Analyzing the Volatility of Non-Core Deposits in Indonesian Islamic Banks:
Sharia Restricted Intermediaries Accounts (SRIA) as Stabilizer?

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Abstract

Objective – This research delves into the causes of Non-Core Deposit by applying the Austrian Business Cycle Theory (ABCT) in the case of Islamic Bank. To examine it. This paper is using some internal and external factors in exploring the volatility of Non-Core Deposit in Islamic Bank for both Full-Fledged and Islamic Window Bank. Furthermore, this paper also proposes the future model of Islamic bank using new product namely Sharia Restricted Intermediaries Account (SRIA)

Design/methodology – The study centers on core deposits as the dependent variable, drawing data from the Indonesian Financial Service Authority and Central Bank of Indonesia websites spanning from June 2014 onwards. This study uses internal variables which are Third-Party Fund, Cost of fund, and Vostro while Conventional Interest Rate and Bank Indonesia Rate as external variables as the independent variable. Methodologically, Vector Auto Regression (VAR) and Vector Error Correction Model (VECM). To propose the future model, this paper do the descriptive analysis.

Results – The Total Third-Party Funds and Cost of Fund of Conventional Banks exerting significant negative effects to Non-Core Deposit. As a solution, a two-stage implementation plan is proposed: in the short term, separating funds based on purpose and introducing guarantees, while in the long term, introducing Sharia Restricted Intermediaries Account (SRIA) without LPS guarantees to promote stability and risk sharing.

Research limitations/implications – Understanding the dynamics and future model by all stakeholders can aid in the formulation of policies aimed at fostering a stable and resilient Islamic banking sector. Banks, particularly Islamic banks, can leverage the insights gained from this research to enhance risk management strategies and future innovative products.

Novelty/Originality – This paper innovatively applies the Austrian Business Cycle Theory to investigate irregular deposits and bank runs in Islamic banks. The finding informs a two-stage plan for stability, aiding policy and risk management.

Keywords: Islamic Banks, Non-Core Deposit, Investment Account, SRIA

1. Introduction

Depositors flocked to withdraw their funds from the Bank of Paris and Bank of Barcelona in 1927 and 1934. What caused these bank runs? The bank failed to return funds to depositors! (De Soto, 2006; Michael & Rozeff, 2010; Rothbard, 2008)). This was repeated in the ASEAN crisis in 1998 where Indonesia experienced a bank run which caused the bankruptcy of several banks. The Indonesian government spent as much as USD. 60 billion to return customer funds (Radelet & Sachs, 2000; Syamlan,

2016)). This incident recurred in 2007 when Northern Rock Bank collapse due to massive withdrawal from its customer (Janson, 2009)). These examples occurred with conventional banks, but depositor runs can also occur with Islamic banks. The depositors of Islamic bank could withdraw its money any time thus vulnerable to be bank run (Syamlan, 2016). This feature is a philosophical mistake which called 'irregular deposit' (Bagus et al., 2015, 2016; Bagus & Howden, 2009, 2012, 2016; Syamlan, 2018).

The concept of irregular deposit introduced by Austrian economists led by Ludwig Von Mises which means that the words deposit are equated when someone places their goods in a warehouse (Von Mises, 1912). The warehouse owner cannot use the goods or in other words placements in banks whose value and physical are not change (Rothbard, 2008, 2009). This meaning is contradictory considering the way Islamic banks and conventional banks treat customer deposits based on their intrinsic value. This can be illustrated when banks get $50 money with number of series M123 and give back $50 dollar to the customer using other series than M123 (Syamlan, 2016). This is happened in both types of Islamic bank which are the full-fledged Islamic bank and the *Shariah* business unit of conventional bank called as Islamic Window ((Beck et al., 2013; Syamlan & Istiana, 2018)).

Both Islamic banks have the share three types of products in the nutshell, products which are Islamic bank cases consists of *Wadiah* (safe keeping) and *Mudharabah* (investment) current account & saving account and *Mudharabah* (investment) term deposit account. Those customers who want to put their money to Islamic bank without risk of losing the money, *Wadiah* based either in form of current account or saving account are the fittest. On the other hand, customers who are eager to risk their money to get return without any restriction of withdrawing it *Mudharabah* current account or saving account can be opt. Moreover, depositors who keen to put their money which gain higher return than the current/saving account, *Mudharabah* Term Deposit is the best solution (Farooq, 2011; Hosen, 2021)). Both Islamic banks benefits these products since only some of customers pull out the money frequently while others don't. Deposits that is sinking in the bank called as the "core deposit" (DeYoung & Jang, 2016; Jin et al., 2018; Karam et al., 2014)Below are the data of the core deposit in both types of Islamic Banks.

Figure 1.
The Core Deposit of Full-fledged & Shariah Business Unit Islamic Bank
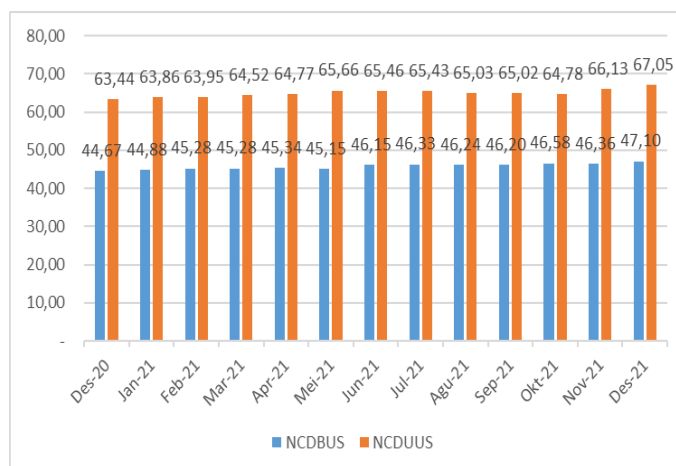
NCDBUS = Full-Fledged Core Deposit; NCDUUS = Sharia Business Unit Core Deposit

The Islamic window has lower core deposit compares to the full-fledged one; average 45% compare to 63% (OJK, 2022). Meaning to say the customer of Islamic window more active in withdrawing their deposit liken to the full-fledged bank. Interestingly, under three months' term deposit has been the major cause that makes the core deposit considerably low. Form Indonesia Islamic Bank Statistic, it is shown that approximately 57% of total Islamic bank liabilities is *Mudharabah* term deposit

while rest are the current account & saving account which based on the *Wadiah* and/or *Mudharabah*. Furthermore, if we look deeper into the data of *Mudharabah* Term Deposit in both types of Islamic bank, the Islamic window has highest dependency to the under three months' term deposit compare than the full-fledged counterpart; averaging 83% vs 48% to total deposit which might be major cause of the lower core deposit. It is a pity since the *Mudharabah* Term-Deposit is has rate sensitivity according to (Banker et al., 2005; Harrison Jr. & Hollingsworth, 1991). Moreover, both Full-fledged and Islamic window rely heavily on short term *Mudharabah* term deposit period to fulfill the withdrawal of depositors. When depositors pull out their money, naturally the Full-fledged and Islamic window will do their best to raise fresh fund by offering new other depositors with higher equivalent rate (Ismal, 2008, 2011b)

Surprisingly, the Full-fledged Islamic Banks and Islamic window in Indonesia misinterpret *Wadiah* from the warehouse deposit which should be kept the bank notes as well (Farooq, 2011; Omar Farooq, 2012). Morover, the *Mudharabah* is actually investment not deposit which led the second misinterpretation of irregular deposit (Archer et al., 2010; Archer & Karim, 2012). Thus, this practice might trap Islamic banks to the new problem which has happened in Indonesia namely Bank Run. To minimize the bank run risk, it needs to reform the liability side of Islamic Bank by looking up into the motivation of withdrawing the deposit on the customer side to construct the new product that fit to "Regular Deposit". This research will fill the gap implementing the Austrian school concept of full reserve banking. The full reserve banking concept mainly divide the liability side in to two categories which are demand deposit (current account & saving account) for customer safe keeping and transaction. This second category is an investment account as the venue of investment for the customer and bank can use this as the capital to finance project. With respect to the full reserve banking concept, the bank run risk can be omitted gradually.

