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-RESEARCH ARTICLE-

ANALYSIS OF EFFICIENCY OF INTERMEDIATION FUNCTIONS FROM FINANCIAL INSTITUTIONS AND CONSUMER SURPLUS OF FUNDS IN INDONESIA

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─Abstract─

The number of reserves in banking that exceeds the amount of credit that customers do not pay off will be a problem because it will burden the bank and increase its operational costs. High operating costs will worsen banking efficiency. Therefore, banks need to manage their assets and liabilities to maintain their liquidity and earn business profits in carrying out their business. This study looks at banking efficiency from the intermediation function approach. This study aims to analyze the efficiency of the intermediation function of financial institutions and the consumer surplus of funds in the funds market in Indonesia. The Autoregressive Distributed Lag (ARDL) model with the PMG estimator analyzes efficiency, loan interest rates, and consumer surplus funds

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Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

using panel data from conventional banks during the 2000 – 2019 observation period. The results demonstrated the validity of the three models used to estimate EFI, Interest, and Consumer Fund Surplus. All independent variables employed in the three models influence EFI, Interest, and Consumer Fund Surplus statistically. Each Model's independent variables are cointegrated and have a long-term connection with EFI, Interest, and Consumer Fund Surplus. The research findings have the following policy implications. In this digital era, EFI measures must incorporate elements of changes in financial service technology, and monetary authority regulations are required to discipline banking actors so that the management of banking assets and liabilities becomes more efficient. Using multiplier effect analysis, Consumer Surplus Funds in the fund market will be used to measure changes in the level of satisfaction and public welfare in the goods and services market.

Keywords: Intermediation Function Efficiency (EFI), Loan Interest Rate, Consumer Surplus Funds (CS_L), Ratio of Operating Costs to Intermediation Income (BOPI).

1. LATAR BELAKANG

In the 1980s, deregulation of financial markets included the provision of credit or similar facilities from banks and looser regulations for establishing financial institutions. This condition has led to a strong foundation for developing the financial sector so that its growth is faster than other economic sectors.

The current financial system has changed and become more complex. There has been a surge in the diversity of financial instruments, the diversification of financial operations, and the complexity and dynamism of the hazards. The financial sector has become more interdependent and integrated with industrial and geographical aspects. The global financial ecosystem is characterized by intricate and ever-changing relationships Arestis, Basu, and Mallick (2005); Tobin (1999). These indicators show that the financial system is becoming more accessible. All of these will have substantial connections to financial markets. Complex financial markets and openness to capital flows will encourage economic growth in a nation.

The financial system includes financial institutions (banks) and financial markets, which facilitate financial transactions, such as the flow of funds from lenders to borrowers Babu (2018). Intermediation theory states that financial intermediation can pay lender-savers interest or provide substantial services and still earn a profit Mishkin (2010). Financial intermediation also increases efficiency by increasing the allocation of productive resources and reducing liquidity constraints Eden (2016). If the financial system does not function, economic growth will be hampered because companies will not be able to expand and adopt new technologies during the 2007-2009 financial crisis in the USA Levine (1997). History shows that only countries with well-developed financial systems have maintained high levels of economic growth (Aziakpono, 2003; Dima & Opris, 2014).

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

Financial institutions borrow money from savers and lend it to borrowers. Investors and borrowers receive three primary benefits from financial institutions: risk sharing, liquidity, and information Mishkin (2010). Commercial banks are the prevailing financial institutions. Financial institutions contribute significantly to the economic success of developed nations (Mayer, 1990; Shephard, Joshi, Susaeta, & Will, 2021). Financial institutions play a crucial role in the economy, the primary source of loans for consumers and enterprises Levine (1997). People and businesses cannot typically borrow money directly from savers and must instead acquire loans from financial organizations or banks. Therefore, when banks decide to tighten the requirements for obtaining loans, many households cannot obtain the credit necessary to purchase automobiles and homes, and small businesses have trouble financing operations. In the post-conflict era in Sri Lanka, the increased demand for credit paralleled the expansion of banking branches, with private sector credit expanding by 25,1 percent in 2010, 34.5 percent in 2011, and 17.6 percent in 2012 (Arjomandi, Dakpo, & Seufert 2018).

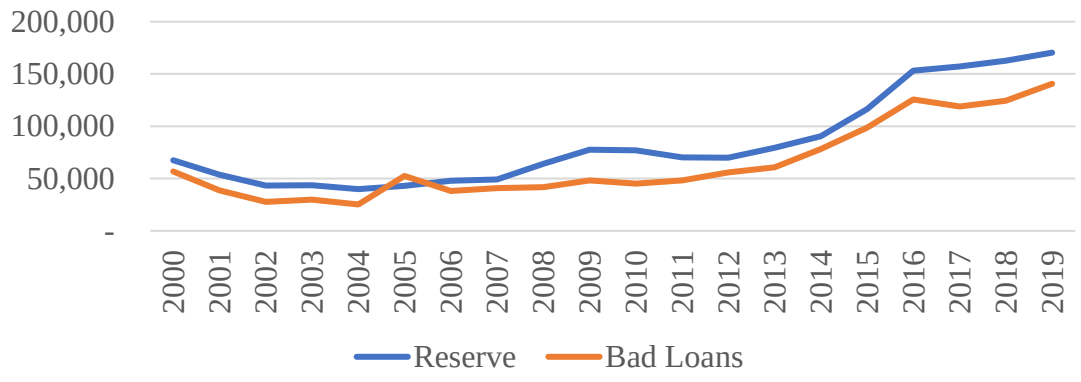
In addition to providing cost-effective services, the financial system collects and disseminates information on the expected return on financial securities to borrowers. This is because asymmetric information is problematic in numerous financial transactions. Asymmetric information refers to a circumstance in which one side of an economic transaction has superior knowledge. For instance, individuals and businesses requesting loans are more aware of their financial status than the lender. A corporation seeking to borrow money to avoid bankruptcy has a strong motive to conceal its precarious financial condition from prospective lenders. Similarly, an investment bank attempting to sell security has an incentive to make it appear less dangerous than it is. Adverse selection is the term economists use to describe a situation in which one side of a transaction takes advantage of knowing more than the other. Often, lenders will give money if they have complete information about the borrower's true financial situation.

The importance of the financial system to the economy cannot be overstated. The intermediary function of financial institutions will assist in the reallocation of resources, particularly finances, so that surplus funds in surplus units can be utilized by deficit units Law No. 10 of 1998. In order to perform the intermediation role and other financial service functions, financial institutions must be in good health and devoid of stress Working Paper Bank Indonesia, 2013. The health and resilience of financial institutions will promote the efficient implementation of the intermediation role to be effective. The intermediation function of financial institutions will also affect the surplus of funds that groups can enjoy with a deficit of funds. In addition, the surplus funds that the deficit group can enjoy can be used to improve welfare. The positive impact of financial activity on economic productivity depends on capital intensity. Although according to research by Morales (2003), there are positive and negative externalities as a result of the development of financial intermediaries on economic growth. However, Beck, Lundberg, and Majnoni (2006) state that there is no clear relationship between financial intermediaries and the volatility of economic growth and that financial intermediaries

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

are not a cure-all. This means that the efficiency of the intermediation function of financial institutions can affect the consumer surplus of funds, while the use of the surplus funds largely determines the capacity of the national economy.

Figure 1. Total Reserves and Bad Loans in Conventional Banking in Indonesia The year 2000-2019
(Billion Rupiah)



Source: OJK, SPI 2000 – 2019.

The LDR ratio (loan to deposit ratio) increases during the 2000 – 2019 period, followed by the reserve size also increasing in the same period. Related to the prudential principles and risk management, banks apply in carrying out business activities (POJK No. 4 of 2016). In Figure 1, it can be seen that the value of the reserve funds set is far greater than the bad loans it faces (OJK, SPI Year 2000 - 2019). Determining the value of reserve funds that exceed bad loans will cause problems for banks. Therefore, the problem faced by the financial sector (banking) in Indonesia, namely that the number of reserves that exceed the number of bad loans, will burden the banking sector because it will increase operating costs.

Based on a functional perspective for financial institutions Merton and Bodie (1995), this study develops a financial framework for financial institutions (banks), especially in distributing funds. This financial framework addresses three main issues: the intermediation function's efficiency, interest rates on loans, and consumer surplus funds. This study aims to estimate the financial behavior of financial institutions (banks) in channeling loan funds to the fund market, using 3 models: Intermediation Function Efficiency Model, Interest Model, and Consumer Fund Surplus Model. The combined panel approach of autoregressive distributed lag (ARDL) was estimated using the Pooled Mean Group (PMG). Research results can contribute to clarifying issues that can be explained with each of these models. In addition, it can also explain the role of banks in increasing consumer surplus funds. The large consumer surplus of this fund will be used

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

for productive activities to increase the usability of borrowed funds, namely for the community's welfare.

