Payment System Statistics to Support Policy Formulation in Indonesia

Farida Peranginangin[1]
Bank Indonesia, Indonesia – faridap@bi.go.id

Abstract

Bank Indonesia sets monetary, financial system stability, and payment system policy in accordance with its mandate of achieving and maintaining the stability of the Rupiah value. In Indonesia's payment system, Bank Indonesia operates high value payment system–Bank Indonesia Real Time Gross Settlement (BI-RTGS)–and regulates retail payment systems that are operated by industry: card-based payment instruments (ATM-Debit and credit cards) and electronic money. In conducting payment system policy, Bank Indonesia synchronously considers the monetary and financial system stability policymaking process. In this framework, the role of payment system is to support the monetary policy transmision and the stability of financial system. In order to enhance the robustness of policy formulation, Bank Indonesia continuously performs in-depth analysis of data (research-based policy), including data that is produced through payment system. In this session, we will present several use case of payment system statistics for payment and settlement systems monitoring and strengthen Bank Indonesia's policy formulation on payment system as well as in monetary and financial system stability

Keywords: statistical simulation, retail payment, economic growth, financial development

1. Introduction

As the authority of payment system in Indonesia, Bank Indonesia strives for a safe, efficient, smooth and reliable payment system with considerations of expanding access and protecting consumer. In Indonesia's payment system, Bank Indonesia functions both as the operator of high value dan systemically important payment system known as BI-Real Time Gross Settlement (BI-RTGS) system and as regulator of various industry-operated retail payment systems, including ATM-Debit card, credit card, and electronic money. Thus, Bank Indonesia is in the most pertinent position to harness the economic insights from payment and settlement system data in Indonesia. These statistics are used for enhancing the robustness of Bank Indonesia's policy formulation, both in payment system policy or monetary and financial system policy.

In order to achieve its mandated objective–the stability of the Rupiah–Bank Indonesia harmonizes monetary, financial system stability and payment system policies. In this framework, payment system has a role in ensuring the transmission of monetary policy and support financial system stability. Bank Indonesia continuously performs in-depth analysis of data in order to enhance the robustnessof its policy formulation, particularly but not limited to payment system. The data are collected monthly from Bank Indonesia-operated payment system (BI-RTGS) and industry players-operated payment systems (card-based payment and electronic money). The statistics of BI-RTGS serves as an input bank's liquidity monitoring

---

[1] Director of Payment System Policy and Regulation, Bank Indonesia

and in monetary and financial system stability policymaking. Bank Indonesia also uses figures from retail payment system in fostering an efficient transaction cost and promoting consumer protection. Bank Indonesia has also formulated the Payment System Liquidity Index (PSLI) as a measure of general liquidity conditions in the payment system by utilizing statistics of BI-RTGS settlement data. Due to PSLI's characteristic as a composite index that is constructed from BI-RTGS settlement data, it is suitable to indicate the condition of banking liquidity in the payment system.

2. Payment System Development in Indonesia

BI-RTGS settlement statistics consists of settlement data of BI-RTGS's participants that includes all conventional and sharia banks in Indonesia. Currently there are 141 BI-RTGS participants, 136 of these are the aforementioned banks with 69% of Rp477.9 trillion daily transaction nominal (value) and 95% of 37.456 daily transaction volume. As a consequence, the banking industry dominates the payments system liquidity in BI-RTGS and this figure could serve as a proxy of banking liquidity conditions in Indonesia. BI-RTGS statistics is available at T+1 both in nominal and volume for all individuals BI-RTGS participants with each participant transaction's detail. The availability of BI-RTGS data in minute detail allows Bank Indonesia to conduct banking liquidity monitoring in a timely manner. In addition to analyzing the liquidity conditions of banking industry, the availability of individual bank's statistics in BI-RTGS allows Bank Indonesia to analyze the statistics both in terms banking group/classification as well as individual bank. Furthermore, BI-RTGS statistics can be broken down to the type of the transactions, such as government transactions, customer transactions, interbank money market transactions, etc. The abundance of high frequency data in BI-RTGS with a lot of variations and low data lag, prompts Bank Indonesia to employ various payment system data analyses as part of its policy formulation in payment system as well as macroeconomic and financial system stability.