As discussed above, the irregular deposit also happened in both types of Islamic Bank. This research question will measure the cause of bank-run as per the Austrian Business Cycle Theory (ABCT) from the internal factors and the external factors in both types of Islamic banks. Based on ABCT, whenever the central bank interest rate is reduced, bank does credit expansion to maximize profit by exploiting the third-party fund. However, when economic downturn occurs, the bank performance will be worsening since the non-performance loan escalate due to the hike of inflation. Thus, the customers might pull put their deposit which address the bank into catastrophic event of bank run (Rothbard, 2008). Acharya & Naqvi (2012) and Harun & Nattan (2021)say that the internal factors of third-party fund, pricing and the behavior of bank managers affects bank run. While the external factors of central bank monetary policy also gauge the bank run.

Referring to above theory, the internal factors are the amount of the *Wadiah/ Mudharabah* current account, *Wadiah/ Mudharabah* saving account and *Mudharabah* Term Deposit, non performing financing and the profit sharing account in both Islamic bank (Ibrahim, 2016). The External factors are the interest rate of Central Bank, the Inflation, and the interest of conventional bank (Bagus & Howden, 2012). The dependent variable in this research is the amount of core deposit in both types of Islamic bank. Thus, we aim to investigate as to what extent the internal and external factors amplify the non-core deposit in a full-fledged Islamic Bank or Islamic Window Bank and how is the ideal model of Islamic bank deposit product to avoid the non-core deposit,

2. Literature Review, Theoretical Framework and Hypotheses Development
2.1. The Islamic Bank Balance Sheet
Referring to IFSB Guidelines No. 1 on Risk Management issued by the international institution in 2005, below is the typical balance sheet of an Islamic bank:

Table 1.

The Islamic
Bank Balance
Sheet According
to IFSB

Asset Side	Liability Side
Types of Cash Flow	Types of Funds
1. Known Cash Flow Maturities and the amount is known in advance	1. Current Account Holder The amount is guaranteed and should be repaid at any time
2. Conditional and Predictable Cash flow The inward cash flow depends on the financing terms and the amount is predictable both the amount as well as the periods	2. Investment Account Holder - Including but not limited to UIAHs and RIAHs - Share profit and bear losses from Investment on their behalf
3. Conditional and Unpredictable Cash flow Occurs in the equity partnership contract	

Source: (IFSB, 2005; 2006)

IFSB divides the typical liquidity of Islamic banks into two parts: liquidity on the asset side and liabilities. On the asset side, there are three classifications of financing assets based on the characteristics present in each Shariah contract. The first classification is the typical "Known Cash Flow," which comes from contracts with clear and upfront maturity dates, such as *Murabaha* and *Ijarah*. The second type is "Conditional and Predictable Cash Flow," arising from contracts like *Salam* and *Istisna'* with the characteristic that customer installment funds can be predicted with certain conditions. The third is "Conditional and Unpredictable Cash Flow," arising from *Musharakah* contracts that are uncertain in terms of principal repayment and profit sharing, occurring only if profits are obtained.

From the table above, IFSB divides the typical funds of Islamic banks into two parts: Current Account, which includes savings and checking accounts, and Investment Account. For the current account, IFSB specifies the term relevant to this study: "The amount is guaranteed and should be repaid at any time." This means that products classified under this category will be fully guaranteed in value because they are necessary for customer transactions. In this case, banks assisted by the Deposit Insurance Corporation must guarantee this product category.

Regarding the investment account, which is also like the product development plan in Indonesia, already studied by the Financial Services Authority (OJK) in 2018 which called as the Sharia Restricted Intermediaries Account (SRIA) (Syamlan et al., 2018). In this case, focusing on investment account, there are two types: Unrestricted Investment Account and Restricted Investment Account. Here, IFSB places both product classifications on the liabilities side and explains that the risks arising from these transactions are fully borne by the investor or *Shahibul Maal* and follow the principle of profit and loss sharing. IFSB's explanation, upon further examination, benefits the Deposit Insurance Corporation because the investment account essentially transfers risks to investors.

Based on IFSB's guideline above, it can serve as a foundation for product development in Indonesia, even though they do not explicitly state the necessity of having different pools of funds for each liability side. As written in PSAK (IAI, 2016, p. 65), paragraph 87, about Temporary Partnership Funds (also referred to as *Dana Syirkah Temporer* - DST), the book explains that transactions based on partnership contracts, which in this case use *Mudarabah* and *Musharakah*, cannot be categorized as the obligation of an Islamic bank or as capital. Both contracts cannot be classified as liabilities because the bank is not obliged to repay the principal or share the profit since everything is conditional, or in other words, the principal and profit can only be paid to customers when the project is profitable. Both contracts are typical Unconditional and Unpredictable Cash Flow, highly dependent on business conditions or the underlying asset being financed. On the other hand, DST also cannot be categorized as equity by

Islamic banks because by making such placements, customers do not automatically gain voting rights in the General Meeting of Shareholders. With these two main reasons, Islamic Accounting Board of Indonesia introduces a new breakthrough with the DST position. Furthermore, in the same paragraph, it is explained that DST is only used to record *Mudarabah Mutlaqah, Mudarabah Muqayyadah,* and *Musharakah* transactions on the On-Balance Sheet.

2.2 Non-Core Deposit

According to Mcguire (2001), Core Deposit is a deposit that remains indefinitely with "indeterminate maturity and administered pricing," meaning it does not have a specific maturity date, and its pricing is regulated. In this context, banks, particularly Islamic banks in this study, can gain various advantages. According to McGuire (2006), the benefits of core deposits include low Cost of Fund, serving as an income generator by providing opportunities for cross-selling in Islamic banks, and acting as a liquidity buffer for Islamic banks.

In this specific research, instead of using the term "core deposit," to align with the calculations from the Statistics of Islamic Banking (SPS) in Indonesia provided by the Financial Services Authority (OJK), the term used is "non-core deposit," which has characteristics opposite to those described in the literature. In this case, non-core deposit refers to deposits withdrawn by customers. Managing these deposits requires significant effort, as attracting them back necessitates raising the cost of funds for the Islamic bank (Karam et al., 2014).