2. LITERATURE STUDY

2.1 Banking Efficiency

The notion of efficiency examines the "Benefits and Costs" of economic operations inspired by these economic issues. Multiple concepts of efficiency arose. Efficient can be regarded as achieving an optimal goal (quickly and accurately) while using the fewest resources possible. Consequently, the relationship between inputs and outputs is utilized to measure the level of efficiency Shephard et al. (2021). Efficiency in banking is defined as the difference between the observed and ideal numbers of input and output variables. A bank is considered efficient if its value reaches a maximum of one, whereas it is considered inefficient if its value may be reduced to zero. Mathematically, efficiency can be expressed as the ratio of output to input, the quantity of output produced per input unit, or the ratio of output to input (Gordo, 2013).

The three components of banking's financial activity are capital, institutional efficiency, and intermediation. These three financial activities are referred to as the financial system stability trinity because they describe the condition of a financial system that can function effectively and efficiently and can withstand both internal and external fluctuations so that the allocation of funding or financing can contribute to the growth and stability of the national economy (Larson, Butzer, & Mundlak 1998). Using the Data Envelopment Analysis approach, the efficiency of banking institutions may be determined using input and output indicators (Cooper and Ejarque 2000). Specifically, Matthews and Ismail (2006) explain that firm efficiency, particularly in the banking industry, is intimately tied to banking market efficiency, intermediation process efficiency, and efficiency in executing monetary policy via regulation of bank lending.

Data Envelopment Analysis (DEA) has been utilized in several studies analyzing the efficiency of banking organizations. Several studies, including those undertaken by Barr, Killgo, Siems, and Zimmel (2002); Garza-García (2012); Gong and Phelan (2015); Gordo (2013); Morales (2003); Safiullin, Ismagilova, Gallyamova, and Safiullin (2013) have examined the efficiency of financial institutions (2016). After analyzing the efficiency of banking institutions, the elements believed to influence their performance are analyzed. According to Sufian and Kamarudin (2016) factors believed to affect the efficiency of banking institutions include performance, concentration size, non-interest income, capitalization, and sector risk.

2.2 Intermediation Function Efficiency

One of the three banking financial activities is intermediation . According to Berger and Humphrey (1997), the intermediation approach is more appropriate for evaluating

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

financial institutions. In the financial sector, intermediation becomes important. Therefore, banks are also required to be efficient in carrying out the intermediation function. Banks can carry out their intermediation function if the banking institutions are efficient and have good resilience. There are two aspects used to measure the size of the banking intermediation index, namely the idiosyncratic aspect (horizontal) and the vertical aspect Basaza et al. . The idiosyncratic aspect is measuring the size of the intermediation index based on the behavior of individual banks in conducting intermediation, both in distributing funds and raising funds as a form of banking business. Meanwhile, in the vertical aspect, the intermediation index is measured by the overall banking intermediation function associated with the national economy. Merton (1989) has developed a model that financial intermediaries provide functions that allow risk to be allocated efficiently at minimum cost.

Several prior scholars in banking intermediation incorporated banking intermediation as an exogenous variable in the Model they created. Several measures are used as banking intermediation variables as an exogenous variable in the Model, including the size of the product diversification, carried out by banks, such as the Model developed by Winton (1997), which states that the greater the product diversification, the more effective the intermediation function. Other metrics are employed as proxies for intermediation variables, such as Cooper and Ejarque (2000) and Levine (1997), which use reserve requirements, regulations, and technology to measure the efficiency of financial intermediation that affects economic growth Oks (2001) employs four ratios, including the ratio of bank credit to the private sector to GDP, the ratio of claims to the private sector to domestic credit, the ratio of domestic credit issued by commercial banks to domestic credit issued by commercial banks and the central bank, and the difference between the interest rate on loans and deposits. Beck et al. (2006) employ the amount of private credit as a proxy for the efficiency of financial intermediation, while economic growth is the endogenous variable. According to Eden (2016), financial intermediation is inefficient when it drains productive resources and causes input prices to rise. In addition to being an exogenous variable, financial intermediation efficiency can also be employed as an endogenous variable. The Model developed by Thilakaweera, Harvie, and Arjomandi (2016) measures intermediation efficiency using the cumulative growth of advances balances as an endogenous variable and the number of permanent employees, the total value of fixed assets, and cumulative deposit balances as exogenous variables.

This study analyzes the efficiency of the intermediation function based on the distribution of loan funds by individual banks. According to the concept of Efficiency theory with "cost-benefit" analysis, efficiency is a metric that demonstrates how to achieve the largest intermediation objective while incurring the same amount of expenditures. The banking intermediation function in terms of loan fund disbursement is the basis for measuring the efficiency of the intermediation function with the ratio between operational costs and income from intermediation (BOPI), with a maximum

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

value of 1 (one); the lower the BOPI, the lower the efficiency of the intermediation function. This study's Model for estimating the banking intermediation function combines the efficiency of the intermediation function as an endogenous variable with exogenous factors such as indices of banking resilience and the efficiency of banking institutions.

2.3 Financial Sector and Economic Growth

To build a theoretical foundation on the relationship between the financial sector and the real sector is to determine the transmission mechanism between the financial sector and the real economy. To do so, we begin by defining the main functions of the financial sector. The general objective of the financial sector is time-to-time, namely the transfer of resources. More specifically, the financial sector helps firms overcome adverse moral hazards by reducing external financing (Rajan and Zingales, 1998) and transaction costs in general (Levine, 1997).

Information gathering, resource allocation, increased liquidity Greenwood and Jovanovic (1990), increased productivity King and Levine (1993), and decreased monitoring costs (Gordo 2013; Holmstrom & Tirole 1997) are indicators of the positive impact of financial sector development on economic growth. A financial intermediary's role is to assist agents in selecting higher-profits projects. Agents cannot invest in these initiatives without financial intermediaries due to a lack of knowledge and poor project liquidity (Greenwood & Jovanovic 1990). Quantitatively, the financial system is not as involved in real capital accumulation as anticipated. At least not in giving capital to finance investments for productive firms, since the vast majority of business investment in a particular period is funded internally (Holmstrom & Tirole, 1997; Winkler, 1998).

Numerous impact analysis models have been established in the study of the relationship between financial sector expansion and economic growth. Bencivenga and Smith (1991) found that the development of the financial sector is measured by the number of financial institutions in the economy to compete with one another, hence influencing economic growth. According to a similar study by Morales (2003), financial innovation has two negative effects in the form of moral hazard, whereas the positive effect is aggregate growth. The significance of financial institutions for the economy, whether or not an economy is integrated (Aziakpono 2003). Long-term, if the cost of borrowing for micro-enterprises is reduced, then the number of micro-enterprises will increase, leading to economic expansion Swamy and Bk (2011), comparable to Dima and Opris (2014). According to King and Levine (1993), in Kenya, there is an intermediary financial institution known as SACU, through which each member receives a loan at a reduced rate so that it can contribute to the community's welfare. Conventional banking, Islamic banking, and non-bank financial institutions can coexist and mutually promote economic expansion (Mirza, Rahat, and Reddy 2015).

In contrast to Pesaran and Smith (1995), who contends that the presence of leverage

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

costs will increase financial intermediation, leading to financial sector instability. Histories demonstrate that, during economic downturns, all household borrowers and savers bear a portion of the welfare costs borne by the US society Morales (2003). This implies that borrowers will bear a greater burden than savers, even though savers will also incur a loss.

2.4 Loan Interest Rate

Equilibrium in the funds market determines the number of loanable funds that will flow from the lender to the borrower each period. It also determines the loan price (loan interest rate) that the lender will receive and that the borrower must pay. Financial institutions as producers know the price of borrowed funds (output) and the price of input funds. As a business institution, banks diversify their products to reduce interest rate risk and adjust products with longer maturities with higher-yielding instruments. Financial institutions (Banks) will care about profit margins and protect and increase the company's ongoing revenue streams.

