank financing significantly boost labor force participation (LFPR), while decreases have no significant effects. Long-term analysis shows positive changes continue to enhance LFPR, but negative changes do not impact GDP. The impact of financing on LFPR is symmetrical over time, indicating short-term asymmetries do not persist

Implications: This research implies that the Indonesian government can boost the growth of Islamic bank financing to increase employment opportunities for the population both in the short and long term.

Keywords:

Islamic bank financing; labor force participation rate; asymmetric impact; non-linear ARDL; conditional ECM

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INTRODUCTION

Bank credit significantly enhances the labor force participation rate through multiple channels. Research indicates that bank-allocated credit stimulates business activities in real sectors, fostering economic growth and increasing labor demand, positively influencing labor force participation rates (Sipahutar, 2016). Ncube et al. (2019) also state that high loan accessibility can boost labor force participation, highlighting the importance of a conducive business environment for promoting social equity and economic growth. Additionally, easing credit constraints, as observed in bank branching deregulation, has been linked to changes in labor supply decisions. This condition suggests that better credit access can affect individuals' labor force participation choices (Bui & Ume, 2019). Furthermore, microfinance's positive impact on female labor supply in rural areas demonstrates how credit provision can enhance participation in non-farm activities, thereby increasing labor force participation rates (Chowdhury, 2017). The positive relationship between credit management and agricultural output also shows that labor force participation can benefit from credit availability in agriculture (Shafique & Ali, 2019).

The labor force participation rate (LFPR) is essential for understanding employment and unemployment trends (see Figure 1). Variations in the LFPR significantly influence labor market dynamics (Elsby et al., 2015). During economic downturns, increased labor force attachment among the unemployed can affect the participation margin, impacting employment and unemployment rates. This condition highlights the necessity of considering the LFPR when evaluating the overall health of the labor market. Shifts in the LFPR can result in downward trends in unemployment rates, as a smaller proportion of marginal nonparticipants entering the labor force through unemployment can reduce the overall unemployment rate (Barnichon & Figura, 2013). Additionally, Hotchkiss (2014) links changes in the employment-to-population ratio to relative shifts in the employment rate and the LFPR. This condition illustrates how LFPR variations can directly affect the overall employment rate, making it a crucial indicator for assessing labor market strength.

Figure 1. Development of Indonesian Labor Force Participation Rate

Source: Data processed based on the Indonesian National Workforce report by the Central Statistics Agency, 2006-2023

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Islamic banks are vital in providing capital to businesses for several key reasons. Firstly, they adhere to Sharia principles, which forbid charging interest (riba) and investing in industries considered unethical in Islam, such as alcohol, gambling, or pork (Faozan, 2021). This ethical framework ensures that the funds from Islamic banks support businesses that align with Islamic values, promoting socially responsible investments. Additionally, Islamic banks emphasize profit-sharing and loss-bearing, fostering a partnership approach between the bank and the business seeking financing (Abedifar et al., 2015). This profit-sharing model leads Islamic banks to carefully evaluate the viability of businesses before providing capital, resulting in more prudent and sustainable investments.

Furthermore, Islamic banks often focus on small and medium-sized enterprises (SMEs) that may struggle to secure capital from conventional banks (Suharli & Rahman, 2024). Islamic banks contribute to economic growth and job creation by funding these businesses, particularly in sectors where traditional financing is limited. Moreover, Islamic banks aim to empower entrepreneurs who face challenges in accessing capital, not just for profit but also from a humanitarian perspective (Suharli & Rahman, 2024). This approach supports entrepreneurship and innovation, driving economic development and diversification.

From 2006 to 2022, Islamic bank financing in Indonesia increased significantly, rising from 15,479 billion Rupiah to 254,332 billion Rupiah. While there were periods of rapid growth, such as between the second semester of 2011 and the first semester of 2014, fluctuations also occurred. For instance, financing declined in the second semester of 2012 but more than doubled between the first and second semesters of 2013. In 2014, there were notable surges, and from 2015 onward, financing generally followed a stable upward trend despite occasional dips, reaching 254,332 billion Rupiah by the second semester of 2022 (see Figure 2).

Figure 2. Trend of Total Islamic Bank Financing in Indonesia

Source: processed from Indonesian Islamic banking statistics published by the Indonesian Financial Services Authority (2006-2022)

A theoretical framework that considers the varying influences of financial development across different industries and economic contexts supports the hypothesis that bank credit has an asymmetric impact on employment. According to Pagano and Pica (2012), as financial development increases, the availability of bank credit enables firms to expand their workforce, significantly impacting employment in less financially developed environments due to initially high financial constraints. As financial development goes on and constraints get less severe, the marginal benefits of more credit on employment go down. This condition shows that the effects of more credit are stronger in places where financial constraints are stronger. Furthermore, the degree of financial development moderates the employment response to a firm's profitability increase, with more pronounced effects in financially constrained environments.