2.3 Deposit Insurance in Indonesia

This multidimensional crisis resulted in the depreciation of the Rupiah, the liquidation of 16 banks, and a decline in public trust in the national banking system (Ariefianto & Soepomo, 2013). In response, the Indonesian government implemented a blanket guarantee policy that regulates government assurance for all obligations (third-party funds) of commercial banks and rural credit banks. This policy was also intended as an effort to improve the performance of the banking sector, strengthen the capital structure of banks, and mitigate various negative impacts due to bank runs. The Blanket Guarantee was provided without a limit on the amount of customer deposits in banks and was implemented by the National Banking Restructuring Agency (1998-February 2004) in collaboration with the Ministry of Finance through the Government Guarantee Implementation Unit (since February 27, 2004).

The Blanket Guarantee showed positive implications in restoring public confidence in the banking system, but on the other hand, the guarantee caused a financial burden on the state and the potential for moral hazard for banks. Therefore, the Indonesian government, through Banking Law No. 10 of 1998 Article 37b, narrowed the scope of guarantees by changing the policy from a blanket guarantee to a limited guarantee. In the interest of this guarantee, the government established the Deposit Insurance Corporation (LPS) on September 22, 2004, legalized through Law No. 24 of 2004. LPS is a deposit insurance institution formed based on Law Number 24 of 2004 concerning the Deposit Insurance Corporation (LPS Law), as amended by Law Number 7 of 2009. The limited guarantee applies to both Islamic and conventional banks under the prevailing law. Currently, the amount covered by LPS for all products, including current accounts, savings, and deposits, is a maximum of IDR 2,000,000,000, regardless of the contract type, whether *Wadiah* or *Mudharabah*. Concerning Islamic bank deposits, Article 96 of Law No. 24 of 2004 regarding LPS states that LPS is obligated to fulfill its function as a depositor guarantor for Islamic banks and also participate in maintaining the stability of Islamic banking in the future.

2.4 Theoretical Framework

Based on above problem statement and literature Review, this research will provide information on various aspects related to the business cycle, banking systems, and Islamic banking practices. It discusses the business cycle, highlighting its recurring patterns of economic booms and busts influenced by factors like non-neutral money and credit expansion which according to Syamlan (2016) also happened in Islamic Bank. The current Islamic Bank System which more on fractional reserve banking system will create potential consequences for economic sustainability. The concept of 100 percent RBS which used in this paper is proposed as a solution to cyclical economic crises, emphasizing responsible fund management by banks. This paper also covers Islamic banking practices, including Wadiah-based and *Mudharabah* deposits, and the role of the Deposit Insurance Corporation. Additionally, In the context of a problem statement, this information could be used to identify issues and challenges within the business cycle, banking systems, and Islamic banking practices, which may warrant further investigation or solutions, thus below is the research framework.

Figure 2.
Research
Framework
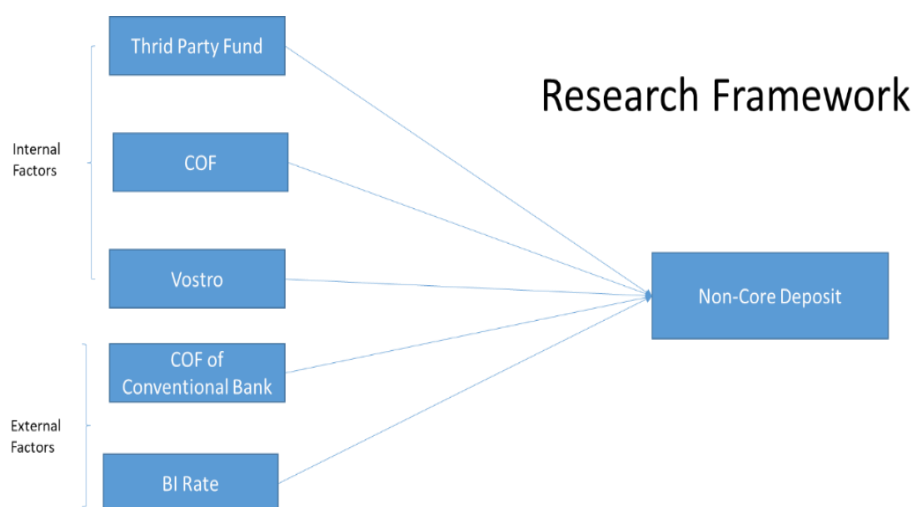
The variables that affect Non-Core Deposits in this case according to Karam et.al (2014) are the bank's own products which include demand deposits and term deposits. In Islamic banks, Current Accounts and Savings are offered to Customers with Wadiah and *Mudharabah* contracts. For term deposits, here we use deposits with 1 and 3 month terms because these two types of deposits have a large proportion of DPK in Islamic banking in Indonesia. Related to external factors that affect NCD, this study uses Other Bank Placements on the liability side so that it is in accordance with previous research by Karam et.al (2014) as well as Harrun and Nattan (2021).

2.5. Hypothesis Development

In this study, we present hypotheses aimed at unraveling the determinants of Non-Core Deposits (NCD) in Islamic banks operating in Indonesia, building upon insights from Karam et.al (2014). Our initial focus is on scrutinizing the relationship between the bank's proprietary products, comprising demand deposits and term deposits, and Non-Core Deposits. We posit an alternative hypothesis that suggests a substantial and significant influence of the bank's own products on Non-Core Deposits in Islamic banks within the Indonesian context.

Subsequently, our investigation extends to the impact of Islamic contracts, particularly Wadiah and Mudharabah, on Current Accounts and Savings. Here, the alternative hypothesis asserts a noteworthy and meaningful influence of the Islamic contract on Non-Core Deposits. Additionally, we turn our attention to the role of term deposits, specifically those with 1 and 3-month terms, acknowledging their significant presence in Deposits with Profit and Loss Sharing (DPK) in Islamic banking in

Indonesia. The alternative hypothesis suggests a meaningful contribution of term deposits to the variation in Non-Core Deposits in Islamic banks in Indonesia. Lastly, we explore external factors by examining the impact of Other Bank Placements on the liability side, aligning with the findings of previous research by Karam et.al (2014) and Harrun and Nattan (2021). Here, the alternative hypothesis suggests that Other Bank Placements significantly affect the level of Non-Core Deposits in Islamic banks in Indonesia. These hypotheses lay the groundwork for empirical testing and statistical analysis, aiming to comprehensively understand the intricate dynamics of Non-Core Deposits within the unique landscape of Islamic banking in Indonesia.

3. Research Method

The data for research question no 1 will be sourced from the Indonesian Financial Service Authority (IFSA or *Otoritas Jasa Keuangan* – OJK) official website www.ojk.go.id for internal factors of bank run cause and from Central Bank of Indonesia official website www.bi.go.id for the external factors. The span of data series is monthly data from June 2014 to January 2022. This research will take separate data for internal factors in both types of Islamic banking and common data for external factors that released by the central bank. These variables are based on the research of Bagus & Howden (2009, 2012). Nevertheless, this research wants to prove the Bagus & Howden (2009, 2012) qualitative study with statistical approach using more detail and Islamic bank related data from above sources. Afterwards, the data will be processed thru statistic Vector Auto Regression (VAR) / Vector Error Correction Model (VECM) to gain the Impulse Response Function (IRF) to know the shock of the core deposit as well as Varian Error Decomposition (VED) to observe the contribution of variables to the change of the core deposit. Moreover, to explore the relationship of the internal & external variable and the core deposit, this research will used also the Error Correction Model to see how significant the cause and effect of the both internal and external factors (Illiyin & Ascarya, 2013).