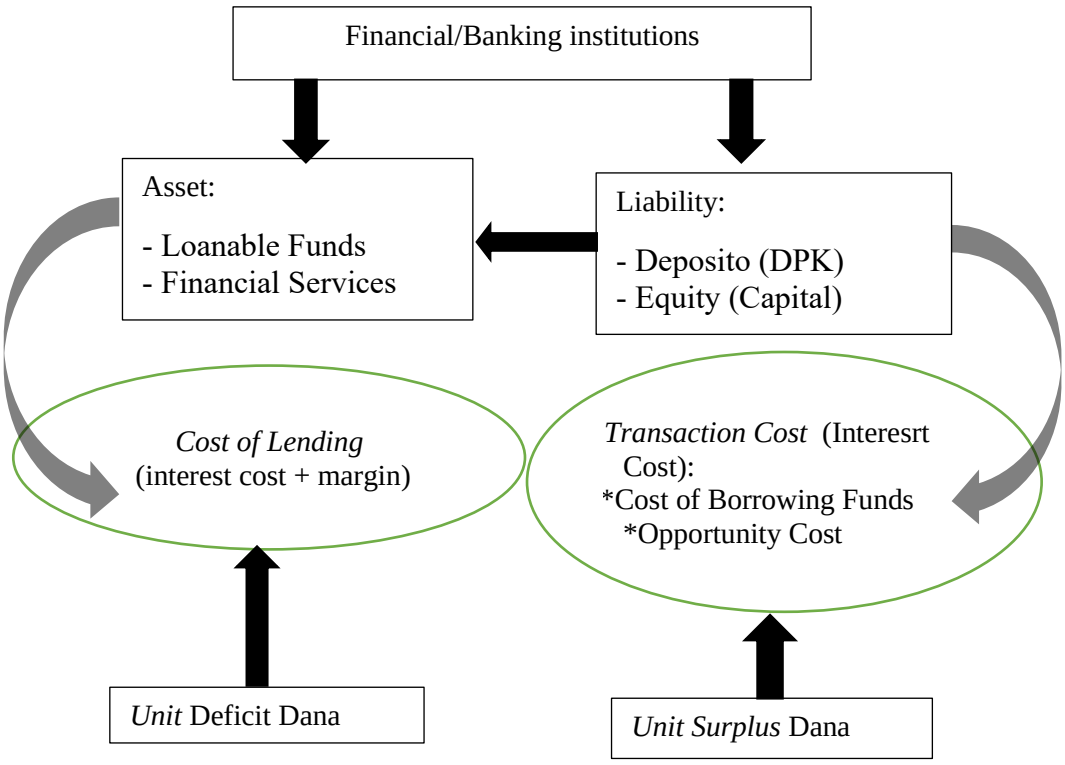


Figure 2. Illustration of Flow of Funds and Fees

The evolution of the banking industry requires banks to be more inventive and resourceful in finding and acquiring sources of capital. The increasing number of banks increases the competition to acquire public cash. Each bank will compete to raise as much money as possible from the public and then redistribute it to those in need. The intended interest rate for a loan indicates how much the lender will receive and how much the borrower will pay. Consequently, interest rate risk is managed solely by each financial institution or bank.

The formation of financial assets for financial institutions (banks) covers three areas, namely: capital (equity), fundraising (pooled of funds), and use of funds (asset allocation). Banks must incur costs from collecting funds, namely transaction costs, which consist of the cost of borrowing funds (cost of borrowing funds) plus other opportunity costs (opportunity costs). The sum of the two fields, namely equity (equity) and fundraising (deposits / DPK), will result in the use of funds (assets). The use of funds such as in the form of loan funds (credit). Credit disbursement will incur lending costs, the sum of transaction costs plus a margin. The cost of lending (costs of lending) depends on industry structure, information, and technology. Therefore, Assets and Liabilities management shows the bank's ability to generate profits.

Financial Institutions (Banks) as business institutions with the principle of prudence in determining the desired loan interest rate, with the condition of an efficient intermediation function (Thilakaweera et al., 2016) and also considering the amount of profit expected to be obtained (Kumar 1977). In the fund market, financial institutions (banks) determine the loan interest rate based on managing assets and liabilities that will incur costs for banks (Figure 2). The loan interest rate reflects the amount of these costs and the desired profit. Alternatively, the loan interest rate is influenced by the amount of obtaining funds (transaction cost) and the cost of lending (cost of lending). Therefore, several factors affect the loan interest rate (i_{Lt}) set by financial institutions (banks) such as borrowing costs/savings ($Depo_{it}$), fund management costs/operational costs (BO_{it}), opportunities such as Bank Indonesia Certificates (SBI_{it}), and the efficiency of the intermediation function of financial institutions (EFI_{it}).

2.5 Consumer Surplus Fund (CS_L)

The demand curve (D) shows how many people are willing to pay for an additional unit of the good at various quantity levels (Q). The total value of a consumer's purchase of a good (relative to a situation in which none of the good is available) is represented by the total area under the demand curve from Q = 0 to Q = Q* (equilibrium). At equilibrium, the consumer pays a given amount of (P*.Q*) and therefore receives a "surplus" (above the P* that the consumer pays), the size of the consumer surplus is indicated by the area AP*E (Figure 3). When there is an event in the market that can change P* and Q*, there will be a change in consumer surplus (Nickson Muhaya Kadagi, Ahmed, & Wafula ,2015).

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

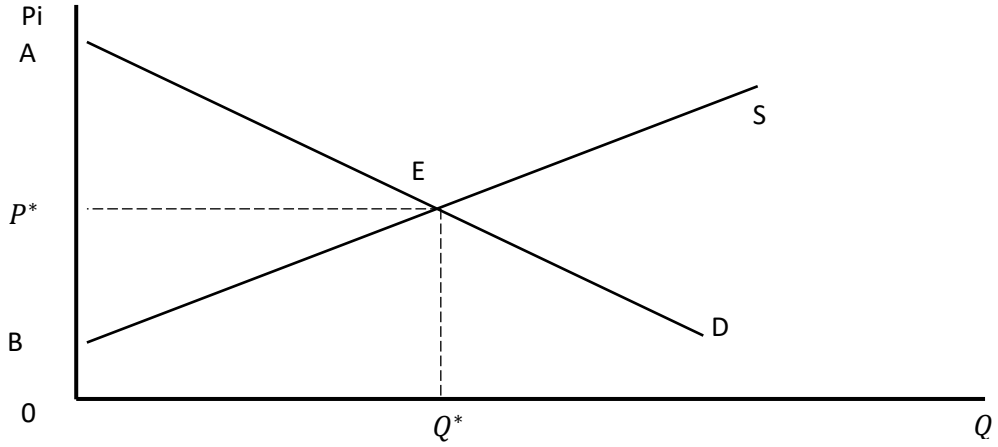


Figure 3. Goods & Services Market
Source: Nicholson & Snyder, 2010

Consumer surplus (CS) is the extra value individuals receive from consuming a good over what they are paid for, i.e., AP*E, what people would be willing to pay for the right to consume goods at current prices. Producer surplus (PS) is the extra value producers get for good over the opportunity costs incurred to produce it, i.e., BP*E. Based on the understanding of the two surpluses, the amount of the surplus can be identified as the amount of profit that the community can enjoy. In modern economic literature, the term "consumer profit" denotes the difference between the maximum amount of money a consumer is willing to pay for the quantity of a good and its actual cost, based on current market prices. This is the area between the demand curve and the market price line for consumers. Several studies have been conducted to estimate the number of consumer surpluses, such as (Blackburne Iii & Frank, 2007; Blackorby & Donaldson, 1999; Larson et al., 1998; Oks, 2001; Schlee, 2008; Stennek, 1999).

Consumer Surplus as an estimate of welfare has been modeled by Stennek (1999), namely the estimation of consumer surplus (ECS) for welfare (Welfare, W), $ECS \equiv W$. A similar study by Blackorby and Donaldson (1999) calculated the consumer surplus in the housing market due to the planned development of rail transportation outside the city. Estimated consumer surplus in the competitive Korean cellular phone service market. Schlee (2008) argues that the change in the expected consumer surplus (ECS) approximates the change in the consumer's willingness to pay. Several previous researchers have used consumer surplus (CS) from the consumption of final goods to estimate the monetary measure of people's welfare. Meanwhile, this study estimates the amount of consumer surplus funds (CS_L). Consumer surplus of funds (CS_L) cannot be applied to measure welfare because consumer surplus of funds is an intermediate consumption of goods.

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

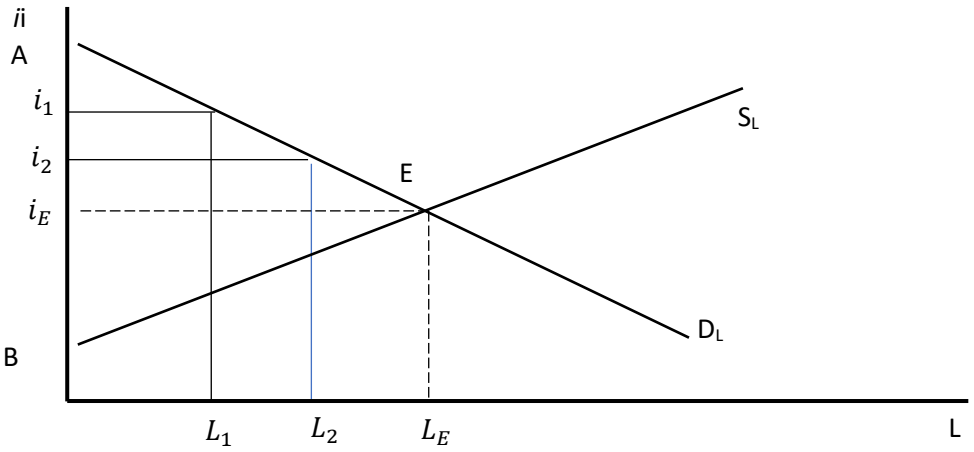


Figure 4. Fund Market Dana
Source: Hubbard et al, 2012

The balance of the funds market (Figure 4) will result in a market surplus consisting of a consumer surplus of funds and a surplus of producer funds. Fund consumers are categorized as deficit units or groups lacking funds, so it would be more appropriate to prioritize the study on consumer surplus funds when discussing welfare. A consumer surplus of funds is a surplus that can be enjoyed from the consumption of funds because funds are intermediate goods. This implies that the surplus of consumer funds cannot be used to measure welfare. The consumer surplus of funds is strongly influenced by the behavior of the supply of funds (S_L) and demand for funds (D_L). Financial institutions (banks) as suppliers of funds and at the same time as a business entity, when choosing the form of assets, will be a combination of liquidity with other assets (Mishkin, 2010). Therefore, the amount of funds provided for loans (S_{Lit}) is influenced by several factors such as the number of funds collected / third party funds (DPK_{it}), the loan interest rate (i_{Lit}), the rate of return of alternative types of wealth other than borrowed funds (μ_{it}), and Intermediation Function Efficiency (EFI_{it}). The assumption is that the use of funds by the deficit unit is for additional working capital and investment so that the demand for loanable funds will be influenced by investment behavior to obtain future profits Mishkin (2010). Therefore, the demand for loanable funds (D_{Lit}) is influenced by income (Y_{it}), interest rates on loans (i_{Lit}), expectations of future loan interest rates $(\hat{\imath}_{Lit+1})$, desired return on investment (r_{it}), and inflation (π_{it}).