The study from Garcia-Appendini and Montoriol-Garriga (2013) provides evidence supporting the role of bank credit in boosting employment. The research findings suggest that firms with high pre-crisis liquidity levels increased trade credit extended to other corporations, leading to better performance than cash-poor firms. This research indicates that access to credit can enhance economic activities and potentially contribute to job creation by overcoming capital constraints that hinder investment. Additionally, Cingano et al. (2016) found that a decrease in credit growth significantly reduces the investment rate over time, highlighting the importance of credit availability in stimulating investment and potentially creating more job opportunities. This research suggests that bank credit is vital in supporting business activities that can lead to increased employment. Furthermore, Rusydiana (2024) emphasized that bank credit facilitates the efficient allocation of resources from savers to borrowers with productive investment opportunities, thereby promoting economic growth and potentially contributing to job creation. This result underscores the positive impact of bank credit on economic development and employment outcomes.

The study from Olilingo and Putra (2020) provides evidence of the challenges of a direct relationship between bank credit availability and employment rates. Their research findings indicate that bank credit did not significantly impact employment rates (Olilingo & Putra, 2020). This study highlights the complexity of the relationship between bank credit and employment, suggesting that other factors or mechanisms may play a more influential role in determining employment levels. While some studies have emphasized the importance of bank credit availability in influencing employment dynamics, the findings of Olilingo and Putra (2020) offer a contrasting perspective by suggesting a lack of significant impact of bank credit on employment rates. This divergence in results underscores the need for further research to comprehensively understand the mechanisms through which credit influences labor market outcomes.

The impact of bank credit on employment can exhibit a linear relationship, where positive changes in bank credit have a similar duration impact as adverse changes in increasing unemployment. This research is supported by the study conducted by Adewole et al. (2022), which analyzed the relationship between bank credit to the private sector and economic growth in Nigeria. The results indicated an impactful linear connection

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between bank credit and economic growth, suggesting that changes in bank credit availability can consistently impact economic outcomes over time. Furthermore, the study by Bossler and Schild (2015) examined the employment structure of cooperative banks and found that cooperative banks, compared to private and savings banks, exhibited more stable employment patterns. This stability in employment within cooperative banks implies a consistent impact on job retention, irrespective of positive or negative changes in credit availability. Moreover, Berton et al. (2018) highlighted that the employment elasticity to credit supply is particularly relevant for micro and small firms, indicating a consistent relationship between credit supply and job creation across different firm sizes. This condition suggests that the impact of bank credit on employment can be linear, with changes in credit supply having a proportional effect on job opportunities, regardless of the direction of the change.

The impact of bank credit on employment can exhibit a non-linear relationship due to various factors influencing the dynamics between credit availability and job creation. Studies have shown that positive changes in bank credit can stimulate job creation more rapidly than negative changes can lead to a slowdown in unemployment growth (Neumark & Grijalva, 2013). This non-linear relationship can be attributed to the intricate interplay between credit expansion, economic stability, and regulatory frameworks. Research has indicated that as credit expands, the financial system becomes more liquid in a non-linear dynamic ((Becke & Sornette, 2017). This liquidity enhancement can have varying effects on employment, with rapid credit creation fueling job growth faster than credit contraction, leading to decreased employment levels.

Additionally, the impact of bank credit on employment can be influenced by factors such as credit risk, liquidity risk, and regulatory capital requirements (Ofori-Sasu et al., 2023). These elements contribute to the non-linear relationship between bank credit and job creation. Moreover, external financing constraints and the size of firms can also shape the non-linear effects of bank credit on employment growth (Baslandze & Reserve, 2023). Small firms, which are more susceptible to credit constraints, may experience more pronounced fluctuations in employment levels in response to changes in bank credit compared to larger enterprises.

The fluctuations in Islamic bank financing in Indonesia from 2006 to 2022 highlight the need to examine its asymmetric impact on employment. Periods of rapid growth, such as between 2011 and 2014, suggest that increased financing may drive job creation, while declines, like in 2012, could threaten employment stability. The significant variations in financing trends (see Figure 2) indicate that the effects of financing on employment might not be uniform. Analyzing these asymmetric impacts can provide insights into how Islamic bank financing influences labor market dynamics, helping policymakers and financial institutions support sustainable employment growth.

Despite the extensive body of research exploring the role of bank credit on employment, including studies on the asymmetric and non-linear impacts of conventional bank credit, the influence of Islamic bank financing on employment remains underexplored. While numerous studies have analyzed how credit availability affects job creation and

unemployment through linear and non-linear mechanisms, there is a noticeable gap in understanding how Islamic bank financing, with its unique principles and structures, influences labor market dynamics. This gap is particularly evident in Indonesia, a country with a rapidly growing Islamic banking sector and a complex financial landscape. The limited research on the non-linear or asymmetric effects of Islamic bank financing on employment in Indonesia highlights the need for further investigation to understand how these financial instruments impact employment outcomes, especially given their increasing role in the country's financial ecosystem.

This study aims to investigate the impact of Islamic bank financing on employment in Indonesia, focusing on its non-linear and asymmetric effects. By analyzing how Islamic bank credit influences labor market outcomes, the research seeks to fill the existing gap in understanding the unique role that Islamic financial principles play in shaping employment dynamics. Through these objectives, the study aims to provide insights that can inform policymakers and stakeholders on the potential of Islamic banking to support sustainable employment growth in Indonesia.