Regarding the operational definition of variables, especially to answer the formulation of problem No, below is the VAR/VECM equation as well as the meaning of each notation in it.

$$NCDBUS = \alpha 0 + \alpha 1 lnTPFBUS + \alpha 2 COFBUS + \alpha 3 lnVostroBUS + \alpha 4 COFBK + \alpha 5 LBIRate \; \mu t$$

$$NCDUUS = \alpha 0 + \alpha 1 lnTPFUUS + \alpha 2 COFUUS + \alpha 3 lnVostroUUS + \alpha 4 COFBK + \alpha 5 LBIRate \; \mu t$$

Where:
- NCDi = Non-Core Deposit of BUS or UUS
- lnTPF = Third Party Fund of BUS or UUS
- lnVostro = Vostro of BUS and UUS
- COF = COF of BUS and UUS
- BIRATE = Bank Indonesia Rate
- COF BK = Cost of Fund of Conventional Bank
- μ dan ε = *Error*
  d(log(ncdbus)) d(log(tpfbus)) d(log(cofbus)) d(log(vostrobus)) d(log(cofbk)) d(log(birate))

4. Results and Discussion

4.1 Results
Unit Root Test

Based on the results of the unit root test, all variables both on BUS and UUS are stationary at the first difference so that the VAR/VECM can be run according to the procedure (Illiyin & Ascarya, 2013).

VAR Stability Test

Below are the results of the VAR stability test:

Table 2.
VAR Stability
Test of BUS

Model	Modulus range	Max Lag
d(ncdbus) d(tpfbus) d(vostrobus) d(cofbus) d(cofbk) d(birate)	0.208164- 0.693566	2

From the table above, it can be interpreted that the NCDBUS model built will remain stable at a maximum lag of 2. If this model is processed with a lag above 2, then the VAR/VECM results will be invalid (Illiyin & Ascarya, 2013).

Table 3.
VAR Stability
Test of UUS

Model	Modulus range	Max Lag
d(ncduus) d(tpfuus) d(vostrouus) d(cofuus) d(cofbk) d(birate)	0.249424- 0.698198	2

From the table above, it can be interpreted that the NCDUUS model built will remain stable at a maximum lag of 2. If this model is processed with a lag above 2, then the VAR/VECM results will be invalid (Illiyin & Ascarya, 2013).

Optimum Lag Test

Below are the results of the optimum lag test:

Table 4.
Optimum Lag
of BUS

Lag	LogL	LR	FPE	AIC	SC	HQ
0	792.9180	NA	6.93e-18	-22.48337	-22.29064*	-22.40682*
1	834.9772	75.70660	5.85e-18*	-22.65649	-21.30739	-22.12061
2	871.1784	58.95624*	5.95e-18	-22.66224*	-20.15677	-21.66704
3	896.0810	36.28663	8.65e-18	-22.34517	-18.68334	-20.89064
4	920.7701	31.74315	1.34e-17	-22.02200	-17.20380	-20.10815
5	954.6538	37.75617	1.73e-17	-21.96154	-15.98696	-19.58836

From the table above, the optimum lag that can provide the best results for this NCDBUS model according to Illiyin & Ascarya (2013)is at lag 2.

Table 5.
Optimum Lag
of UUS

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1392.052	NA	2.96e+09	38.83478	39.02450*	38.91031*
1	-1359.403	58.94984	3.26e+09	38.92786	40.25591	39.45656
2	-1317.965	67.91184	2.86e+09*	38.77681*	41.24320	39.75869
3	-1296.473	31.64122	4.51e+09	39.17980	42.78453	40.61485
4	-1269.082	35.75993	6.35e+09	39.41895	44.16201	41.30718
5	-1214.022	62.70809*	4.48e+09	38.88949	44.77088	41.23089

From the table above, the optimum lag that can provide the best results for this NCDUUS model according to Illiyin & Ascarya (2013)is at lag 2.

Cointegration Test

Below are the results of the cointegration test:

Table 6.
Cointegration
Test Result of
BUS

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.472793	171.0439	83.93712	0.0000
At most 1 *	0.423984	123.0316	60.06141	0.0000
At most 2 *	0.351691	81.66017	40.17493	0.0000
At most 3 *	0.294040	49.15613	24.27596	0.0000
At most 4 *	0.180645	23.04135	12.32090	0.0006
At most 5 *	0.102355	8.098507	4.129906	0.0052

Trace test indicates 6 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

　　According to Illiyin & Ascarya (2013)to proceed to VECM, at least the model built must have 1 cointegration. Based on the cointegration test results via Eviews 12, there are 5 cointegrations from the above equation model so that they can proceed to VECM.

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.507495	174.1292	83.93712	0.0000
At most 1 *	0.411388	120.3022	60.06141	0.0000
At most 2 *	0.386682	80.02303	40.17493	0.0000
At most 3 *	0.260816	42.86878	24.27596	0.0001
At most 4 *	0.139365	19.90091	12.32090	0.0023
At most 5 *	0.105750	8.494502	4.129906	0.0042

Table 7.
Cointegration Test Result of UUS

Trace test indicates 6 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

　　According to Illiyin & Ascarya (2013) to proceed to VECM, at least the model built must have 1 cointegration. Based on the cointegration test results via Eviews 12, there are 5 cointegrations from the above equation model so that they can proceed to VECM.

4.2 Discussion
4.2.1 Shocks to Non-Core Deposits
Impulse Response Function (IRF)
　　Impulse Response Function (IRF) analysis is an analysis that functions to find out how the response of each current and future variable is to a particular variable and the timeframe for the variable to respond to shocks until it stabilizes. IRF analysis will explain the impact of shocks on one variable on other variables, where in this analysis it is not only in the short term but can be analyzed for several future horizons as long-term information. In this analysis you can see the long-term dynamic response of each variable if there is a certain shock of one standard error in each equation. The results of the IRF analysis will be described as follows:
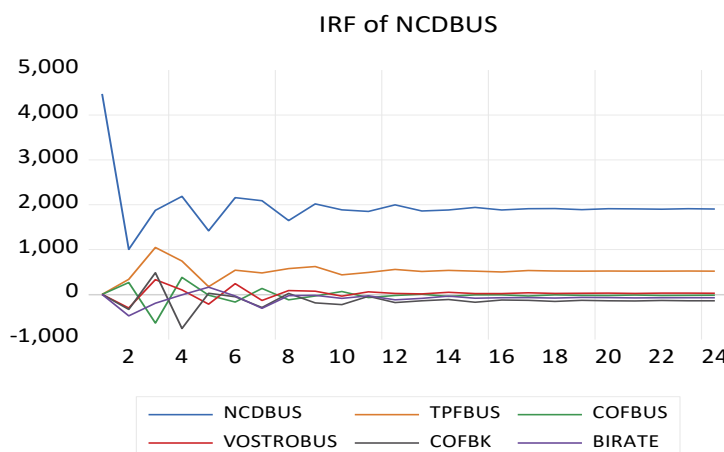

Figure 3.
Impulse Response Function of Non-Core Deposit in BUS

　　From the IRF results for a period of 24 periods, the VOSTROBUS, BIRATE, and TPFBUS variables in the first 2 months had a negative effect. Followed in the 3rd month with the COFBUS variable at -1,000. On the other hand, TPFBUS experienced an increase in periods 2-8 until it finally stabilized in period 12. In period 12, the variables

TPFBUS, COFBUS, VOSTROBUS, BIRATE began to stabilize. Meanwhile, COFBK still experienced fluctuations until it finally stabilized after the 16th period.