The demand for funds is determined by the willingness of borrowers (borrowers) to pay the loan interest rate. If the interest rate on a loan is high, only a few borrowers can afford to borrow. The lower the interest rate on a loan, the wider the reach of the borrower. At loan interest rates as high as i_E (Figure 4) some borrowers get a surplus because they do not have to pay according to their abilities. Consumer surplus of funds (CS_{Lt}) can be

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

interpreted as the ability of the borrower to pay the loan price. In economic theory, it is known as "willingness to pay." The lower the interest rate on a loan, the greater the consumer surplus of funds. The amount of consumer surplus of funds (CS_{Lt}) is measured by the change in consumer surplus of funds (ΔCS_{Lt}) caused by changes in the interest rate on loans multiplied by the loan amount, which can be formulated as follows:

$$CS_{Lt} = \Delta CS_{Lt} = \Delta i_{Lt} \; x \; L_t \quad \text{...} \; (1)$$

Changes in the consumer surplus of funds (ΔCS_{Lit}) occur when there is a new equilibrium in the funds market. The area of ΔCS_{Lit} is affected by the behavior of the demand curve for funds and the curve for the supply of funds. To estimate the consumer surplus of funds model (CS_{Lit}), several factors that are considered influential from the demand side of funds are selected, namely: the expected loan interest rate in the future ($\hat{\imath}_{Lit+1}$), from the supply side of funds, namely: DPK_{it} and EFI_{it}.

This research contributes to existing knowledge in three ways. First, there are no studies, as far as we know, that have measured the efficiency of the banking intermediation function by the ratio between operating costs to income from intermediation (BOPI) and used as an endogenous variable in the Model. Second, based on the financial system stability trinity (Working Paper Bank Indonesia, 2013), Intermediation Function Efficiency (EFI) is analyzed as an endogenous variable in the Model using bank resilience and health indicators as exogenous variables. Third, the consumer surplus of funds is approximated by the magnitude of the change in the surplus of consumer funds which is measured by the formula as the product of the change in the interest rate on a loan and the amount of the loan, ($\Delta i_{Lt} \; x \; L_t$).. This consumer surplus of funds is estimated as an endogenous variable using exogenous variables originating from the demand for funds and the supply of funds.

3. METHOD

3.1 Data and Data Sources

To measure the efficiency of the intermediation function, loan interest rates, and consumer surplus funds, we use the data from the available database to provide a snapshot of the Indonesian banking industry. From 2000 to 2019, panel data from six groups of conventional banks are utilized. Included in the requested data are loan interest rates, loan quantities (loans), DPK, NPL, CAR, ROA, NIM, banking profits and banking revenue from loans, and qualitative data pertinent to this study. All of these statistics are derived from official agency publications, particularly those of Bank Indonesia (BI), the Financial Services Authority (OJK), and the Central Statistics Agency (BPS).

3.2 Variables Used in the Model

This study estimates the financial framework for disbursing loan funds by banks in the fund market. Financial institutions (banks) must be healthy institutionally and have

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

resilience in facing financial risks Working Paper Bank Indonesia, 2013. In carrying out the intermediation function, banks will enter the funds market. Banking as a business entity that in carrying out the intermediation function cannot be separated from the goal of seeking profit. This profit can be obtained through the difference between the loan price and the acquisition cost of funds. Therefore, financial institutions (banks) will formulate loan prices that will generate profits, provided that the institutions are sound, have sufficient resilience, and the intermediation function will is efficient. Consideration of financial institutions (banks) in determining the amount of the loan price based on asset and liability management. Namely: the cost of borrowing (cost of borrowing funds), opportunity costs, costs of lending, and efficiency in distributing loan funds. When the funds market is in balance, the magnitude of the change in the consumer surplus of funds will be known. This means that the amount of change in the consumer surplus of funds is not only determined by changes in the demand for funds but also by changes in the supply of funds.

To achieve the objectives of this study, three models were used: efficiency of the intermediation function, interest rates on loans, and consumer surplus funds. The variables used in each Model are as follows:

1. Intermediation Function Efficiency Model (EFI),

$$EFI_{it} = f(NPL_{it}, CAR_{it}, ROA_{it}, NIM_{it}) \quad \text{.....} \quad (2)$$

a. EFI_{it} is measured from the idiosyncratic aspect because the behavior of individual banks in conducting intermediation is a form of banking business. The size of EFI_{it} is: $BOPI_{it}$ is the ratio between Intermediation Revenue over Operating Costs.

$$EFI_{it} = BOPI_{it} = Operating\ Costs_{it} / Intermediation\ Revenue_{it}$$

b. Non-Performing Loan (NPL_{it}), reflects the credit risk faced by banks and is used to measure the bank's ability to refute the risk of credit failure by debtors. This study uses the net NPL_{it}measure, namely the ratio between Allowance for Impairment Losses (CKPN) and total loans.

$$NPL_{it} = (CKPN_{it}) / Total\ Kredit_{it}.$$

c. Capital Adequacy Ratio (CAR_{it}), a capital ratio to measure banking resilience as a reflection of the level of internal banking pressure.

$$CAR_{it} = (Core\ Capital_{it} + Supplementary\ Capital_{it}) / ATMR_{it}$$

d. Return on Assets (ROA_{it}) is a measure of the effectiveness of banks in obtaining profits by utilizing their assets.

$$ROA_{it} = Profit\ Before\ Tax\ in\ the\ last\ 12\ months\ /\ Average\ Assets\ in\ the\ same\ period.$$

e. The net interest margin (NIM_{it}) is chosen to show how much profit banks earn in

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

running their business. NIM is measured by the ratio of net interest income divided by average earning assets.

NIM_{it}= *Net Interest Income / Average Earning Assets*

2. Loan Interest Rate Model (Interest)

$$i_{Lit} = f(Depo_{it}, Bo_{it}, SBI_{it}, EFI_{it}) \quad \text{..... (3)}$$

a. Loan interest rate (i_{Lit}), which is the amount of interest rate on loans from conventional banks. What is used is the loan interest rate for capital and investment.

b. The 1-month deposit interest rate ($Depo_{it}$) is the amount of a one-month deposit interest rate in conventional banking.

c. Operational Costs (BO_{it}) are the total banking operational costs written on the income statement in the Indonesian Banking Statistics report, in billions of rupiah.

d. Bank Indonesia Certificate (SBI_{it}), in billions of rupiah. SBIs are securities issued by Bank Indonesia in recognition of short-term debt.

e. EFI_{it}As measured by $BOPI_{it}$ is the ratio between Operating Costs to Intermediation Revenue.

3. The Consumer Surplus Fund Model

$$CS_{it} = f(Ex\_Bunga_{it}, DPK_{it}, EFI_{it}) \quad \text{..... (4)}$$

a. Consumer surplus of funds is the amount of change in the surplus of consumer funds in units of billions of rupiah. The formula for changing the consumer surplus of funds:

$$CS_{it} = \Delta CS_{it} = \Delta i_t^*.L_t^*$$

b. The future loan interest rate expected by the demander for loanable funds (i_{t+1}) is the same as the loan interest rate for the period (t+1) in percent.

c. The amount of savings or third party funds in conventional banking (DPK_{it}) is the number of third-party funds in conventional banking in billions of rupiah.

d. EFI_{it}As measured by $BOPI_{it}$ is the ratio between Operating Costs to Revenue from Intermediation.

3.3 Model Pooled Means Group

3.3.1 ARDL Model

The data panel used in this study is from 6 conventional banking groups for 20 years from 2000 to 2019. Empirically, there is a dynamic adjustment to the variables used in

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

the three models to be analyzed. Therefore, the approach used is to study the heterogeneity of dynamic adjustments in both the short and long term, namely the combined panel approach of autoregressive distributed lag /ARDL (Gujarati, 2008). The reasons for using the ARDL model, as stated by Shin et al. (2014) that the nonlinear ARDL model in the form of a panel which is also a nonlinear representation of the dynamic heterogeneous panel data model, there are three reasons; First, it is possible to capture asymmetry nonlinearly. Second, it considers the effects of inherent heterogeneity in the data. Third, it is more appropriate if the unit root or mixed order of integration is not more than I (1).