METHODS

Table 1 presents a comprehensive overview of the key variables used in this study, encompassing the period from the second semester of 2006 to the second semester of 2022. The Indonesian Statistics Agency sources the dependent variable, the Labor Force Participation Rate (LFPR), which measures the workforce's employment proportion. The primary independent variable, Total Islamic Bank Financing (TIBF), represents the total financing provided by Islamic commercial banks across all economic sectors in Indonesia, according to data obtained from the Indonesian Financial Services Authority. To ensure a robust analysis, we include control variables like Total Direct Investment (TDI) and Real Gross Domestic Product (RGDP), measured in billion rupiahs and sourced from Bank Indonesia. The Net Debt variable also accounts for companies' financial leverage, with data sourced from Eikon Thomson Reuters Datastream. These variables are significant for looking at how Islamic bank loans affect the number of working people in Indonesia while considering the effects of direct investment, economic output, and company debt over the given period (Table 1).

The Non-Linear Auto Regressive Distributed Lag (NARDL) model is an econometric tool that builds on the Auto Regressive Distributed Lag (ARDL) model by allowing variables to have non-linear relationships with each other (Turay et al., 2022). This model is utilized to capture asymmetric effects and non-linear dynamics in the relationships between economic variables. The primary purpose of employing the NARDL model is to provide a more flexible framework for analyzing economic relationships that do not adhere to linear patterns, thereby offering a more accurate estimation of the effects of variable changes on economic outcomes (Turay et al., 2022). The NARDL model's ability to capture non-linear and asymmetric relationships between variables, which conventional linear models may overlook, is one of its key advantages (Turay et al., 2022).

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The investigation analyzes the effects of Total Islamic Bank Financing (TIBF) on LFPR. Equation 1 models the relationship by incorporating both positive and negative shifts in TIBF and considering its interaction with LFPR in the presence of other economic variables like TDI, RGDP, and net debt. This foundational model provides insights into how overarching Islamic financing trends correlate with labor market participation amid varying economic conditions and firm leverage dynamics.

$$\Delta LFPR_t = \alpha + \sum_{i=0}^{p} \phi_i \, \Delta LFPR_{t-i} + \sum_{j=0}^{q+} \Delta TIBF_{t-j}^{+} + \sum_{k=0}^{q-} \theta_k^{-} \Delta TIBF_{t-k}^{-} + \Upsilon LFPR_{t-1}$$
$$+ \delta_1 \, TIBF_t + \delta_2 \, TDI_t + \delta_3 \, RGDP_t + \delta_4 \, Netdebt_t + \varepsilon_t \quad (1)$$

The Error Correction Model (ECM) is an essential component of the Autoregressive Distributed Lag (ARDL) modeling approach. The ARDL methodology involves estimating the ECM, which allows for the examination of both short-term and long-term relationships between variables (Katircioglu & Feridun, 2011). This model is particularly useful in analyzing the impact of various factors on economic phenomena such as exchange rates, GDP, inflation, and trade deficits (Sulaiman et al., 2019).

Table 1. Data and Measurement

Variable	Abbreviation	Description	Unit	Source	Role
Labor Force Participation Rate	LFPR	The proportion of the workforce that is employed	Percentage	Indonesian Statistics Agency (Indonesia Workforce Report)	Dependent Variable
Total Islamic Bank Financing	TIBF	Total financing provided by Islamic commercial banks across all economic sectors	Billion Rupiah	Indonesian Financial Services Authority (Indonesian Islamic Bank Statistics)	Main Independent Variable
Total Direct Investment	TDI	Total direct investment flow into Indonesia	Billion Rupiah	Bank Indonesia (Indonesian Economic and Financial Statistics)	Control Variable
Real Gross Domestic Product	RGDP	Indonesia's real gross domestic product using the production approach with the base year 2000	Billion Rupiah	Bank Indonesia (Indonesian Economic and Financial Statistics)	Control Variable
Net Debt	Net Debt	Difference between a company's total debt and its cash and cash equivalents	Billion Rupiah	Eikon Thomson Reuters Datastream	Control Variable

Source: Authors

An advanced econometric tool, the Conditional Error Correction Model (CECM), analyzes the relationship between variables in the short and long run. It adds to the original Error Correction Model (ECM) by including more variables explaining how fast short-run deviations are fixed and how long-run equilibrium is reached (Katircioglu et al., 2014).

The CECM framework includes error correction terms as distinct independent variables, enhancing the understanding of the dynamics among the studied variables (Katircioglu et al., 2014). The CECM is particularly beneficial for capturing the adjustment process between short-run fluctuations and long-run equilibrium levels of variables. It finds applications in various fields, such as economics, energy consumption, international trade, and tourism-led growth hypothesis testing (Katircioglu et al., 2014; Hendratono & Puspitasari, 2018).

