EFFECT OF INCREASING USE THE CARD PAYMENT EQUIPMENT ON THE INDONESIAN ECONOMY

Tiara Nirmala
Tri Widodo
Faculty of Economics and Business, Universitas Gadjah Mada
Jl. Sosio Humaniora No. 1, Bulaksumur, Yogyakarta, 55281, Indonesia
(kociwid@yahoo.com)

ABSTRACT

Non-cash payments have been increasing significantly, followed by its substitution and efficiency effects. Cash payment is substituted, inducing a decrease of cash holding by economic agents, while on the other hand more money enters the banking system. The increase of non-cash payments also cuts transaction costs, and the economy runs more efficiently. Using Vector Error Correction Model (VECM), its impacts on the economy are investigated. The result shows that cash holdings decrease, while money stock M1 and M2 increase. The increase of non-cash payments also induces GDP growth and slight price decrease.

Keywords: *non-cash, payment system, money demand, JEL: E42, E52*

ABSTRAK

Pembayaran non-tunai pembayaran telah meningkat secara signifikan, diikuti dengan efek substitusi dan efisiensi. Pembayaran tunai diganti dan hal ini mendorong penurunan kas yang dipegang oleh agen ekonomi. Ssementara di sisi lain lebih banyak uang masuk ke sistem perbankan. Peningkatan pembayaran non tunai juga memotong biaya transaksi, dan ekonomi berjalan lebih efisien. Dengan menggunakan Model Vektor Koreksi Kesalahan (VECM), dampak terhadap perekonomian dianalisis. Hasil penelitian menunjukkan bahwa kepemilikan tunai menurun, sementara stok uang M1 dan M2 meningkat. Peningkatan pembayaran non tunai juga menginduksi pertumbuhan GDP dan penurunan harga.

Kata Kunci: *non-cash, payment system, money demand*, JEL: E42, E52

INTRODUCTION

Bank Indonesia since 2006 has the theme of a work program to increase the use of non-cash payment instruments through the development of means of payment using the card (APMK).The idea was generated in the framework of the initiative less cash society (community non-cash) in order to encourage the creation of a secure payment system, efficient and reliable for the community, so it can build a better national economy.

Along with the rapid use of non-cash payment instruments based cards (such as ATM, credit cards, and debit cards, both associated with the account or not), an increase in transactions and economic activities. Meanwhile, on the other hand stimulate increased economic activity increased need for the tools of non-cash payment. The increasing on-cash payments suggests that the type of payment is more appreciated by the public rather than cash payments, which is partly due to lower transaction costs, lack of man power and time required, and the absence of constraints of time and place to transact. Increased non-cash payments, among others, encouraged by developments in information technology and telecommunications. It is estimated that the volume and value of non-cash payment transactions will continue to rise, along with the increasing development and use of technology and economic growth.

Results of research conducted by Bank Indonesia (2006) revealed high public interest and the business community to use non-cash payment instruments. Means of payment using the card, either ATM, credit card, or ATM cards that also function as debit cards in circulation continues to increase. This can be seen from the development of means of payment using the card in the last five years in Figure1.Based on studies conducted by Pramod, et al (2006) note that the increase in non-cash payments to reduce the demand for currency and M1. But so far the effects of increasing non-cash payments are to the economy, in this case GDP and inflation, not yet conclusive. Similarly, the implication of monetary control is made by Bank Indonesia. Therefore, interesting research would be done about it, mainly examines the impact of increased use of payment cards that measured through an appropriate model. This study is addressed to answer the following questions: (1) what is the impact of improved means of payment using the card to demand the public's money? (2) How did the impact on the economy, in this case GDP and inflation? (3) How do the implication of monetary control is made by Bank Indonesia?