The long-term effects of the efficiency model of the intermediation function, loan interest rates, and consumer surplus funds, so that the basic Model can be formed from the panel data as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it} \quad \text{...} \quad (5)$$

In the current studies, it is known that there is a balance through the process of adjusting variables for the short and long term. Therefore, an ARDL panel model approach is needed to control heterogeneity in the relationships that exist between variables and integrate individual-specific effects. Referring to the work of Pesaran, Shin, and Smith (1999), the ARDL model (p, q) is determined by the following equation:

$$Y_{it} = \sum_{j=1}^{p} \varphi_{ij} Y_{i,t-j} + \sum_{j=0}^{q} \delta_{ij} X_{i,t-j} + \vartheta_i + \varepsilon_{it} \quad \text{...} \quad (6)$$

With i = 1,2, . . ., N is the type of Bank; t = 1, . . , T is time; j is the number of lags; X_{it} is a vector of exogenous variables, and ϑ_i is a specific fixed effect of the type of bank (group). To consider the adjustment coefficient and long-term dynamics, equation (6) can be rearranged by reparameterization as follows:

$$\Delta Y_{it} = \emptyset_i \left(Y_{i,t-1} - \theta_i X_{it} \right) + \sum_{j=1}^{p-1} \varphi'_{ij} \Delta Y_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{ij} \Delta X_{i,t-j} + \vartheta_i + \varepsilon_{it} \quad \text{.........} \quad (7)$$

where $\emptyset_i$ is the error correction speed in the long-term dynamics adjustment. If $\emptyset_i$= 0, then there is no evidence for a long-term relationship. This parameter is expected to be negative and significant with the assumption that all variables show results toward long-term equilibrium. θ_i shows the long-run equilibrium relationship between Y_{it} and X_{it}. Meanwhile, φ'_{ij} and δ'_{ij} represent the short-term coefficients that relate the endogenous variables to the past values of the interesting variables, X_{it}. A long-term relationship between endogenous variables and exogenous variables exists if $\emptyset_i$ is negative and significant, then there is a cointegration relationship between Y_{it} and X_{it}. To estimate equation (6), three estimation methods can be used, namely: mean groups (MG) developed by Pesaran and Smith (1995), pooled mean groups (PMG) developed by Pesaran, Shin, Yu, and Greenwood-Nimmo (2014), and dynamic fixed effects estimator (DFE).

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

3.3.2 Pooled Means Group (PMG) Estimator

Based on pooling and averaging, an intermediate estimator known as the combined mean group estimator (PMG) is utilized in this study. The combined group mean (PMG) estimator restricts the long-run coefficients to be identical but permits the intercept, short-run coefficient, pace of adjustment of long-run equilibrium values, and error variance to vary independently across groups (Pesaran, Shin, & Smith 1999). The PMG estimator anticipates that the long-run equilibrium relationship between variables will be comparable across groups due to the limitations that may emerge during this period. Long-term restrictions may include fiscal or solvency constraints, arbitration requirements, or universal technology that impacts all groups equally. Consequently, the rationale for assuming that the short-run dynamics and error variance should be the same is likely to be less compelling. In addition, the absence of a short-term slope coefficient equivalency allows for distinct group dynamic formulations.

In conventional banking-related research, determining the savings interest rate is a crucial policy problem. According to the purchasing power parity theory, which predicts that the income elasticity of long-term consumption will be the same, the quantity of public savings in all banks will be identical. Aside from this, the quantity of savings in the bank will grow or shrink indefinitely. The PMG estimator makes it possible to estimate common long-term coefficients without making unnecessary assumptions about each bank's dynamics. In addition, the determination of loan interest rates is an essential issue in banking. Long-term, the reaction of demand for loanable funds to income and loan pricing changes tends to be rather consistent among institutions. Although short-term changes in the demand for loanable funds are dependent on real sector investment patterns, they are unlikely to be uniform across banks. Again, the PMG estimator enables the investigation of long-term homogeneity without enforcing short-term parameter homogeneity. Pooled mean group (PMG) estimator emphasized the pooling suggested by the homogeneity restriction on long-run coefficients. In addition, the mean across groups is utilized to estimate the error correction coefficient and other short-term model parameters.

Zardoub (2021) uses the ARDL Approach and the PMG estimator to examine the short-term and long-term effects of financial flows on economic growth, concluding that the influence of financial flows on economic growth is economically dependent on investors' expectations. Zardoub also established a long-term link due to the negative and statistically significant adjustment coefficient (error correction parameter). Additionally, Zaedoub discovered that the PMG estimator was more reliable and effective. Short-term, foreign direct investment is detrimental to economic growth, while its long-term impact is negligible.

Blackburne Iii and Frank (2007) estimates of the long-run inflation elasticity were notably negative. Moreover, income elasticity estimates are highly positive. The PMG estimator permits heterogeneous short-run dynamics and generic long-run income and

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

inflation elasticity, according to (Blackburne Iii & Frank 2007). Frequently, only long-term variables are of importance. The PMG results contain both long-term and short-term average parameter estimates.

In their research, Salisu and Isah (2017) utilized the ARDL model to determine the relationship between oil prices and stock prices in oil-exporting nations. The results of Salisu and Isah's analysis indicate that share prices in oil-exporting and oil-importing nations respond asymmetrically to changes in oil prices, although the response from the importing country group is stronger than the response from the exporting country group. This conclusion is further supported by the findings of the oversample forecasting, which indicate that the addition of positive and negative oil price fluctuations in the stock price prediction model will only result in improved forecasting for oil-importing nations. The disparity between oil-exporting and oil-importing nations has global ramifications for the oil-stock price relationship. Results of the Hausman test strongly support the PMG estimator as an efficient estimator for modeling the oil stock relationship between oil-exporting and oil-importing nations.

4. RESULTS

4.1 Unit Root Test

Before assessing the ARDL model, it is essential to examine the stationarity of panel data variables (panel unit root test). The requirement for a stationarity test on panel data variables is due to two factors: first, the possibility of heterogeneity, and second, the use of variables in this study that are not stationary at the level I(0) or in the original data, but will be stationary at first different I levels (1). Moreover, the objective of stationary testing is to demonstrate that non-stationary data is irrelevant so long as the variables are cointegrated (Blackburne Iii & Frank, 2007).

Table 1 presents the results of the stationarity test of panel data with individual unit root processes, namely the augmented dicky fuller (ADF), Phillips Perron (PP), I'm, Pesaran, and Shin (IPS) test, and Levin, Lin & Chu. ADF Test & Phillips-Perron Test to determine the stationarity of the data from the time series side of each observation. The panel data unit root test of I'm, Pesaran, and Shin considers residual heterogeneity and serial correlation between groups. The significance of the Levin, Lin & Chu probability values is important for the pool stationarity test (overall, i.e., N number of observations times T number of periods). Stationarity test results show that most of the variable data used in the study are convincingly stationary at the 1 percent level at the first degree of integration, or I(1), but there is one variable, namely TPF, that is significant at the 20 percent level.

Meanwhile, the data for the EFI and NPL variables are stationary at the level, or I(0) at 1 percent. These results imply that all variables in the cross-section are heterogeneous.

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

Therefore, the subsequent analysis can use the ARDL panel model and cointegration panel test.

Table 1. Unit Root Test Results

Variable	Unit Root Test			
	Im, Pasaran, & Shin W-stat	ADF chi-square;	PP chi-square	Levin, Lin, & Chu t*
EFI	-6,18997***	58,2020***	927,979***	-7,17898***
NPL	-7,19625***	67,9913***	64,1034***	-7,89490***
CAR	-8.25002***	77,5141***	156,816***	-2,39326***
ROA	-4,70984***	43,9406***	53,2826***	-5,84494***
NIM	-4,16276***	38,9101***	39,0370***	-4,84959***
BUNGA	-9,09947***	85,5469***	131,865***	-10,1274***
DEPO	-11,2725***	105,496***	124,781***	-11,6937***
BO	-2,90660***	27,8783***	34,4776***	-3,13948***
SBI	-4,25915***	39,7822***	132,510***	-1,78552**
CS_L	-3,74458***	35,1166***	33,5527***	-6,09048***
DPK	0,98374*	4,53161*	3,61867*	-0,14192*
Ex-BUNGA	-8,61994***	81,0094***	88,4649***	-10,4614***

Source: Running all Data For unit root test
Description: ***significant 1% ; **significant 5% ; *significant 10%

4.2 Panel Cointegration Test

This panel cointegration test determines whether the dependent and independent variables have a long-term relationship or not. Data can have a long-term relationship if the data are cointegrated at the same level. This study uses the Kao test, which uses a standardized approach based on residuals from the ADF test to test cointegration in panel data by adopting the step procedure performed by Engle-Granger (Baltagi, 2005). The Kao cointegration test is more specific on heterogeneous intercepts, and homogeneous coefficients for cross-sections and all trend coefficients are assumed to be absent. Kao developed the ADF statistical test to test cointegration in the panel data so that the dependent and independent variables were cointegrated. The Kao test in this study will be observed using the Eviews 9 software. The statistical value of the cointegration test of the ADF-Kao panel data is then compared with the t-statistic value on the probability value (1%, 5%, or 10%). If the statistical value is greater than the critical value or probability value, then the observed variables are cointegrated or have a long-term relationship. and vice versa, then the observed variables are not cointegrated.