In terms of retail payment systems, BI manages statistics of card-based payment instruments which includes ATM Debit card, credit cards and electronic money. These statistics includes statistics of payment instrument providers, the number of outstanding payment instruments, and transaction statistics both in volume and nominal per providers/issuers of the payment instrument. These statistics are presented on a monthly basis and are obtained from bank or non bank. The data is reported online through Commercial Bank Head Office Report (LKPBU) and Non Commercial Bank Report (CB and NCB Report) application with a lag of one month. The analysis from retail payment statistics is used for policy formulation in payment system area in order to increase the efficiency of the economy by promoting consumer protection. In addition, the analysis is also used to fortify Bank Indonesia's policy mix formulation on monetary and financial system stability.
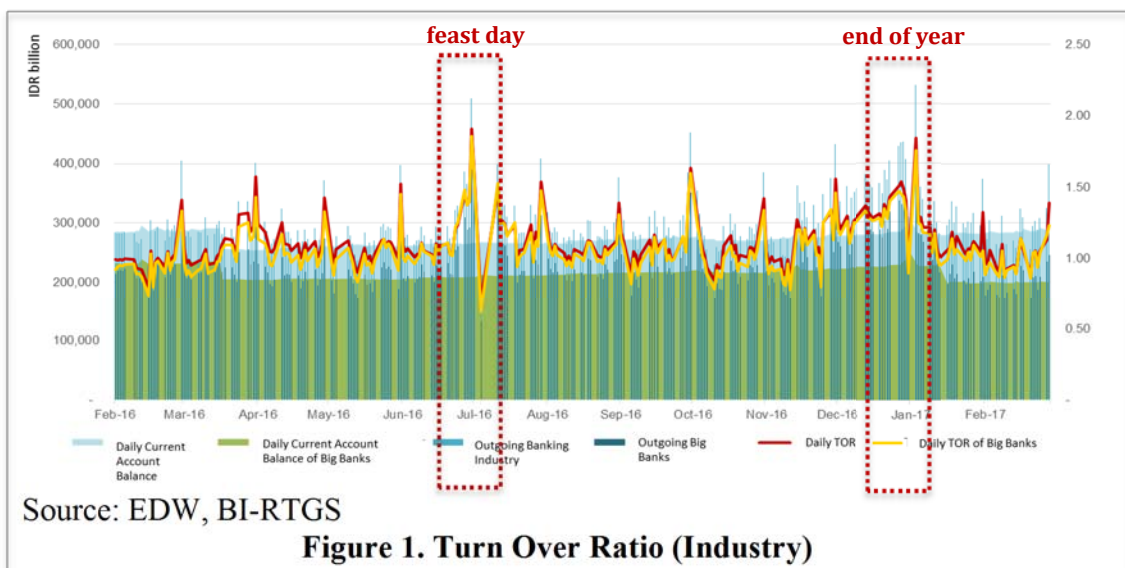
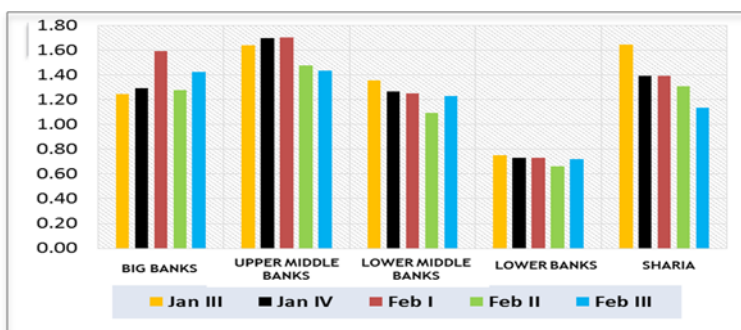## 3. Payment System Statistics as a Tool for Financial Market Risk Monitoring

The availability of BI-RTGS statistics in a daily basis allows the use of these statistics for either weekly or monthly monitoring. The indicators used for monitoring are Turn Over Ratio (TOR), throughput zone III, and interconnectedness which formulated as follows:

Table 1. Indicator of Payment System for Monitoring

Indicator	Formula	Interpretation
Turn Over Ratio	$$TOR_i = \frac{\sum Outgoing\ transaction}{Current\ account\ balance}$$ $$TOR_{industry} = \frac{\sum_{i=1}^{n} Outgoing\ transaction}{\sum_{i=1}^{n} Current\ account\ balance}$$	TOR ≤1 : settlement obligation can be settled only with current accounts balance in Bank Indonesia. TOR > 1 : settlement obligation can be settled with incoming funds from other participants.
Throughput zone III	$$\frac{\sum_{t=14.30}^{n} Outgoing\ transaction}{\sum_{t=0}^{n} Outgoing\ transaction}$$	The share of transactions settled during 3rd BI-RTGS window settlement. Bank Indonesia's Guideline: 30% in zone I (system open-10.00 AM), 30% in zone II (10.00 AM – 2.00 PM), and max 40% (zone III: 2:00 PM-closed).
Interconnectedness	$$\frac{\sum_i^n \sum_j^n X_{ij}}{n^2 - n}$$ $$X_{ij} = 1\ ,$$ *if there is a transfer of funds from bank i to bank j, i ≠ j* $n = numbers\ of\ banks$	The payment system relationship between the participants in the BI-RTGS. Interconnectedness = 100% is reached when all RTGS participants doing transactions with all of other participants.

Bank Indonesia monitors the payment system liquidity indicators in both weekly and monthly basis with two stream of analysis: banking industry ownership group and banking industry BUKU group. Analysis on the indicators is conducted by reviewing the historical pattern, such as the increase of banking industry's TOR around feast day (Ramadhan), holiday and end of year which is a common phenomenon due to increasing payment system activities by customers and government (Figure 1). Bank Indonesia observes whether the significant increasing of TOR beyond this seasonality period due to its impact on the smooth operation of payment systems. If this shift occurs continuously within a long time period, the result of this analysis is delivered as input in macroeconomic and financial system policymaking mix.

Source: EDW, BI-RTGS

Figure 1. Turn Over Ratio (Industry)

Source: EDW, BI-RTGS

Figure 2. Turn Over Ratio (Group of Bank)

TOR monitoring is also applied on group of banks to see whether there is a change on banks' behavioral pattern on their liquidity management in BI-RTGS. Historically, groups of BUKU 4 has the lowest TOR (TOR<1), which means that settlement obligations of this group of banks can be settled only by using their current account balance in Bank Indonesia. Meanwhile, other groups of banks have TOR>1, means that their settlement obligations can be settled only if there exists incoming fund transfer since their current account balance in Bank Indonesia is not sufficient to cover their settlement obligations (Figure 2). The significant increase on the TOR of group of BUKU 4, especialy when it exceeds 1, should be closely evaluated since these banks cover 70% of liquidity in the payment system which could impact the payment system liquidity of the rest of banking industry. Monitoring on TOR indicator can be applied daily if necessary.
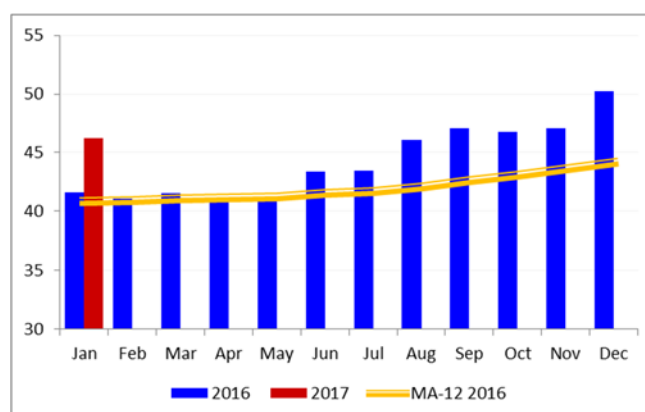