Through CECM estimation, researchers can explore how variables interact over time, considering both short-term dynamics and long-term equilibrium relationships (Katircioglu et al., 2014). The model's structure typically involves linking changes in one variable to past equilibrium errors and previous changes in both variables (Engle & Granger, 1987). This methodology enables a comprehensive examination of the relationship between the variables under investigation, offering insights into the direction and pace of adjustment equilibrium (Engle & Granger, 1987). Moreover, people commonly use the CECM with other econometric methods, such as cointegration analysis, to enhance their understanding of variable relationships (Katircioglu, 2010)(Arvanitopoulos & Agnolucci, 2020). The CECM is a strong way to examine how economic and social things change over time because it includes error correction terms and extra explanatory variables (Katircioglu et al., 2014).

We employ a Conditional Error Correction Model (CECM) to capture the dynamic interactions between financing and labor market activity in exploring the impact of Islamic Bank Financing (IBF) on the Labor Force Participation Rate (LFPR) in Indonesia. Equation 2 represents the research objective of this study, which examines the overall influence of total Islamic bank financing (TIBF) on the LFPR. We construct Equation 7 to represent this relationship.

$$\Delta LFPRt = \alpha + \beta 1 \cdot ECMt - 1 + \beta 2 \cdot \Delta TIBFt + \beta 3 \cdot \Delta TDIt + \beta 4 \cdot \Delta RGDPt + \beta 5 \cdot \Delta Net\ Debtt + \epsilon t \quad (2)$$

RESULTS AND DISCUSSION

Descriptive statistics are essential in scientific research as they provide a foundational understanding of the data, setting the stage for deeper analysis. By summarizing the central tendencies, dispersion, and distribution shapes of variables, these statistics offer a snapshot of the data's overall behavior, which is critical for identifying patterns, anomalies, and potential relationships among variables. This preliminary assessment guides subsequent analytical choices and helps interpret more complex statistical outcomes. Table 2 presents the descriptive statistics for five key variables: Labor Force Participation Rate (LFPR), Total Islamic Bank Financing (TIBF), Total Direct Investment (TDI), Real Gross Domestic Product (RGDP), and Net Debt, each based on 34 observations. The means of these variables suggest typical values within the dataset, whereas the medians indicate central tendencies, with half of the observations falling below these points. The range, highlighted by the maximum and

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minimum values, illustrates the spread of the data across various economic indicators. High standard deviations for RGDP and net debt suggest significant variability, hinting at diverse economic conditions. Positive skewness values for some variables indicate right-skewed distributions, suggesting outliers pulling the distribution's tail to the right. These insights are crucial for interpreting the data correctly and setting the stage for more detailed analyses.

In time series analysis, particularly within the frameworks of Autoregressive Distributed Lag (ARDL) models, including Nonlinear ARDL (NARDL), a fundamental prerequisite is that the data must be stationary or free from unit roots. This requirement ensures that relationships between variables are consistent over time, making the statistical inference valid and reliable.

Table 2. Descriptive Statistic

	LFPR	TIBF	TDI	RGDP	NET DEBT
Mean	94.11	114,111.16	2,819.16	180,086.84	123.37
Median	92.86	124,374.45	2,545.72	1,205,299.57	122.69
Maximum	99.98	254,332	6,357.58	5,623,619.05	262.93
Minimum	89.49	14,890	65.45	453,061.05	165.75
Std. Dev.	3.14	78,584.09	2,216.61	1,629,194.88	760.90
Skewness	0.61	0.145	0.100	1.217	0.328
Observations	34	34	34	34	34

Source: Data Processed

Table 3 showcases the results of the Phillips-Perron unit root tests for five key variables: LFPR, LOGTIBF, LOGTDI, LOGRGDP, and LOGNETDEBT, evaluated for stationarity at both the level and first difference, with specifications for intercept and trend. The findings are pivotal for setting the stage for ARDL modeling. At the level, LFPR and LOGRGDP are found to be stationary, as evidenced by their very low probability values, leading to the rejection of the null hypothesis of a unit root presence. This indicates that these variables can be directly used in ARDL modeling without further modification.

Conversely, LOGTIBF, LOGTDI, and LOGNETDEBT initially exhibit non-stationarity at the level, necessitating first differencing to achieve stationarity—demonstrated by significantly low probability values after this transformation. The transition from non-stationarity to stationarity upon differencing confirms the suitability of these transformed variables for inclusion in ARDL analyses. This approach ensures that the long-term and short-term dynamics captured in the ARDL framework are grounded in data that adheres to the necessary statistical assumptions, enhancing the credibility and depth of the econometric investigation.

Table 3. Stationary Test Result

Intermediate Phillips-Perron test results with Intercept and Trend Spesification at Level			
Series	**Prob.**	**Bandwidth**	**Obs**
LFPR	0.000	3.0	34
LOGTIBF	0.708	16.0	35
LOGTDI	0.632	2.0	34
LOGRGDP	0.001	4.0	34
LOGNETDEBT	0.252	2.0	34
Intermediate Phillips-Perron test results with Intercept and Trend Spesification at First Difference			
Series	**Prob.**	**Bandwidth**	**Obs**
D(LFPR)	0.000	20.0	33
D(LOGTIBF)	0.000	16.0	34
D(LOGTDI)	0.000	0.0	33
D(LOGRGDP)	0.000	5.0	33
D(LOGNETDEBT)	0.000	10.0	33

Source: Data Processed

The bounds test is crucial in time series analysis, especially when employing models like the Non-Linear Autoregressive Distributed Lag (NARDL). This test ascertains the existence of stable, long-term relationships between variables at different levels of integration, ensuring that the use of potentially non-stationary time series in regression analyses does not lead to spurious results.