Figure 4.
Impulse
Response
Function of
Non-Core
Deposit in UUS

IRF of NCDUUS
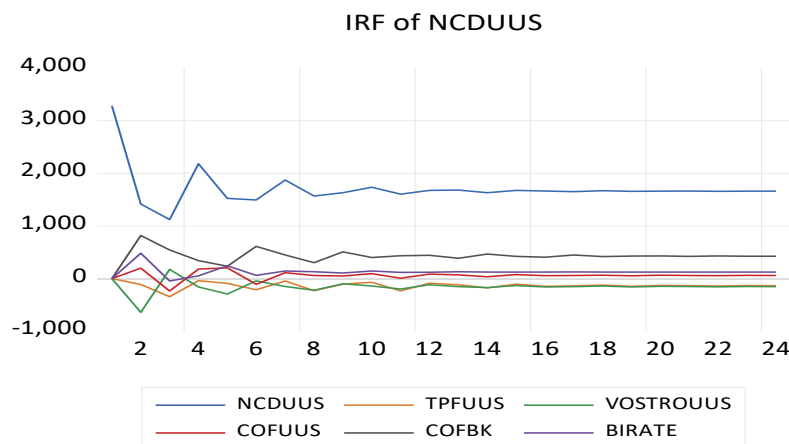
From the IRF results for a period of 24 periods, the variables VOSTROUUS and TPFUUS have decreased. While COFBK and BIRATE are above 0, and COFUUS until the 2nd period is still stable before then experiencing fluctuations. The TPFUUS, VOSTROUUS, COFUUS, COFBK, and BIRATE variables only stabilized after the 12th period.

In both cases, the strategy of Islamic banks when experiencing financial difficulties is in accordance with what was conveyed by (Ismal, 2011b, 2011a, 2012) namely by increasing the profit sharing ratio so that the source of the TPF increases.

Forecast Error Variance Decomposition Analysis

After analyzing the response generated from shocks for each variable using Impulse Response analysis, next is the Forecast Error Variance Decomposition analysis which aims to see the contribution of each variable to changes in certain variables. The following is the result of the Forecast Error Variance Decomposition analysis:

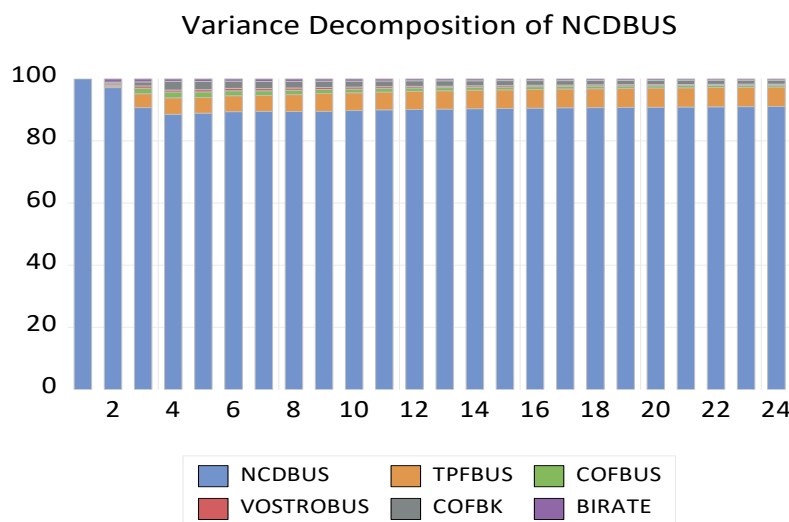**Figure 5.**
Variance
Decomposition
of Non-Core
Deposit in BUS

Variance Decomposition of NCDBUS

Table 8.
Detail of
Variance
Decomposition
of Non-Core
Deposit in BUS

Period	S.E.	NCDBUS	TPFBUS	COFBUS	VOSTRO BUS	COFBK	BIRATE
1	4473.776	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	4651.886	97.14523	0.512468	0.321248	0.427175	0.523890	1.069994
3	5199.991	90.74456	4.460832	1.775347	0.739406	1.279667	1.000190
4	5753.533	88.57157	5.304104	1.880205	0.633194	2.793598	0.817332

Period	S.E.	NCDBUS	TPFBUS	COFBUS	VOSTRO BUS	COFBK	BIRATE
5	5934.298	88.95932	5.069911	1.768626	0.732196	2.627826	0.842124
6	6344.328	89.39861	5.152502	1.620480	0.782072	2.306382	0.739952
7	6712.458	89.53487	5.108995	1.486554	0.739783	2.250907	0.878896
8	6936.640	89.46866	5.465764	1.424132	0.708011	2.108510	0.824921
9	7253.671	89.55785	5.727608	1.304907	0.656987	1.997328	0.755323
10	7511.981	89.81011	5.675444	1.223905	0.615635	1.955692	0.719219
11	7752.663	90.01624	5.725968	1.157774	0.583350	1.839518	0.677151
12	8027.971	90.13574	5.817050	1.080831	0.544732	1.766854	0.654792
13	8258.547	90.25687	5.876719	1.021342	0.514868	1.699440	0.630764
14	8488.347	90.35156	5.961639	0.969805	0.490403	1.627215	0.599382
15	8724.812	90.46570	5.992863	0.918092	0.464520	1.581617	0.577211
16	8940.650	90.57949	6.020024	0.874524	0.442769	1.526537	0.556658
17	9159.545	90.65925	6.070130	0.834892	0.423259	1.475509	0.536959
18	9373.762	90.73445	6.105769	0.797360	0.404589	1.436910	0.520919
19	9577.117	90.80754	6.139589	0.764374	0.388263	1.395931	0.504299
20	9781.484	90.87451	6.170121	0.733501	0.373050	1.359769	0.489047
21	9980.417	90.93889	6.193562	0.704805	0.358758	1.327857	0.476128
22	10173.91	90.99576	6.220150	0.678845	0.345908	1.295754	0.463581
23	10366.00	91.04699	6.245246	0.654395	0.333832	1.267590	0.451952
24	10553.20	91.09647	6.266328	0.631714	0.322570	1.241597	0.441326

Analyzing the Volatility of Non-Core Deposits in Indonesian Islamic Banks: Sharia Restricted Intermediaries Accounts (SRIA) as Stabilizer?