Table 2 presents the results of the panel cointegration test of the ADF-Kao statistics for the three models. The EFI, Interest, and CS_L Models are convincing that all selected independent variables will affect the dependent variable. The cointegration coefficient

strengthens this on the ADF-Kao statistic value of -4.257223 (significant at the 1 percent level), -11.8371 (significant at the 1 percent level), and -1.4253 (significant at the 10 percent level). Cointegration of the panel based on the statistical results of ADF-Kao that the EFI, Interest, and CS_L Models are all cointegrated. Cointegrated variable means that the variable has responsiveness to any deviation from the long-term equilibrium. The error correction system implies the short-run dynamics of the variables affected by deviations from equilibrium. The estimation results also confirm the existence of a long-term relationship because the adjustment coefficient (error correction parameter) is negative and statistically significant at the 1 percent level.

Table 2. Panel Cointegration Test Results

			EFI	**INTEREST**	CS_L
Test	**Null Hypothesis**	**Name of the Statistic**	**E-Statistic (p-Value)**		
Kao residual cointegration test	No cointegration	Panel ADF - a statistic	-4,257223***	-11, 8371***	-1,425345*

Source: Running Data for Panel Cointegration Test
Description: ***significant 1% ; **significant 5% ; *significant 10%

4.3 PMG Estimate

Using the PMG estimator, Table 3 illustrates the short- and long-term correlations between the variables utilized in each Model. Significant at the 1% level, the error correction (EC) values near -0.46898, -0.46965, and -1.077318 show the PMG estimation results for the EFI model, Interest Model, and Consumer Surplus Funds Model have a high long-term equilibrium trend. The cointegration coefficient on the ADF-Kao statistical value, which is similarly significant at the 1% and 10% levels, demonstrates conclusively that all the specified independent factors will influence the dependent variable across all three models.

Individually, all independent variables of the EFI model are statistically significant, between 10 and 1 percent. A 1 percent increase in NPL and CAR will result in an intermediation efficiency decrease of around 0.13 percent and 0.02 percent, respectively. ROA and NIM are significant at the 1% and 5% levels, with the sign of the coefficient determined by the null hypothesis. When the ROA variable increases by 1 percent, EFI will become around 0.27 percent more efficient. Meanwhile, a 1 percent increase in the NIM will result in a 0.11 percent decrease in EFI's efficiency. The CAR variable impacts EFI statistically substantially at the 10% level, but the coefficient sign contradicts the premise. All independent factors are cointegrated and affect EFI throughout the long

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

term. In the near run, based on the sign of the coefficients, all independent factors, except NPL, have a statistically significant impact on EFI at the 10% level, except for NPL. When the NPL one period before t-1 increases by 1 percent, EFI for the current year t will be approximately 0.058 percent more efficient. The short-term coefficient sign for variables CAR, ROA, and NIM is consistent with the hypothesis, although the three variables are not statistically significant. On a short-term basis, the variables CAR, ROA, and NIM one period prior to t-1 have a negligible impact on EFI at present t. If CAR, ROA, and NIM each increase by 1 percent in period t-1, this will change EFI in period t is 0.013 percent more efficient, 0.021 percent less efficient, and 0.055 percent less efficient, respectively. The three independent variables, NPL, CAR, and ROA, are indices of banking resilience, and banking resilience has a significant impact on EFI. According to the hypothesis, for the NIM variable with a positive coefficient, an increase in bank health indicators will cause the intermediation function to become less efficient with a higher BOPI value. The reason for this is that when banks aim to achieve a sound level, they may prioritize the health of bank institutions over EFI. The error correction coefficient is -0.46898, which is statistically significant at the 1% confidence level. This indicates that when there is a short-term imbalance, the independent variables will be adjusted by 0.47 percent to achieve the long-term equilibrium of the EFI model. In the long term, all variables are cointegrated. Hence the EFI model is viable.

Table 3. PMG Estimation on EFI Model, Interest Model, and CS_LModel

EFI Model		**Interest Model**		**CS_LModel**	
Variable	**Coefficient**	**Variable**	**Coefficient**	**Variable**	**Coefficient**
Coeff- LR		Coeff-		Coeff-LR	
NPL	0,128903***	LR		DPK	0.2002182*
CAR	0,015365*	DEPO	0.875655***	Ex-Interest	
ROA	-0,26787***	BO	-0,00001***	EFI	27029,95***
NIM	0.1055383**	SBI	-0.00003***		-41150,6**
		EFI	-0,633652*		
Coeff-SR				Coeff-SR	
C	0,924628***	Coeff-		C	
NPL(1)	-0.057639*	SR		DPK(1)	-
CAR(1)	-0.012870	C	4,118936***	Ex-	331395,8***
ROA(1)	-0.021109	DEPO(1)	0.0779775	Interest(1)	-0,7599621
NIM(1)	0.055142	BO(1)	-0,0000364	EFI(1)	-27456,47*
EC	-0.46898***	SBI(1)	-0.0000197	EC	
		EFI(1)	1,238504		163297,4***
		EC	-0,46965***		-1,07732***

Source: Running Data Model by estimator PMG

Description: ***significant 1% ; **significant 5% ; *significant 10%
Coeff-LR = Coefficient Long Run ; Coeff-SR = Coefficient Short Run

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

The results of PMG estimation on the loan interest rate model individually, each independent variable has a statistically significant effect on the dependent variable. It is increasingly certain that the variables of Depo, Bo, SBI, EFI, and Loan Interest Rate have a long-term cointegration relationship, with the cointegration test result of the panel from the ADF-Kao statistic of -11.38371, which is significant at the 1 percent level. If there is an imbalance in each Depo, Bo, SBI, and EFI variable, it will be corrected by 0.47 percent towards the long-term balance of the Loan Interest Rate model. In the long term, statistically, all independent variables, Depo, Bo, SBI, and EFI, significantly affect the loan interest rate. If the Depo variable increases by 1 percent, the interest rate on the loan is set to increase by about 0.88 percent. The difference for the BO variable from the coefficient sign does not match the hypothesis but is supported by a significance level of 1 percent. When the BO variable increased by 1 billion rupiahs, it- pushed the loan interest rate down by around 0.00001 percent. When the EFI variable is 1 percent more efficient, it causes the loan interest rate increases by around 0.63 percent. The SBI variable with a negative and significant coefficient sign at the level of 1 percent. If the SBI increases by 1 billion rupiahs, it will decrease the loan interest rate by 0.000003 percent. The BO and SBI variables have a relatively small effect on the loan interest rate by looking at the coefficients of -0.0000136 and -0.000268, respectively. Two other independent variables largely influence the loan interest rate, namely DEPO and EFI, around 0.88 percent and 0.63 percent, respectively. Depo, BO, and SBI variables have a statistically significant effect on the loan interest rate at 1 percent. At the same time, the EFI variable has a statistically significant effect on the loan interest rate at 10 percent. In the short term, all independent variables do not significantly affect the dependent variable.

Meanwhile, according to the hypothesis, the variables with coefficient signs are the Depo, SBI, and EFI variables, except for the BO variable, which does not match the hypothesis. If the Depo variable in period t-1 increases by 1 percent, it will cause an increase in the loan interest rate for period t by 0.08 percent. An increase of 1 billion rupiahs in the BO variable one period before t-1 will cause a decrease in the loan interest rate for period t of around 0.000004 percent. In contrast to the SBI variable at t-1, an increase of 1 billion rupiahs caused the loan interest rate to decrease by about 0.000002 percent at time t. If the EFI variable in period t-1 is 1 percent more efficient, it will cause the loan interest rate for period t to decrease by 1.238 percent. In the short term, the EFI variable has the greatest influence on the loan interest rate compared to the other three independent variables in the loan interest rate model.