Source: EDW, BI-RTGS

Figure 3. Throughput

Throughput guideline is set by Bank Indonesia to avoid accumulation of BI-RTGS settlement risk at the end of day. Buckle and Camppell (2003) observed that the delay in payment by RTGS participant leads an increase in aggregate liquidity requirement, thus reduce efficiency of liquidity turnover. In this case, the throughput guidelines can be used to achieve the desired liquidity turnover efficiency. Therefore, throughput guideline could have risk-reduction benefits since they help to reduce the level of tiering in the financial system. The guideline substantially reduces the overall demand for intraday liquidity in the RTGS system. Bank Indonesia's guideline expects that the maximum value of transactions settled on zone III (throughput zone III) be at 40% from all the settlement transaction during the day. The distribution of BI-RTGS settlements that follow this guidance indicates that payment system liquidity condition is well managed (Figure 3). Furthermore, the increase of throughput zone

III indicates the escalation of risk in BI-RTGS settlement. It also reflects the increase of liquidity tightening in banking industry. Historically, throughput zone III was increased due the increasing macroeconomy and financial system instability in 2005 (high inflation) and 2008-2009 (Global Financial Crisis).
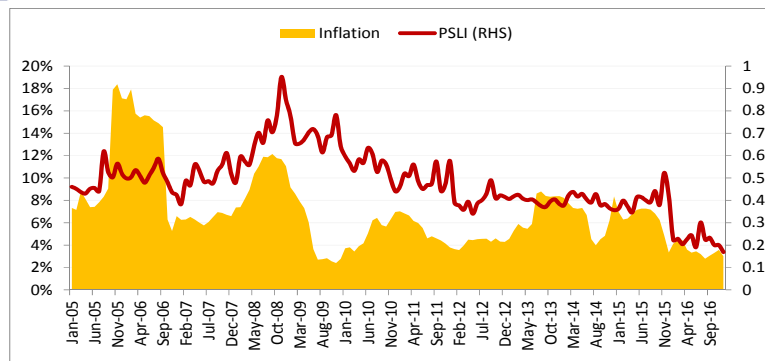
Bank Indonesia also monitors level of connectivity among BI-RTGS participants (interconnectedness). This variable indicates the distribution of risk in the payment system. High interconnectedness indicates that risk is equally distributed and fewer banks dominate BI-RTGS transactions. Historically, interconnectedness will increase significantly at the end of year period following the increase of RTGS transactions from both customers and government approaching end of year/book closing (Figure 4). The significant decrease of interconnectedness on certain period should be closely monitored since it indicates the increase of concentration risk in BI-RTGS system, or in other words only a few banks that have big role in payment system and these banks' settlement failure will give spillover effect to other banks. The attention is mainly focused on banks with a high interconnectedness and net outflow pattern in BI-RTGS, in this case "bank A". These banks have more settlement obligations than incoming fund transfers and have transaction interconnectivity with many banks. Settlement failure on this type of bank will give spillover effect to other banks which have transaction relation.
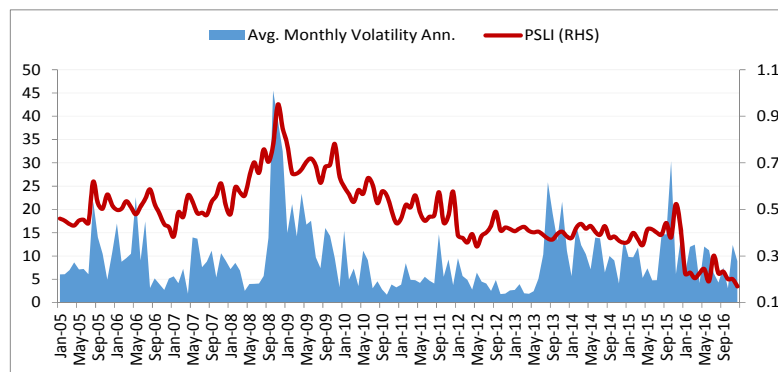