In the picture above the FEVD results on NCDBUS, the most dominant influence is the TPFBUS variable which contributes 6.26 percent. The COFBUS variable contributed 0.67 percent, the VOSTROBUS variable contributed 0.34 percent, the COFBK variable contributed 1.24 percent and the BIRATE variable contributed 0.44 percent. All variables that contribute to the long term.
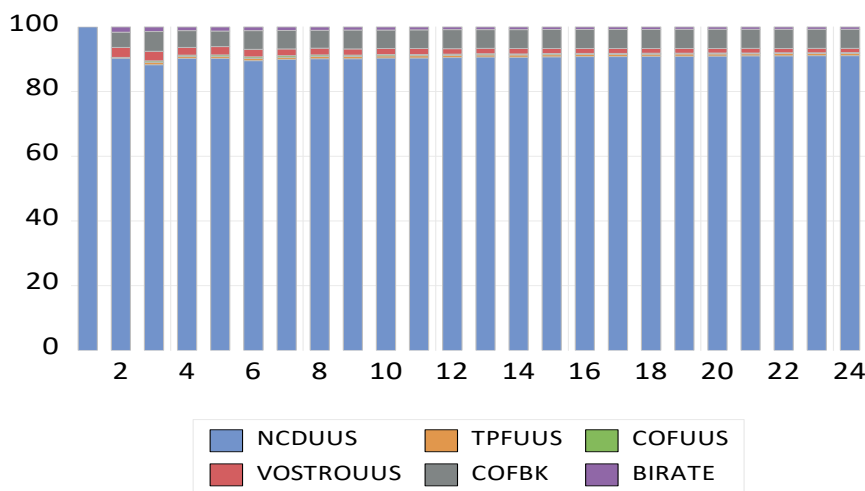

Figure 6. Variance Decomposition of Non-Core Deposit in UUS

Period	S.E.	NCDUUS	TPFUUS	COFUUS	VOSTROUUS	COFBK	BIRATE
1	3281.402	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	3760.024	90.36674	0.085443	0.132620	3.044463	4.726174	1.644557
3	3987.828	88.26813	0.818733	0.421851	2.947365	6.068834	1.475085
4	4565.490	90.19339	0.631815	0.454836	2.395373	5.185358	1.139224
5	4838.632	90.19756	0.596912	0.538959	2.547356	4.852939	1.266273
6	5106.908	89.52587	0.707557	0.530368	2.290537	5.794479	1.151186
7	5463.454	89.97779	0.625104	0.495211	2.086629	5.740229	1.075036
8	5703.272	90.14399	0.736538	0.459071	2.072696	5.549787	1.037920
9	5956.986	90.13701	0.705447	0.425650	1.929581	5.819373	0.982941
10	6222.132	90.40586	0.659050	0.406634	1.826008	5.747497	0.954956
11	6448.161	90.35850	0.744114	0.378861	1.792889	5.803547	0.922092
12	6680.340	90.47884	0.710366	0.365455	1.705469	5.847685	0.892189
13	6903.963	90.64923	0.694552	0.348941	1.649131	5.787591	0.870557
14	7114.667	90.61655	0.714952	0.329196	1.611807	5.877625	0.849874
15	7325.144	90.72616	0.695184	0.317872	1.555565	5.874512	0.830706

Table 9 Detail of Variance Decomposition of Non-Core Deposit in UUS

313

Period	S.E.	NCDUUS	TPFUUS	COFUUS	VOSTROUUS	COFBK	BIRATE
16	7526.991	90.80709	0.695822	0.303949	1.521006	5.858318	0.813816
17	7722.898	90.82787	0.693090	0.291858	1.486790	5.900645	0.799747
18	7915.832	90.90230	0.684215	0.281828	1.449838	5.895897	0.785922
19	8102.998	90.94033	0.685729	0.271215	1.424112	5.905090	0.773526
20	8285.945	90.98044	0.680152	0.262956	1.396141	5.917582	0.762731
21	8465.406	91.02770	0.676533	0.254746	1.370594	5.918199	0.752231
22	8640.842	91.05519	0.675404	0.246921	1.349360	5.930143	0.742982
23	8812.779	91.09198	0.671597	0.240291	1.327539	5.934268	0.734326
24	8981.557	91.12371	0.669630	0.233750	1.308378	5.938368	0.726167

In the picture above the FEVD results on NCDUUS, the most dominant influence is the COFBK variable which contributes 5.93 percent. The TPFUUS variable contributed 0.66 percent, the COFUUS variable contributed 0.23 percent, the VOSTROUUS variable contributed 1.3 percent and the BIRATE variable contributed 0.72 percent. All variables that contribute to the long term.

In conclusion, the analysis of Impulse Response Function (IRF) results and Forecast Error Variance Decomposition (FEVD) for Non-Core Deposits (NCDUUS) and Non-Core Deposits (NCDBUS) provides valuable insights into the dynamics of Islamic banks in Indonesia. For NCDUUS, the dominant influence is attributed to COFBK, contributing 5.93 percent in the FEVD results. This suggests a substantial impact of COFBK on NCDUUS, aligning with the hypothesis that the variable significantly affects Non-Core Deposits. While TPFBUS exhibits an influence, its contribution of 0.66 percent indicates a comparatively lesser impact on NCDUUS, supporting the corresponding hypothesis.

Turning to NCDBUS, the results indicate that TPFBUS plays a pivotal role, contributing 6.26 percent in the FEVD results. This lends support to the hypothesis that TPFBUS significantly influences Non-Core Deposits. Furthermore, the contributions from COFBUS, VOSTROBUS, COFBK, and BIRATE, albeit varying, reinforce the hypotheses positing their substantial impacts on NCDBUS.

In essence, the findings from the data-driven hypothesis testing validate the roles of COFBK and TPFBUS in shaping the trajectory of Non-Core Deposits in Islamic banks in Indonesia. These empirical insights contribute to a nuanced understanding of the factors driving financial dynamics in Islamic banking, paving the way for informed decision-making and strategic planning within the sector. Further statistical analyses and ongoing research endeavors can build upon these results, refining our understanding of the intricate relationships among the variables influencing Non-Core Deposits in the unique context of Islamic banking in Indonesia.

4.2.2 Linking The VAR-VECM Result and The Proposed Model for Future Islamic Bank
Key Take Away From VAR-VECM Result

From the results of the Impulse Response Function (IRF) Figure 4 and Figure 5, it can be observed that there is a positive impulse when there is a change in TPFBUS in the case of NCDBUS in Figure 4 and a positive change in NCD UUS when the COF of Conventional Banks changes. In this case, both NCDBUS and NCD UUS will increase when these triggers move. However, according to Figure 4 and Figure 5, this positive impact does not last long due to fluctuations in the NCDBUS impulse when both triggers change. This is also confirmed through the Variance Decomposition Technique. The Variance Decomposition Table (VEDF) in both Figure 6 and Figure 7 provides an overview of the distribution of variance over 24 periods after the last data point in September 2022. This research attempts to examine the contributions of TPFBUS, COF, Vostro, and BIRATE to changes in Non-Core Deposits in both BUS and UUS. When examining the components that affect both variables more deeply, on the BUS side, TPFBUS contributes the most to changes in NCD BUS. On the other hand, when talking about UUS, it is the COF of Conventional Banks that makes NCD UUS shaky, or in other

words, there is a transfer of funds from UUS to Conventional Banks or possibly to their sister companies with Conventional Bank status. This is reasonable because the management of funds in UUS is also not separate from their parent company in Conventional Banks.

From the above IRF and VEDF results, it is confirmed that Non-Core Deposits do exist and occur in Islamic banking. According to the literature presented in the introduction, non-core deposits refer to third-party funds (TPF) obtained by Islamic banks but not included in long-term reliable deposits due to their volatility, influenced by factors such as BIRATE and profit-sharing provided by Islamic banks (Harun & Nattan, 2021; Roulet et al., 2014). These funds come from various corporate or individual customers and are highly vulnerable to market changes and risks and can be withdrawn at any time within a short period. This can be detrimental to Islamic banks as they must prepare reserve funds beyond the Minimum Statutory Reserve (GWM) to secure the bank's position. Non-core deposits can cause funding instability, increase liquidity risk, especially if withdrawn in large quantities. Vulnerable to interest rate fluctuations, high funding costs can affect the profitability of the bank (Jin et al., 2018; Karam et al., 2014).