Figure1. Trend of Using the Card Payment Instrument (APMK) Circulating
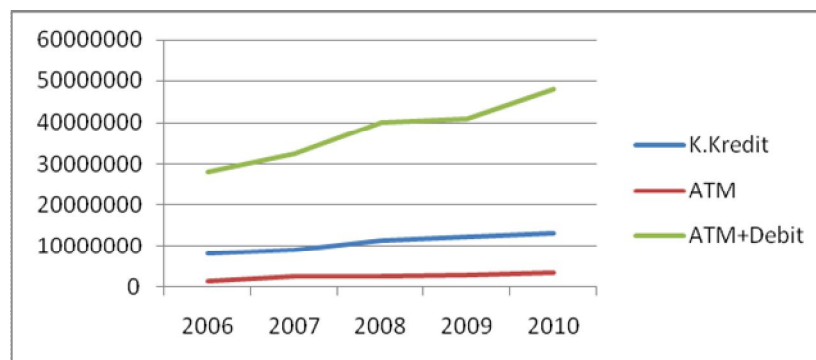
Source: Bank Indonesia, 2010

THEORY

1. Literature Review

Increased non-cash payments have implications that are not small. Van Hove (2007), among others, suggests a dilemma in addressing the development of the Central Bank non-cash payments, given the role which is run by the Central Bank as a dealer currency and its role in the efficient payment system. Meanwhile, Bank for International Settlements (1996) mentions the existence of several issues related to increased use of electronic money, among others: the payment system, seigniorage, monetary policy, and the risks posed by the electronic money.

1.1. Money Demand and Non-Cash Payment

Money demand function is a factor that links the community sector monetary and real sectors. Therefore, the behavior of money demand of society, associated with the increasing use of non-cash payment media, critical scrutiny. There are several theories related to the demand for money, among others, as follows: Fisher (1911), the Quantity Theory states that the total demand for money will in line with the large volume of transactions / economy. In line with the Quantity Theory, Cambridge Cash Balance Approach also shows the same thing. Assuming velocity of money is constant, the demand for money will be in line with the price level and real GDP. The second money demand model money demand model emphasizes on the functions of money as a means of payment.

Keynes (1936) mentions the existence of three motives of holding money, namely: transactions motive, precautionary motive, and the speculative motive. Money demand is thus function of income levels and interest rates. Friedman (1956) mentions that the demand for money is determined also by the wealth holder, in addition to income level (in this case the use of permanent income), interest rates, inflation and other factors.

Baumol and Tobin, with Inventory Model, mentioned that there are two things considered in the choice to hold money or assets, namely: transaction cost which must be issued when choosing to hold the assets for the holding assets reduced its liquidity and the return earned by holding assets in the context of the Inventory Model, non-interest bearing demand for money, e.g money currency and demand deposits (in this case it is assumed there is no interest on deposits in form of demand deposit account) is determined by real income, interest rates, and transaction cost. Level interest rates and transaction costs in this case are the various types of deposits are not included in the M1 category (time and saving deposits) as well as various types of assets others (such as bond). This formula may also be used to analyze the demand currency and M2, of course, by using interest rate and magnitude relevant transaction costs.

From some of the money demand models above shows that the technology variable payments, such as ATM, clearing, RTGS, and various media other non-cash payments not be accommodated on the money demand function. Only the inventory model of Baumol and Tobin is considered appropriate for use in calculating the effects of the use of media of non-cash payments, e.g. variable transaction in accommodation cost in addition to interest rates. But of course need to be an adjustment, considering the non-cash payments can save money in the community form of demand and savings deposits without having to face a trade-off, namely to obtain return without having to bear the transaction costs to process, (the level of liquidity very high).

Several empirical studies started to model the demand for money not only as function of real income and interest rates, but also against payment technology. Amromin and Chakravorti (2007) conduct a study on the influence of the increased use of debit card to the circulation of currency. The result of his studies showed that increasing debit cards may decrease low denomination currency, but high denomination currency is less affected. Studies conducted by Pramono, et al (2006) shows that the increase in non-cash payments reduces the demand for money currency and M1. A similar study is conducted by Dias (2001), but the results show that the increase in non-cash payments as a whole will have an impact on increased demand for money.