Source: EDW, BI-RTGS
Figure 4. Industry's Interconnectedness

PSLI built by Bank Indonesia is a composite of three variables which are processed from settlement statistics. It consists as follows: (i) liquidity of RTGS (turnover ratio, queue, placement on Monetary Operations), (ii) Interbank Money Market Transactions (frequency, spread of interbank money O/N with policy rate), and (iii) interconnectedness. Historically, PSLI were able to capture changes in banking industry's behavior liquidity, at the time of magnitude change in looseness or tightness liquidity, driven by changes in macroeconomic and financial system stability. The increasing of PSLI can be read as an increase of tightness of payment system's liquidity. Therefore, Bank Indonesia can decide whether a further policy measures is needed. PSLI increases significantly in the period mid-2005 due to the increase of inflation pressure driven by rising fuel prices in that period (Figure 5). Furthermore, PSLI also showed an increase in the period between 2008 and 2009 when the Global Financial Crisis occurs due the increased volatility of exchange rate (Figure 6). Currently, PSLI is used both as a monitoring tool as well as an input to the formulation of macroeconomic stability policy and financial system policy.

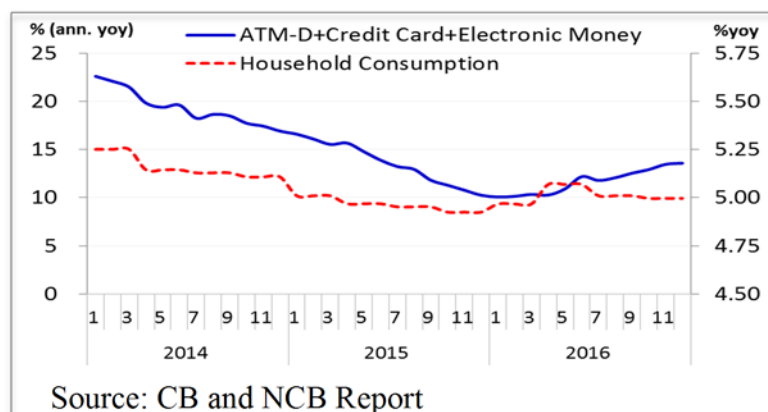Source: BI-RTGS, Reuters

Figure 5. PSLI and Inflation

Source: BI-RTGS, Reuters

Figure 6. PSLI and Exchange Rate

4. Payment System Statistics as a Prompt Indicator for Economic Activity
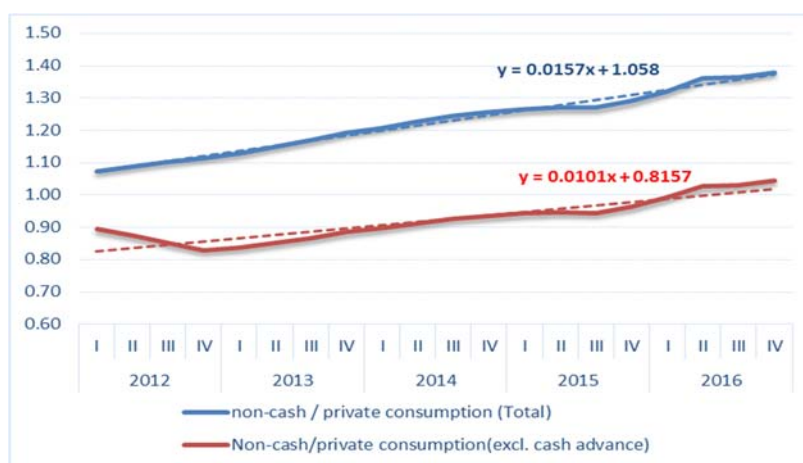
Bank Indonesia uses statistics of retail payment transactions (ATM-Debit, credit card and electronic money) as a tracking indicator for household consumption, since this statistics could describe the dynamics of household consumption reasonably well (Figure 7). The retail payment statistics is available before the release of official Gross Domestic Product (GDP) that includes household consumption, therefore it gives an early figure on the growth of household consumption. The figure on current household consumption is very important for Bank Indonesia's policymaking ing macroeconomics and financial system considering it is the highest contributor in Indonesia's GDP, reaching 55.31% on 4th quarter 2016.