For Islamic Banks, portfolio diversification on the balance sheet needs to be well managed in the form of innovative funding products. This is crucial to reduce dependence on funds, including non-core deposits. The Financial Services Authority (OJK) has recently launched a new product called Sharia Restricted Intermediaries Account (SRIA). SRIA is an innovative product in the Islamic financial sector that can be offered by Islamic banks to reduce Non-Core Deposits. The focus of SRIA is to support Sharia principles and create mechanisms that match surplus units with deficit units without liquidity mismatch. In terms of fund management, SRIA is essential in creating alignment between funding and financing. Funds received from investors are directly channeled to the deficit unit without being deducted for the minimum statutory reserve at Bank Indonesia. This not only reduces the mismatch in the duration of funding and financing but also provides clarity in project financing. In this context, SRIA creates mechanisms that minimize risks and create a more transparent environment for all parties involved (Rulindo et al., 2020; Syamlan et al., 2018).

The decision to grant financing is another prominent feature of SRIA, where investors play an active role in determining which projects will receive financing after analyzing project owner submissions. This concept creates greater investor participation in decision-making processes, increasing involvement and enhancing supervision of fund utilization. SRIA also stands out due to the absence of guarantees from the Deposit Insurance Agency (LPS). Credit risk is fully borne by investors, and Islamic banks use partners or guarantees from project owners to secure investor interests, in line with Sharia principles. Although risky, this creates opportunities for investors to directly participate in project financing that aligns with their investment values and goals. The main source of income from the SRIA scheme comes from fees for financing analysis services and other fees as agreed. This model reflects common practices in the Islamic financial industry, where income is derived from services provided. This profit provides an incentive for Islamic banks to maintain the quality of financing analysis and provide the best service to investors while offering an alternative return to fund providers (Rulindo et al., 2020; Syamlan et al., 2018).

### 4.2.3 SRIA and The Proposed Future Islamic Bank Guarantee Model

As a basis for implementing new model products in the future, below is the concept offered by Syamlan (2018), SRIA that is proposed by IAI TAZKIA – OJK and KNEKS of Indonesia below.

Figure 7.
SRIA and The
Proposed Future
Islamic Bank
Guarantee
Model
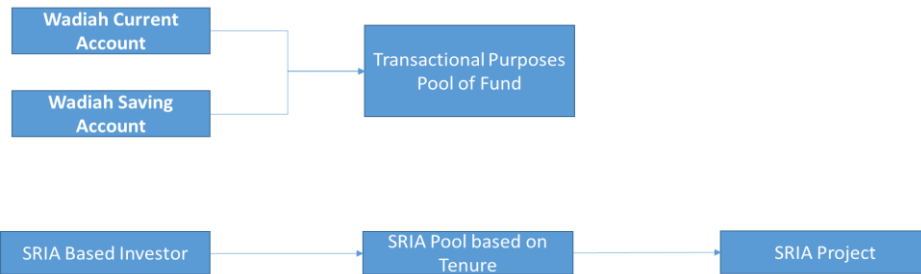
The depicted scenario outlines a strategic approach for Islamic banks to guide customers in choosing appropriate financial products based on their motivations and

Figure 8.
Phase 1 of SRIA
& Future Model
Phase
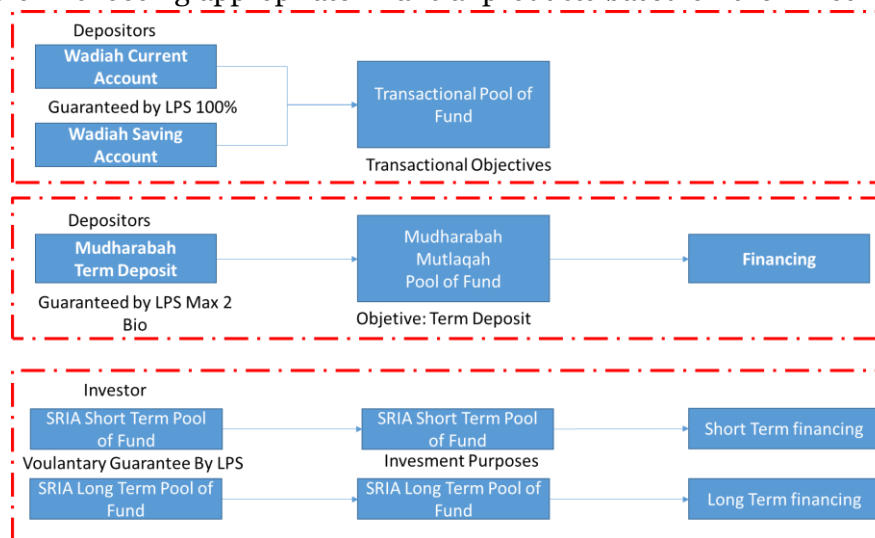
risk preferences. The key element in this context is the identification of customer motivation for engaging with an Islamic bank. Islamic banks are advised to categorize customers based on their financial objectives. If customers aim to save money for transactions or savings, the bank may recommend deposit products, encouraging them to unite as depositors. On the other hand, for customers seeking higher returns and willing to undertake more risk, Islamic banks may suggest investment accounts, such as those offered through Sharia Restricted Intermediaries Accounts (SRIA), allowing them to place funds in projects aligned with Sharia principles (Syamlan, 2018).

The approach involves segregating demand deposits from investment accounts due to their distinct nature. Savings and current accounts, representing demand deposits, are not utilized for debtor financing. Instead, pure debtor financing is facilitated through SRIA, emphasizing the acquisition of project financing over the prioritization of fresh funds. the entire business model undergoes two crucial stages before it is fully realized according to Figure 9 and Figure 10. The first stage serves as a transition phase, during which Islamic banks continue their regular operations while introducing new SRIA products to the public (Syamlan & Azinuddin, 2019). The Deposit Insurance Corporation (DIC or LPS in Indonesia) plays a pivotal role in managing different fund pools. In managing the Transactional Fund Pool, the primary objective is to cater to the financial requirements of depositors with transactional needs. This fund pool serves as a secure repository for individuals seeking a safe and easily accessible place to store their funds. In this context, LPS assumes a pivotal role by offering a blanket guarantee for this specific fund pool. The rationale behind this guarantee lies in the fact that Islamic banks refrain from utilizing these funds for

Analyzing the
Volatility of
Non-Core
Deposits in
Indonesian
Islamic Banks:
Sharia
Restricted
Intermediaries
Accounts
(SRIA) as
Stabilizer?

financing, ensuring that the deposited amounts remain secure and readily available for the depositors' transactional purposes (Asrianti et al., 2021; Ye, 2022).

Transitioning to the SRIA-Investment Fund Pool, this stage serves as a crucial transitional phase aimed at acclimating the community to embrace higher-risk financial instruments. Within this pool, the motivation shifts from mere savings to an expectation of returns on investment. To facilitate this transition, the existing *Mudharabah* Time Deposit product is introduced, offering a unique savings avenue with profit-sharing components. The LPS's role in this phase takes the form of providing a limited guaranteed scheme, reassuring depositors with a maximum coverage of Rp. 2 billion. This limited guarantee serves as a strategic measure to instill confidence among depositors, encouraging them to venture into higher-yield financial products while ensuring a safety net for their investments (Syamlan & Azinuddin, 2019).