In the study depicted in Table 4, the bounds test is used to investigate the long-term relationship between Islamic Bank Financing and the Labor Force Participation Rate (LFPR). Through this test, the influence of the independent variable (Islamic Bank Financing) on the dependent variable (LFPR) is measured by the F-statistic in the presence of co-integration. The F-statistic is compared against upper and lower critical bounds at different significance levels (10%, 5%, and 1%).

Table 4. NARDL Bound Test Result

	F-statistic	**Critical Value I(0) at 10%**	**Critical Value I(1) at 10%**	**Critical Value I(0) at 5%**	**Critical Value I(1) at 5%**	**Critical Value I(0) at 1%**	**Critical Value I(1) at 1%**
Islamic Bank Financing on Labor Force Participation	33.585	2.331	3.471	2.804	4.013	3.900	5.419

Source: Data Processed

The result reveals that the F-statistic, standing at 3.5851, significantly exceeds all critical values at these thresholds, leading to rejecting the null hypothesis that posits no long-term relationship. This result indicates a statistically significant link between the variables and validates the use of the NARDL model to explore their dynamics further.

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Hence, it is demonstrated that Islamic finance plays a significant role in influencing labor market behavior over time.

The significance of the error correction term (ECT) in models like the ARDL cannot be overstated. It serves as a critical diagnostic tool, confirming whether the short-term dynamics are appropriately aligned with the long-term equilibrium relationship defined by the model. A negative and statistically significant ECT signifies that the model's residuals are converging towards equilibrium and validates the overall model structure. This result ensures that any short-term discrepancies between Islamic Bank financing and labor force participation are effectively and consistently corrected, thereby maintaining the integrity and reliability of the long-term relationship captured by the ARDL framework. This robust mechanism underscores the dynamic interplay between Islamic financing and labor market activity, highlighting the importance of timely adjustments in economic policy and financial practices to sustain workforce engagement.

Table 5 unveils the findings related to the NARDL error correction term, specifically examining the influence of Islamic Bank financing on labor force participation. Central to this analysis is the variable COINTEQ*, which boasts a coefficient of -1.844 and a standard error of 0.101. Its t-statistic stands at -1.817, with a strikingly significant probability value of 0.000. The negative coefficient of COINTEQ* is particularly telling, indicating a robust adjustment mechanism that swiftly corrects any deviations from the long-term equilibrium at a rate of 1.844 units per period.

Table 5. NARDL Error Correction term Research Objective 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-1.844	0.101	-1.817	0.000

Source: data processed

Table 6 examines the short-term dynamics within the Nonlinear Autoregressive Distributed Lag (NARDL) model, focusing on the effects of total Islamic bank financing (TIBF) on labor force participation (LFPR). The model differentiates between positive (TIBF+) and negative (TIBF-) shocks to TIBF, highlighting their distinct impacts on LFPR.

The analysis reveals a notable asymmetry in the effects of TIBF. Positive shocks to Islamic bank financing (TIBF+) substantially influence LFPR, with a coefficient of 3.962 and a statistically significant probability value of 0.018. This finding suggests that favorable shifts in Islamic banking activities significantly enhance labor force participation in the short term. In contrast, negative shocks (TIBF-) present a different scenario, as indicated by a coefficient of -1.190 and an insignificant probability value of 0.820. These results imply that downturns in Islamic financing do not significantly impact LFPR in the short term, underscoring an asymmetric response to financial changes.

The coefficients of other control variables, such as Total Direct Investment (LOGTDI), Real Gross Domestic Product (LOGRGDP), and Net Debt (LOGNETDEBT), while variable, generally lack statistical significance in this short-term analysis. This finding

further accentuates the distinctive role of TIBF in influencing LFPR, suggesting that TIBF is a key driver of labor force dynamics during the period under study.

Table 6. NARDL Conditional Error Correction Model Research/Short-Term Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFPR(-1)*	-1.844	0.118	-1.553	0.000
LOGTDI(-1)	0.095	0.378	0,251	0.804
LOGRGDP(-1)	-2.692	1.9376	-1.390	0.181
LOGNETDEBT(-1)	-1.432	14.864	-0.963	0.347
@CUMDP(LOGTIBF(-1))	3.962	1.530	2.589	0.018
@CUMDN(LOGTIBF(-1))	-1.190	5.168	0.230	0.820
C	2.412	4.868	495.569	0.000
Δ(LOGTDI)	0.151	0.439	0.344	0.734
Δ(LOGTDI(-1))	0,163	0.452	0,361	0.721
Δ(LOGRGDP)	1.111	0.937	-1.185	0.251
Δ(LOGRGDP(-1))	0.407	0.918	0.443	0.662
Δ(LOGNETDEBT)	0.866	1.404	0.631	0.535
Δ(LOGNETDEBT(-1))	0.622	1.359	0.457	0.652
Δ(LOGTIBF)	1.318	2.713	0.485	0.632
Δ(LOGTIBF(-1))	2.000	2.328	0.859	0.401

Source: data processed

Table 7 provides insights into the long-term relationship between Total Islamic Bank Financing (TIBF) and the Labor Force Participation Rate (LFPR) using the Non-Linear Autoregressive Distributed Lag (NARDL) model. This analysis considers both positive (TIBF+) and negative (TIBF-) shocks alongside key economic control variables to understand their effects on labor participation.