Source: CB and NCB Report

Figure 7. Retail Transaction

Non-cash transactions statistics are used to monitor the National Non-Cash Movement–launched in 2014–progress to decide the design of subsequent policies. Based on current statistics, National Non-Cash Movement progress fares fairly well. However, public preference of using cash is still moderately high. It is reflected from the slope ratio where it shows that cash transactions slope is higher than the slope of purely non-cash transactions (Figure 8). Therefore, Bank Indonesia has to intensify the effort of promoting the efficiency of non-cash transactions.
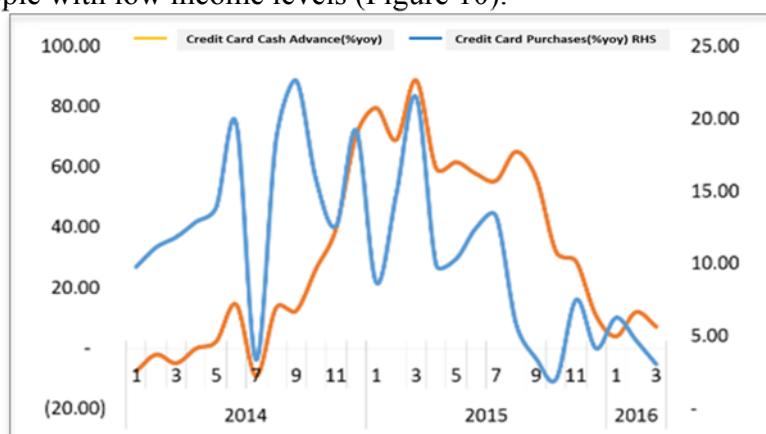

Source: CB and NCB Report
Figure 8. Growth of Non Cash Transactions

5. Payment System Statistics for Policy Review and Policy Formulation

Bank Indonesia also uses retail payment statistics to reinforce the policies of advancing consumer protection interest. In the end of 2016, Bank Indonesia adjust the maximum interest rate of credit card after considering the current macroeconomic conditions, financial data of issuer and the growth of credit card transactions. Along with the economic slowdown in the past few years, there is a declining trend of credit card usage (Figure 9) which followed by an increase in Non-Peforming Loan (NPL), especially in lower credit limit segment or more specifically people with low income levels (Figure 10).
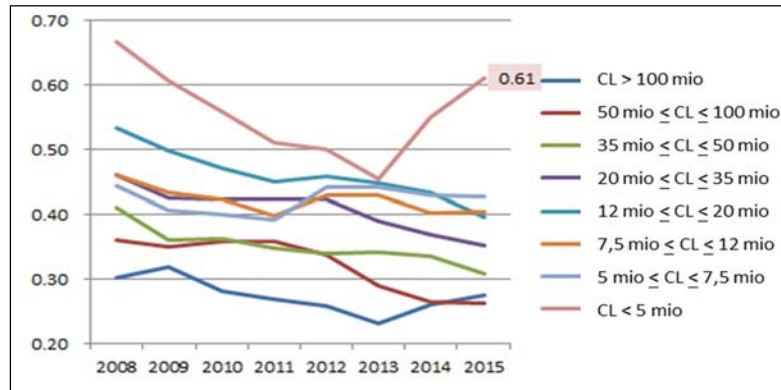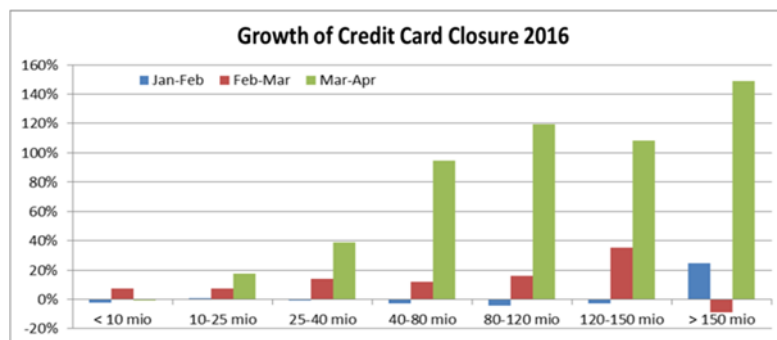