In the long term, the PMG estimator for the Consumer Surplus of Funds model (CS_L) shows that all independent variables have coefficient signs that match the hypothesis and significantly affect consumer surplus funds. Statistically, the three independent variables: DPK, EFI, and Ex-Interest, significantly affect changes in consumer surplus funds at 10 percent, 5 percent, and 1 percent, respectively. A negative sign of the EFI coefficient is if there is an increase of 1 percent more efficient or more efficient, the

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

intermediation function will cause an increase in CS_L with a change of around 41150.6 billion rupiahs. An increase of 1 billion rupiahs in DPK will be able to increase CS_L by an additional about 0.202182 billion rupiahs. For the variable expected interest, when it increases by 1 percent, it causes an additional CS_L of 27029.95 billion rupiahs. In the short term, when DPK one period before t-1 increases by 1 billion rupiahs, it will cause a decrease in CS_L by about 0.7599621 billion rupiahs at the time t. There will be an additional consumer surplus of funds of 163297.4 billion rupiahs in period t if the intermediation function is the inefficiency by about 1 percent in period t-1. Meanwhile, the consumer surplus of funds in period t will decrease by 27456.4 billion rupiahs when there is an expectation of loan interest in period t-1 to increase by 1 percent. Only DPK variables have no statistically significant effect on CS_L in the short term, but in the long term, the three DPK, EFI, and Ex-Interest variables have a statistically significant effect on Consumer Fund Surplus. If there is an imbalance in the short term, the DPK, Ex-Interest, and EFI variables will be corrected by around 1.08 percent to go to the long-term balance of the CS_L Model. Therefore, the variables of DPK, Ex-Interest, and EFI have responsiveness if there is a deviation from the long-term balance, so the CS_L Model is feasible to use.

5. DISCUSSION

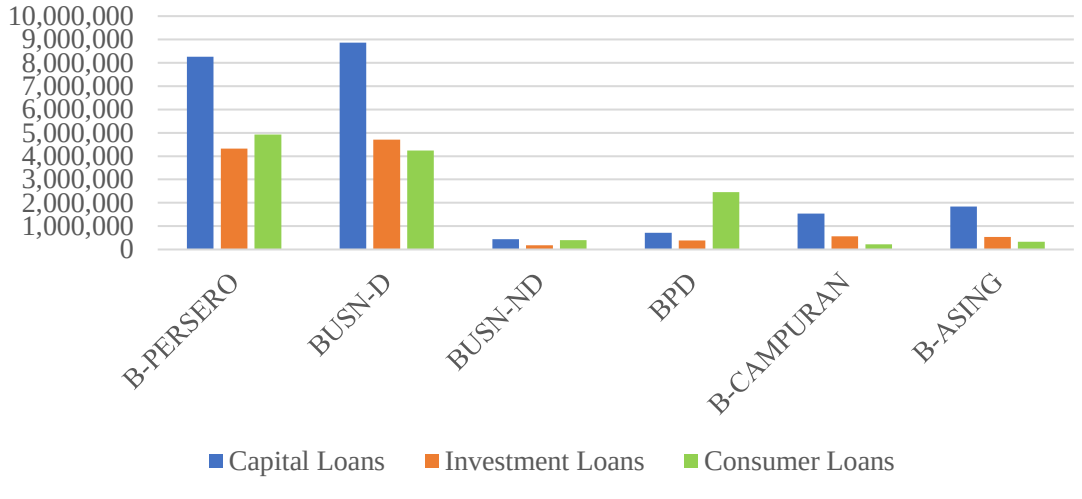
5.1 Descriptive

If it is seen from the amount of credit that banks have disbursed, in the 2000 – 2019 period (Figure 5), credit distribution is dominated by the National Private Commercial Banks-Foreign Exchange (BUSN-D) Bank-Persero groups, both investment loans, capital loans, and consumer loans. The control of the banking credit market reached (OJK, SPI 2000 – 2019): 39.65 percent (BUSN-D), 38.97 percent (B-Persero), 7.94 percent (BPD), 6.01 percent (B-Foreign), 5.17 percent (B-Mixed), and 2.25 percent (BUSN-ND).

There are three categories of bank loans that are disbursed: investment credit, working capital credit, and consumer credit. From Figure 6, the average loan interest rate during the years 2000 – 2019 for the highest investment was provided by National Private Commercial Banks – Non-Foreign Exchange (BUSN-ND) of around 15.67 percent, the highest loan interest rate for capital from BUSN-ND was 18.33 percent, and the highest interest rate on consumer loans was given by the Foreign Bank group of around 23.32 percent (OJK, SPI 2000-2019).

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

Figure 5. Amount of Credit Disbursed by Banks
During the period 2000-2019 (Billion Rupiah)

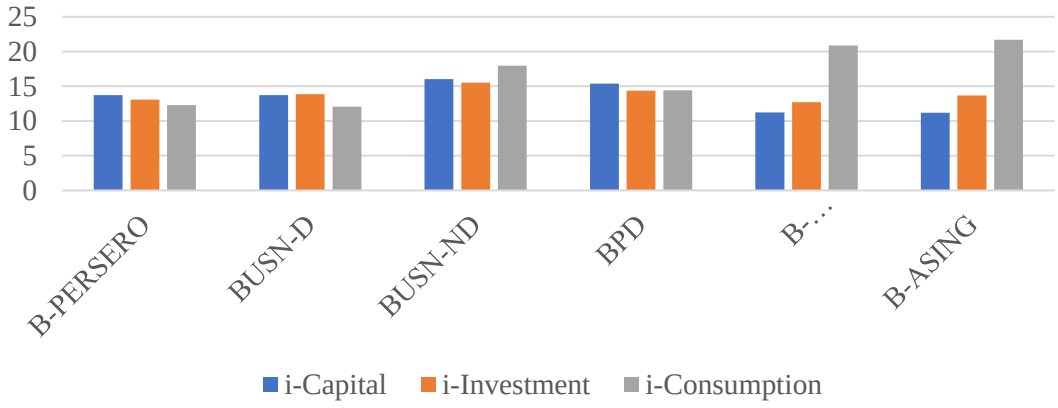


Source: OJK, SPI 2000 – 2009

Description: BUSN-D = national private commercial bank - foreign exchange

BUSN-ND	=	national private commercial bank - non-foreign exchange
BPD	=	regional development bank
Bank-Persero	=	state bank
Bank-Campuran	=	mixed bank
Bank-Asing	=	foreign bank

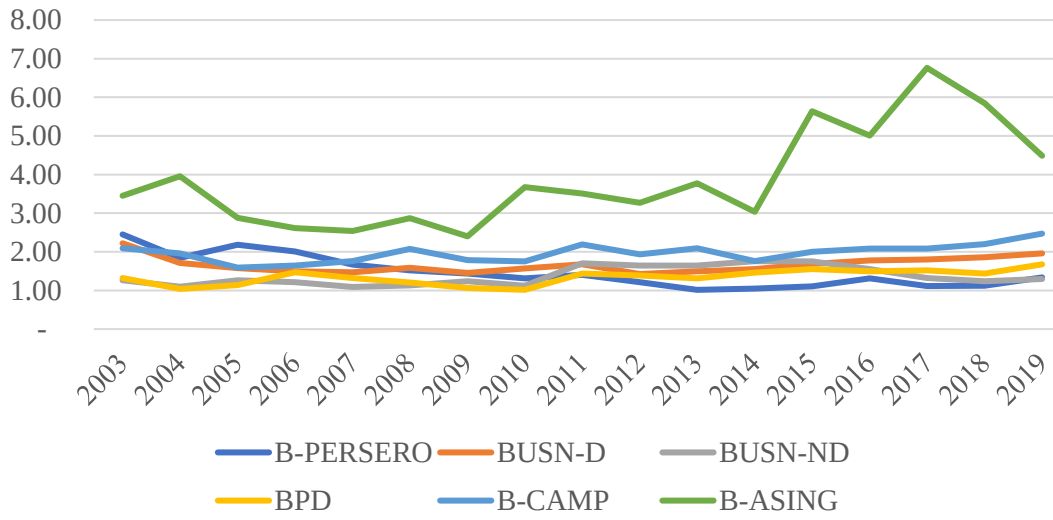
Figure 6. Credit Interest Rate (*i*) For Capital, Investment, and
Consumption in Banking Period 2000-2019 (percent)



Source: OJK, SPI 2000 – 2019.

Changes in the lending efficiency of banks were quite variable (Figure 7). The effectiveness of the intermediation function of banks is heavily influenced by banking circumstances, including their resilience and institutional effectiveness. Only the Foreign Bank group has a low level of efficiency, and there is a trend for it to become less efficient over time. The change in the efficiency level after the observation period indicates that from 2016 to 2018, the intermediation efficiency of five types of banks (other than foreign banks) tends to be higher than in the previous period. In 2018-2019, the intermediation function of banks was likely to become less efficient (OJK, SPI 2000-2019).

Figure 7. The Efficiency of the Banking Intermediation Function (BOPI)



Source: OJK, SPI 2000 – 2019.
Description: BOPI = Operational costs/Intermediation income

5.2 Analysis

5.2.1 Intermediation Function Efficiency Model (EFI)

According to the findings of this study, the EFI model is valid for measuring the efficiency level of the banking intermediation function. This indicates that BOPI can represent the condition of efficiency for the banking intermediation function. Oks (2001) calculated economic growth as an endogenous variable while analyzing the relationship between financial institution intermediation and economic growth. The exogenous variable was the efficiency of the intermediation function of financial institutions. Oks employs four metrics to calculate the efficiency ratio of the intermediation function: (1) the ratio of bank credit to the private sector to GDP, (2) the ratio of claims to the private sector to domestic credit, (3) the ratio of domestic credit issued by commercial banks to

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

domestic credit issued by commercial banks and central banks, and (4) the difference in interest rates between loans and deposits. In contrast to Beck et al. (2006), who construct a model of the relationship between financial intermediation and economic growth in which the quantity of private credit measures financial intermediation, we measure financial intermediation by the volume of private credit. Beck et al. utilized private credit to examine the evolution of financial institution intermediation, not efficiency.