Starting with the control variables, Total Direct Investment (LOGTDI) has a positive coefficient of 0.051, suggesting it might boost LFPR. However, the effect is not statistically significant, as indicated by a probability value of 0.802. Real Gross Domestic Product (LOGRGDP) shows a negative coefficient of -1.460, but again, this result is not statistically significant, with a probability value of 0.169. Similarly, Net Debt (LOGNETDEBT) has a negative coefficient of -0.776 and is statistically insignificant, with a probability of 0.344. These findings imply that while these economic factors influence the labor market, they are not the primary drivers of participation in the long term.

The analysis highlights Total Islamic Bank Financing as a significant factor. Positive shocks (TIBF+) have a coefficient of 2.147 and are statistically significant, with a probability value of 0.013, indicating that increased Islamic financing boosts labor force participation. On the other hand, negative shocks (TIBF-) have a coefficient of -0.645. They are not statistically significant, with a probability value of 0.819, suggesting that decreases in TIBF do not substantially affect LFPR. The constant term (C) in the model

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has a coefficient of 1.307. It is statistically significant, with a probability value of 0.000, indicating a baseline level of LFPR that is consistently influenced by other variables.

Table 7. NARDL Long-Term estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGTDI(-1)	0.051	0.204	0.252	0.802
LOGRGDP(-1)	-1.460	1.033	-141.289	0.169
LOGNETDEBT(-1)	0.776	0.806	-0.962	0.344
@CUMDP(LOGTIBF(-1))	2.147	0.814	2.637	0.013
@CUMDN(LOGTIBF(-1))	0.645	2.799	0.23	0.819
C	1.307	2.484	526.426	0.000

Source: Data processed

Autocorrelation is a critical issue in time series analysis, as it can compromise the validity of a model by leading to misleading statistical inferences and biased parameter estimates. Table 8 presents the results of the Breusch-Godfrey Serial Correlation LM Test, which assesses the presence of autocorrelation in the residuals. The test results reveal an F-statistic of 0.959 with a probability of 0.404 for F(2,16) and an Obs*R-squared value of 3.534 with a probability of 0.17 for the Chi-Square(2) test. These findings indicate no significant serial correlation, ensuring that the model is free from autocorrelation and that the results are valid and reliable.

Additionally, the Jarque-Bera test confirms the normality of the residuals, with a value of 0.410 and a probability of 0.978. This result supports the assumption of normally distributed residuals, further validating the model's findings. The model also demonstrates strong explanatory power, with an R-squared value of 0.95 and an adjusted R-squared value of 0.912. By addressing and confirming the absence of autocorrelation, we can be confident in the model's accuracy and the robustness of its conclusions.

Table 8. Serial Correlation Test Result

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.959	Prob. F(2,16)	0.404
Obs*R-squared	3.534	Prob. Chi-Square(2)	0.17
JB Value	0.041	Prob	0.978
R-squared	0.95		
Adjusted R-squared	0.912		

Source: Data Processed

The Non-linear Autoregressive Distributed Lag (NARDL) model is renowned for its ability to analyze asymmetric and nonlinear effects in economic data. Table 9 presents the results of the coefficient symmetry test and the Wald test, both designed to assess

whether certain coefficients within the NARDL framework exhibit symmetry. The primary focus is on the relationship between Total Islamic Bank Financing (TIBF) and the Labor Force Participation Rate (LFPR), an essential measure of economic engagement.

Table 9. Longterm Symmetry Test Result

Null hypothesis: Coefficient is symmetric			
Degrees of freedom (simple tests): F(1,18), Chi-square(1)			
Variable	**Statistic**	**Value**	**Probability**
Long-run	F-statistic	1.265	0.275
LOGTIBF	Chi-square	1.265	0.260
Wald Test:			
Test Statistic	Value	df	Probability
t-statistic	1.125	18	0.275
F-statistic	1.265	(1, 18)	0.275
Chi-square	1.265	1	0.206
Null Hypothesis: C(+)=C(-)			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(5) - C(6)		5.153	4.580

Source: Data Processed

The coefficient symmetry test evaluates whether the long-term positive change (C(+)) and long-term negative change (C(-)) in the logarithm of TIBF (LOGTIBF) exert equal influences on LFPR. The test results indicate an F-statistic of 1.265 with a probability value of 0.275 and a Chi-square statistic of 1.265 with a probability value 0.260. With the degrees of freedom set at (1, 18) for the F-statistic and 1 for the Chi-square statistic, the p-values exceed the standard significance threshold of 0.05. Consequently, we fail to reject the null hypothesis that these coefficients are symmetric, suggesting that positive and negative variations in LOGTIBF impact LFPR similarly.