This strategic model emphasizes the importance of risk-appropriate financial products aligned with Sharia principles. It ensures that customers are guided towards products that suit their financial goals and risk tolerance. The transition phase, combined with LPS's role in providing selective guarantees, contributes to building trust among depositors and investors, fostering a more robust and transparent Islamic banking ecosystem. Furthermore, the approach aligns with the principles of Sharia finance by emphasizing ethical investment and risk-sharing. As Islamic banks evolve, this model positions them as key players in the broader financial landscape, offering tailored solutions that resonate with the values and aspirations of their diverse customer base (Syamlan, 2018; Syamlan, 2016, 2018; Syamlan et al., 2018).
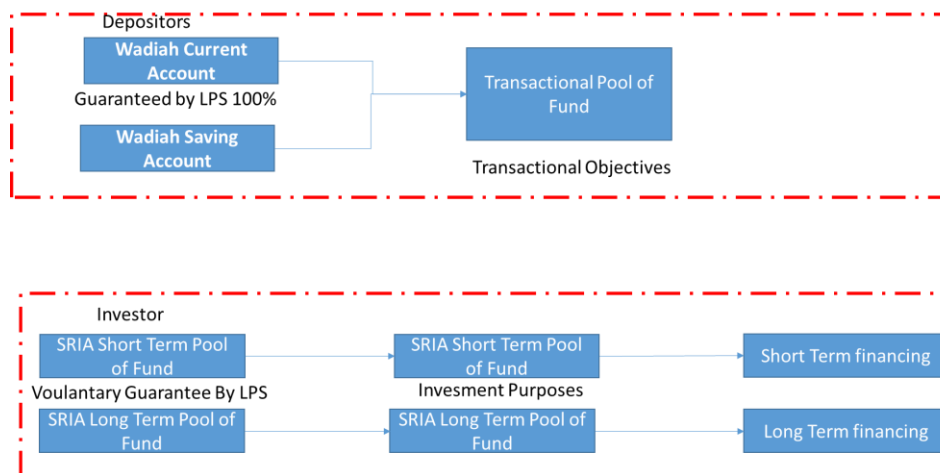
Figure 9.
Islamic Bank
Guarantee &
Liquidity
Management
Model Phase 2

In this scheme, LPS services are ultimately narrowed down into 2, namely providing blanket guarantees (Agusman et al., 2014) for transactional pools and providing voluntary guarantees for investment pools through SRIA (Ye, 2022). This scheme when comparing into Figure 9, the differences is on the omission of the Term Deposit Product of *Mudharabah Mutlaqah*. This evolution of the business model and guarantee services unfolds as a natural progression following the successful integration of customers and Islamic banks into the new financial landscape. This evolution is marked by a mutual acclimatization to the intricacies of Sharia-compliant financial products, symbolizing the maturation of the Islamic banking ecosystem.

As the business model refines itself, the LPS streamlines its services into a more simplified framework. This evolution is particularly evident in the services offered by the LPS during the second phase. The services now fall into two distinct categories. The first category involves providing blanket guarantees for transactional pools, ensuring the security of funds for depositors with transactional needs. Simultaneously, the second category sees the LPS offering voluntary guarantees for investment pools, especially those routed through Sharia Restricted Intermediaries Accounts (SRIA) (Danisewicz et al., 2022). In this case, SRIA recommendation is in line with Shahin

(2022) who proposes the bank to provide risk sharing contract to minimize the moral hazard of deposit insurance.

Within this evolved scheme, the role of the LPS is tailored to provide specific voluntary guarantees for investment pools. This strategic adaptation ensures that investors seeking higher returns actively contribute to the guaranteed scheme, aligning with the principles of transparency and shared responsibility. This idea is actually adopted from Stone (2021). He showed how Bank in America can boost their fund with providing additional deposit insurance aside from the Bank of America. The voluntary nature of these guarantees emphasizes the maturity of the Islamic banking ecosystem, highlighting the confidence placed in ethical financial practices and the strategic alignment with Sharia principles. This nuanced approach reflects a sophisticated understanding of risk management and the dynamics of the Islamic finance landscape, ultimately contributing to the sustainable growth of the industry (Syamlan & Jannah, 2019).

5. Conclusion, Implication and Limitation

At BUS and UUS there are no variables that have a positive effect in the short or long term. All variables at BUS namely total Third-Party Funds, COF, Vostro, COF Conventional Banks, and the BI rate have a negative effect on NCD. The total variable of Third-Party Funds makes the largest contribution to NCD BUS. While COF Conventional Banks are the biggest contributor to NCD at UUS.

As a solution, a new scheme is offered which has 2 stages of implementation where in the first stage, namely short-term changes, Islamic Banks must separate pools of funds according to their purpose where for transactional purposes based on wadiah contracts will only be used for customer transaction needs without being channeled to financing by sharia banks and 100% guarantee from LPS. The second pool in this short-term phase is to separate *Mudharabah Mutlaqah* Bank Syariah funds in one pool with the bank as the fund manager to be channeled to appropriate financing with an existing LPS guarantee of a maximum of Rp2 billion. The third pool, namely the investment pool, uses SRIA products where investors have the right to choose which projects are worth financing. In this SRIA product, risk is shared with investors, so LPS does not need to guarantee. Specifically for SRIA Products, Investors can request that their investments be guaranteed voluntarily by institutions other than LPS such as Sharia Financing Insurance. After Phase 1 shows good stability, Phase 2 (Figure 10) will be pursued by removing the *Mudharabah Mutlaqah* Deposit product to be replaced with SRIA which is not guaranteed by LPS.

The study relies on data sourced from the Indonesian Financial Service Authority (IFSA) and the Central Bank of Indonesia, spanning from June 2014 to January 2022. The limitations in data availability might restrict the generalizability of findings to different time periods. Then External factors, crucial in shaping the dynamics of NCD, are subject to various uncontrollable influences such as global economic conditions and geopolitical events. The study's focus on Indonesia may limit the generalizability of findings to other Islamic banking contexts. The Vector Auto Regression (VAR) and Vector Error Correction Model (VECM) employed, while robust, simplifies the complexities of real-world banking systems. Other nuanced factors influencing NCD may not be fully captured in the chosen model.

The findings, especially regarding the negative impact of certain external and internal factors on NCD, have implications for policymakers. Understanding these dynamics can aid in the formulation of policies aimed at fostering a stable and resilient Islamic banking sector. Banks, particularly Islamic banks, can leverage the insights gained from this research to enhance risk management strategies. By understanding the response of NCD to various shocks, banks can proactively adjust their operations and policies to mitigate potential risks. The proposed Future Islamic Bank Guarantee Model offers a forward-looking perspective for Islamic banks. Implementing phased

strategies, as suggested in the model, can position Islamic banks to adapt to changing market dynamics and cater to the diverse needs of their clientele. The research contributes to the academic discourse on Islamic banking by providing empirical evidence on the factors influencing NCD. Scholars can build on these findings to explore additional dimensions of Islamic banking and refine existing models.

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