Because financial institutions (banks) will carry out information collection resource allocation, and increase liquidity Greenwood and Jovanovic (1990), increase productivity (King & Levine 1993), and reduce costs monitoring (Dima & Opris 2014 and Holmstrom & Tirole 1997), the financial sector has a positive effect on economic growth and welfare. The purpose of financial institutions (banks) is to assist agents in selecting profitable initiatives. Agents cannot invest in projects without financial institutions due to a lack of knowledge and poor project liquidity (Greenwood & Jovanovic (1990). This indicates that financial institutions and banks play a crucial role in promoting the well-being of society. According to Bencivenga and Smith (1991), financial institutions can alter the proportion of savings to capital. While (Levine, 1997) asserts that economic expansion might generate demand for financial services, the financial system responds by supplying these services. As one might think, the financial system is not as active in the process of real capital formation in a strengthening economy. At least not in giving capital to finance investments in productive firms, since the vast majority of corporate investment in a particular period is funded internally (Larson et al., 1998; Morales, 2003; Winkler, 1998). Since Allen and Gale (1999) suggest that the financial sector is constructed in the early stages of growth, bank loans are crucial for businesses. There was a substantial correlation between the financial industry and economic growth.

The existence of the financial sector will be damaging to the well-being of society, according to several conclusions relating to the significance of financial institutions to the economy, including the findings of Eden (2016). In partial equilibrium, when liquidity limitations exist, the financial system helps the optimal allocation of resources, according to Eden (2016), by lowering liquidity constraints. Nonetheless, the existence of this financial sector will have two negative effects: first, intermediation activities will consume productive resources, hence reducing the amount of inputs utilized by the production sector. Second, financial intermediation will increase the cost of inputs, in this case, liquidity, increasing the economy's dependence on the financial sector, the root of the current economic crisis. Consequently, the presence of a financial sector can reduce the position of welfare equilibrium. The best approach, according to Eden, is to minimize the tradeoff between production and the accumulation of liquidity. The ideal strategy was ultimately implemented to alleviate liquidity concerns. Therefore, according to Eden, financial intermediation may be significant in partial equilibrium, but in general, when input prices can be modified, financial intermediation can lead to inefficient use of productive resources in equilibrium.

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 1309-8055 (Online) (**pp.** 377-408) **Doi:** 10.34109/ijefs.20220017

5.2.2 Loan Interest Rate Model

The loan interest rate is established by the source of funds, i.e., financial institutions (banks) in their commercial operations. Interest rate risk is addressed solely at the level of the individual bank (Pedroni 2004). The conduct of the financial economy is significantly influenced by time and uncertainty. Financial institutions will be extremely concerned with profit margins to safeguard and expand the company's recurring revenue stream. Financial institutions, as commercial entities, will handle their financial assets with care to achieve a good spread from time to time. Banks will always seek to profit from the favorable spread between deposit and loan interest rates. This result is consistent with Slovin and Sushka (1983), who found in a survey that 91 percent of banking institutions utilize changes in profitability to gauge their sensitivity to interest rate fluctuations. Even 79% of respondents have limits for the maximum allowable change in profitability or net worth for a given adjustment in interest rates.

Banking institutions are efficient when banks are in good health with good asset and liability management. According to Merton (1989), banks try to minimize the risk of default on the borrower's obligations in distributing loan funds because this is a key element to achieving efficient intermediation. In addition, there is a belief that credit risk is a major macro issue for financial markets. Another finding is that when banking management is still not efficient during the research period, banks will set a lower loan interest rate, even though the decrease in loan interest rates is relatively very small, around 0.00001 percent. The small decrease in the interest rate on loans is to lure so that the distribution of loan funds does not experience a large decline.

If there is increasing competition in the funds market, banks will cut their lending interest rates, but their cost of funds will climb (Lucchetta 2017). Therefore, banks will select safer investments, such as a safer form of their loan portfolio. Assuming that banks are perfectly diversified, the increased cost of funds results from a rise in deposit interest rates. When a bank considers it is ideal to choose a lower loan interest rate when competition grows, it is in a state of banking equilibrium. As Winton (1997) has created a methodology to encourage financial institutions to diversify their product lines, it follows that financial institutions can be encouraged to do so. Banks will eventually face competition from other banks. This rivalry has compelled banks to diversify their product offerings. This product diversification will affect the intermediation efficiency of banks. This indicates that product diversification can enhance the quality of services supplied to customers/investors by financial/banking institutions. How banks enhance the quality of their productive assets is linked with product diversity.

5.2.3 Fund Consumer Surplus Model

This study estimates the change in consumer surplus of funds in the funds market, which is in a state of equilibrium, due to the interaction between banks (fund suppliers) behavior in carrying out their intermediation function with demanders for funds. The

CS_L Model has a significant error correction coefficient at the 1 percent confidence level, supported by the cointegration coefficient, which is also significant at the 5 percent confidence level. This means that the variables of DPK, EFI, and expected interest are cointegrated, and there is a long-term relationship with the consumer surplus of funds variable (CS_L). Therefore, the CS_L Model is valid for estimating the magnitude of changes in the consumer surplus of funds.

Changes in the amount of consumer surplus funds are strongly influenced by the behavior of both suppliers of funds and demanders of funds. The more efficient the banking intermediation function will increase the consumer surplus of funds. When the intermediation function becomes more efficient, banks can channel larger loan funds in the long term. There is a high expectation of income from intermediation, thus encouraging banks to set lower loan interest rates. Because the loan interest rate is set lower, there will be an additional consumer surplus of funds equal to the change ($\Delta i \; x \; Loan$). The intermediation function is efficient when operating costs to revenues from intermediation (BOPI) decreases.

Stennek (1999) argues that the expected consumer surplus (ECS) can be a monetary measure of consumer welfare. Likewise, Babu (2018); Basaza et al. say that consumer surplus can be used to evaluate social welfare. In addition, consumer surplus is also used to estimate changes in welfare (Safiullin et al. 2013). Whereas the consumer surplus of final goods in the goods market can measure people's welfare, what about the consumer surplus of funds in the funds market? The consumer surplus of funds cannot directly become a measure of the people's well-being; instead, the surplus of consumer funds in the funds market must be transferred to the goods market to become a consumer surplus of products in the goods and services market. Consumer surplus funds are utilized to manufacture final consumer goods (final goods) through investment and increased business capital in the goods and services markets. Utilizing consumer surplus funds from the funds market for investment and more venture capital will improve the production of the market for products and services that may be enjoyed by the public, hence increasing public utility and community welfare.

6. KESIMPULAN

This research provides a new approach to evaluating the efficiency of financial or banking institutions. That is looking at banking efficiency from the intermediation function approach. The efficiency of the banking intermediation function is strongly influenced by the resilience and soundness of the bank. In carrying out their intermediation function, banks are faced with determining the amount of loan interest rates. The amount of the loan interest rate is determined based on the costs that have been incurred, including the cost of obtaining funds, the cost of distributing funds, opportunity costs, and margins.

Banks also adopt the development of "digital" technology in providing financial services, so it is necessary to formulate indicators of bank resilience and health that can reflect the ability of banks to face digital financial markets. This "digital" financial service will also affect the efficiency level of the banking intermediary function (EFI), so the EFI measure needs to include elements of changes in financial service technology. However, when banking conditions with intermediation functions and banking institutions are inefficient, they must adopt the development of "digital" technology in the financial sector. For this reason, a monetary authority policy is needed to strengthen the banking structure to have competitiveness and the efficiency of the banking intermediation function through the intensive use of information technology.

The existence of banking power over the calculation of loan interest rates, which is influenced by the costs of collecting and distributing loan funds, promotes the possibility of moral hazard or even vested interest in banking actors. Therefore, it is vital to have rules capable of disciplining banking actors to improve the efficiency of the management of banking assets and liabilities.

A consumer excess of funds will result from banking intermediation activities on the funds market. The amount of consumer surplus of funds is heavily impacted by the actions of the fund provider and fund demander. Since funds are not yet a final good that can raise consumer utility, they cannot be employed to measure welfare. Further research requires further research to determine the magnitude of the flow of consumer surplus funds from the funds market to consumer surplus items in the goods and services sector. Assuming that the excess of consumer funds in the fund market will be used for productive activities such as investment and more firm capital, used to manufacture community-needed commodities. Through multiplier effect analysis, the Consumer Fund Surplus in the fund market will be used to measure changes in the level of satisfaction and public welfare in the goods and services market.

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