The Wald test investigates whether the coefficients C(5) and C(6) are statistically equivalent. Specifically, C(5) denotes the coefficient for long-term positive changes in TIBF affecting LFPR, while C(6) represents the coefficient for long-term negative changes. The Wald test results reveal a t-statistic of 1.125 with 18 degrees of freedom and a p-value of 0.2754, an F-statistic of 1.265 with a p-value of 0.275, and a Chi-square statistic of 1.265 with a p-value of 0.2606. The normalized restriction evaluates the equation (C(5) - C(6) = 0), resulting in a value of 5.153 with a standard error of 4.581. Since all p-values exceed the 0.05 threshold, we cannot reject the null hypothesis that C(5) equals C(6). This finding indicates no significant distinction between the long-term impacts of positive and negative changes in TIBF on LFPR.

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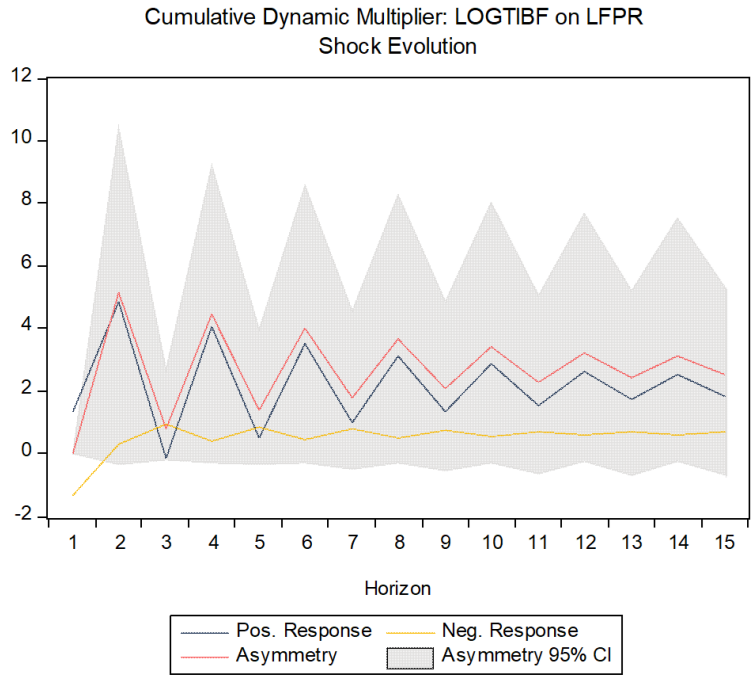
Figure 3. Dynamics Multiplier Graph IBF on LFPR Model



Source: Data Processed by Eviews 13

Figure 3 illustrates how the labor force participation rate (LFPR) responds to changes in total Islamic bank financing (LOGTIBF) over time, focusing on the asymmetrical impacts of positive and negative shocks. The red and blue lines represent LFPR's response to positive and negative changes in LOGTIBF, respectively, while the yellow line shows the asymmetry measure—the difference between these responses. The shaded area around the yellow line indicates the 95% confidence interval, which helps assess the statistical significance of any observed differences. The closeness of the red and blue lines suggests that positive and negative changes have similar impacts on LFPR, indicating symmetry. The yellow line's proximity to zero, combined with the overlap of the confidence interval with the zero line, implies that the impact differences are not statistically significant. Thus, the figure suggests that both increases and decreases in Islamic bank financing have comparable long-term effects on LFPR, highlighting the stability of labor force participation in response to financial changes.

Examining the effects of positive shocks to Islamic bank financing on the labor force participation rate (LFPR) requires a comparison with relevant studies to understand the broader implications fully. The results suggest that such shocks significantly increase labor force participation in the short term, consistent with existing literature on Islamic banking's influence on economic variables. For instance, studies by Farahani and Dastan(2013) and Pala et al. (2023) explore the connection between Islamic bank financing and economic growth. Farahani and Dastan (2013) find a positive link between economic growth and Islamic bank financing, which may influence labor market dynamics. (Pala et al., 2023) highlight the role of Islamic financial literacy in encouraging the adoption of Islamic

banking services, which can stimulate economic activity and potentially enhance labor force participation.

Additionally, research by Mubarok (2024) emphasizes the importance of managing non-performing loans, exchange rates, and inflation in Islamic banking to ensure stability and profitability. This effective financial management could have positive implications for economic activity and labor force participation rates. Studies such as those by Foroni and Furlanetto (2015) and Nursyamsiah (2018) demonstrate how labor supply shocks and macroeconomic factors influence decisions to join the labor force, indicating the complex interplay of factors affecting labor market outcomes. Akhatova et al. (2016) study Malaysia's banking models and monetary transmission mechanisms in the broader economic context, suggesting that Islamic bank financing responds quickly to interest rate changes, which can impact economic activities and potentially influence labor market dynamics. Moreover, research by Hachicha and Amar (2015) on Islamic bank financing and economic growth in Malaysia indicates that such financing can help reduce inequalities and improve economic opportunities, indirectly affecting labor force participation rates.