Source: CB and NCB Report
Figure 9. Credit Card Transactions

On the credit card provider/issuer side, the highest cost is attributed to Cost of Allowance for Impairment Losses which covers the upward trend in credit card NPL. In order to increase public confidence for using credit cards and to boost healthier credit cards industry, Bank

Indonesia decreased the maximum interest rate of credit card from 2.95% per month to 2.25% per month. Along with this interest rate policy, Bank Indonesia requires issuers to deliver a closing statement to credit card customers who already closed their credit card. This measure was taken as a step to strengthen consumer protection of payment system due to the significant increase of credit card closure in mid-2016 which has the potential to put consumer's best interest at risk (Figure 11).

Source: CB and NCB Report
Figure 10. Credit Card Revolving Rate

Source: CB and NCB Report
Figure 11. Credit Card Closure

6. Conclusions

BI-RTGS settlement data can reveal the broad picture of banking liquidity. PLSI devised by Bank Indonesia is able to reflect the liquidity conditions influenced by changes in both macroeconomic condition and financial system condition. Indicators of banks liquidity can be used as a monitoring tool in payment system as well as strengthening policies formulation in macroeconomic and financial system stability. In addition, retail payment statistics can capture the dynamics of the household consumption in Indonesia reasonably well and become an input for macroeconomic and financial system stability policy package. Retail payment statistics can also reflect the adoption of non-cash payment instruments in the society which will be considered as an input for payment system policy that aims to boost non cash transaction. Retail payment statistics will also be of service to Bank Indonesia's policy assessment and formulation concerning consumer protection framework and financial inclusion strategy.

References

Buckle, S dan Campbell, E. (2003). Settlement Bank Behavior and Throughput Rules in an RTGS Payment System with Collateralized Intraday Credit. Bank of England Working Paper no. 209

Christian, S.(2011). Liquidity Requirements and Payment Delays Participant Type Dependent Preferences.European Central Bank.

Committee on Payment and Settlement Systems. (2014). Assessment of Compliance with the Core Principles for Systemically Important Payment System. The Fed Funds Services.

Drehmann, M. dan Tarashev, N. (2011). Systemic importance: some simple indicators. BIS Quarterly Review, Bank for International Settlements.

De Bandt, O. dan & Hartmann, P. (2000). Systemic Risk: A Survey. Working Paper Series 0035, European Central Bank.

European Central Bank (2010). The Payment System: Payments, Securities and Derivatives, and the Role of the Eurosystem. European Central Bank.

ECB-Bank of England Conference.(2008).Payments and Monetary and Financial Stability.Jurnal European Central Bank.

Federic, Hervo.(2008). Recent developments in intraday liquidity in payment and settlement system. Financial Stability Review of Banque de France No.11.

Hasan, Iftekhar, Heiko Schmiedel dan Liang Song (2012). Retail Payment and Bank Performance. Journal of Financial Services and Research, 41 (3): 163 – 195.

Hasan, Iftekhar, Tania De Renzis dan Heiko Schmiedel (2013). Retail Payments and the Real Economy. Working Paper No.1572/August 2013. European Central Bank.

International Monetary Fund (2011), Global Financial Stability Report. Durable Financial Stability: Getting There from Here.

International Monetary Fund /Bank for International Settlements/Financial Stability Board (2009), Guidance to Assess the Systemic Importance of Financial Institu-tions, Markets and Instruments: Initial Considerations.

Scholnick, Barry, Nadia Massoud, Anthony Saunder, Santiago Carbo-Valverde dan Francisco Rodriguez Fernandez (2008). The Economics of Credit Cards, Debit Cards and ATM: A Survey and Some New Evidence. Journal of Banking and Finance, 32, 1468 – 1483.

Troy Gill, Dilhan Perera and David Sunner (2012), Electronic Indicators of Economic Activity, Reserve Bank of Australia.

Zandi, Mark, Virenda Singh dan Justin Irving, 2013. The Impact of Electronic Payments on Economic Growth. Economic & Consumer Credit Analytics. Moody's Analytics.