To understand why adverse shocks to Islamic bank financing have an insignificant impact on the labor force participation rate in the short term, insights from relevant studies can be valuable. The operational dynamics of Islamic banking and their response to adverse shocks could explain. Zarrouk et al. (2016) suggest that inflation, as an unexpected factor, can challenge Islamic banks in adjusting profit rates accordingly. This difficulty may lead to costs rising faster than revenues, affecting profitability. This insight might explain why negative shocks to Islamic bank financing do not significantly impact the labor force participation rate in the short term, as banks focus on managing costs and operational challenges rather than immediate workforce adjustments.

Additionally, Nasution (2024) notes that factors like return on assets, capital adequacy ratio, and non-performing financing positively respond to shocks and enhance the volume of Islamic financing. In the context of negative shocks, Islamic banks may strategically manage these factors to mitigate their impact, thereby minimizing direct effects on labor force participation rates. Montalvo (2006) also discusses the initial impact of shocks on labor markets, indicating that adverse shocks can increase unemployment rates and decrease participation rates. However, short-term shocks may not have lasting effects on labor force participation, especially if Islamic banks implement strategies to stabilize their operations and financing activities in response.

Long-term, positive shocks to Islamic bank financing have significantly influenced the labor force participation rate. Several factors contribute to this relationship, as highlighted in relevant studies. Farahani and Dastan (2013) found a positive link between Islamic bank financing and economic growth, indicating that expanding Islamic financing can stimulate economic activities, leading to increased

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job opportunities and higher labor force participation rates over time. Additionally, Winarto (2024) emphasizes that economic growth tends to respond positively to positive shocks from Islamic bank financing, suggesting a long-term impact on overall economic performance. This sustained growth facilitated by Islamic bank financing can lead to a stable and expanding labor market, encouraging more individuals to participate. Moreover, Ponziani and Mariyanti (2020) highlight the role of Islamic banks in transmitting monetary policy and fostering economic growth, which can indirectly impact long-term labor force participation rates. Islamic banks financing various economic activities contribute to business expansion, leading to increased labor demand and higher participation rates.

To understand why positive and negative Islamic bank financing shocks have a symmetrical impact on the long-term labor force participation rate, insights from relevant studies can be considered. As Soemitra et al. (2021) noted, positive shocks to Islamic bank financing have a lasting positive impact on inflation and output. This positive effect on economic indicators can lead to sustained economic growth, creating more job opportunities and boosting labor force participation rates over time. Conversely, Ascarya (2012) indicates that negative shocks can negatively impact inflation and output. Although negative shocks initially pose challenges, adjustments and strategies implemented in response can enhance economic stability and growth, ultimately contributing to higher labor force participation rates over the long term. Furthermore, as Nastiti and Kasri (2019) discussed, banking regulation is crucial in developing Islamic banking financing. Regulatory frameworks can help mitigate the positive or negative shocks' impact on the stability and growth of Islamic banks. This regulatory stability can sustain economic activities, increasing labor force participation rates over the long term.

CONCLUSION

The non-linear autoregressive distributed lag (NARDL) conditional error correction model (CECM) was used to look at the effects of total Islamic bank financing (IBF) on the labor force participation rate (LFPR). The results are fascinating. In the short term, positive changes in IBF have a notable positive impact on LFPR, while unfavorable changes do not show significant effects. Long-term results mirror this pattern, with positive IBF changes maintaining their significant influence on LFPR and negative changes remaining insignificant. The long-term symmetry test and Wald test confirm that the impacts of positive and negative changes are statistically symmetric, indicating no significant difference between them. The dynamic multiplier graph illustrates this symmetry by displaying consistent responses within confidence intervals for positive and negative changes. Consequently, the long-term achieves a balance between positive and negative effects, with positive changes in IBF exerting a more pronounced impact. The regression analysis and symmetry tests agree that any short-term imbalance does not last into the long term. This result shows that Islamic bank financing has a stable and substantial effect on people's ability to work.

These findings have significant policy implications for Indonesia's labor market and financial sector. Policymakers should recognize the positive impact of Islamic bank financing on labor force participation rates, particularly in the short and long term. Encouraging the growth of Islamic banking institutions and promoting access to Islamic financial products could further enhance employment opportunities and contribute to a more inclusive labor market. Additionally, ensuring the stability and sustainability of Islamic bank financing mechanisms can support long-term employment growth and economic development. Policymakers should consider these insights when formulating strategies to promote labor force participation and enhance the overall economic landscape in Indonesia.

This study, while insightful, has several limitations. Firstly, it employs only three control variables: investment, total company net debt, and economic growth. Expanding the range of control variables to include factors such as conventional bank credit, inflation, and employee salaries could provide a more comprehensive understanding of the dynamics influencing the labor force participation rate (LFPR). Secondly, the study relies on time series regression for its analysis. Utilizing panel data could offer a richer dataset by incorporating information from various regional provinces, thus enhancing the robustness of the findings. Additionally, the study is focused solely on Indonesia, which limits the generalizability of the results. Future research could benefit from a comparative approach, examining the effects of Islamic finance on LFPR across multiple countries.

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