Meanwhile, Humphrey et al (1996) conduct a study on cross-country electronic payment. The result of his studies showed that the cost of

payment systems that range 2% to 3% of GDP will be reduced when the paper-based payment replaced with electronic payment considering the social cost of electronic payment is only a third until half-time fee with paper-based transactions.

1.2. Effect of Non-Cash Payments on Output and Prices

In addition to the impact on money demand, the increase in non-cash payment also have an impact on the economy, given the shift in money demand will result in a shift in the money market equilibrium, which in turn will affect towards equilibrium output and prices in the goods market. To analyze this, we need to place on modeling the influence of money on output and prices. Since the mid-1970s there have been the same view about the influence money on output and prices, the so-called neo-classical synthesis, namely because of the slow adjustment of nominal wages (nominal wage rigidity) and price (sticky prices) against the shock in the economy, changes in nominal money lead to changes in real money balances and aggregate demand and aggregate supply and changes in real output. Several studies empirically demonstrate this. But in the long term money neutrality occur.

Empirical studies about the influence of money on real output with VAR done by Sims (1972, 1980). The influence of money on real output can also be modeled in of the growth model, as presented by Sidrauski (1967), which states that in addition to its role in providing utility for households, for a real company money balance is working capital to improve liquidity in the production so as to increase output, as well as technological progress. Studies related to the influence of non-cash payments on output among other things is performed by Dias (2001), which shows the contribution of the use of payment instruments non-cash to increase welfare (social welfare).

1.3. Implications for Monetary Policy

Given the equilibrium in the money market money supply amount equals the number demand for money, the change in magnitude with an increase in money demand non-cash payments affect equilibrium in the money market, and certainly affect the amount of money supply.

Thus, monetary policy is required to accommodate the development of non-cash payments. As submitted by Bofinger (2001), there are several approaches in monetary policy, including inflation targeting, monetary targeting, and interest rate rules (Taylor rule). Bank Indonesia is currently using the inflation targeting framework.

From the formulation of Taylor rules are not explicitly visible the implications of payment non-cash towards monetary policy. As outlined previously, the influence non-cash payments occur through its influence on money demand, which then affect output and prices. Woodford (2000) conducts a study on the influence of non-cash payment against Central Bank's ability to control monetary policy. The results of his studies show that although the currency substituted by means of non-cash payment, the monetary policy can still be effective. Central Bank in this case can still control the policies through short-term interest rates.

2. Conceptual Framework

Non-cash payments essentially come from the same track as cash payments in which both payment transactions are over the price of goods and services. What distinguishes currency from non-cash payment is the means of reduced cost, effort, and time to transact.

2.1. Money Demand and Non-Cash Payment

Demand for money in this case includes currency and demand deposits. Both are M1. Per definition, demand deposit accounts at banks in the form that can be drawn any time by using checks/ demand deposits, and are often assumed to be non-interest bearing. Besides savings in the form of demand deposits, there are also types of savings deposit (which is not as free as demand deposit withdrawals but rewarding return/ higher interest) and time deposits (which may only be withdrawn on the time allowed by rewarding return/ higher interest rather than demand/ saving deposits). Saving deposits and time deposits, whether denominated Rupiah or foreign currencies, are quasi money belonging to the category M2. Currently visible shift in the definition of savings deposits occurs. Withdrawal of saving deposit can be done so easily, especially with the development of ATM facilities. Although there are still

restrictions on the maximum number of withdrawals in one day, but the freedom nearly matching the demand deposit withdrawals. Therefore, saving deposit is a close substitute of demand deposits. Non-cash payment is not only made through demand deposit accounts in that category, but also saving account deposit.

On the other hand, there is a component of M2 is not a currency and components non-cash in this study, namely time deposits. Types of deposits are not pledged basis for non-cash payments, given the time restriction and its withdrawal consequences of the withdrawal penalty that does not comply with the due dates. Time deposit in this analysis is more appropriate to be grouped together with other types of assets, such as bond, which is the object of people's choice in the function demand for money.

In this case necessary to distinguish between the influence of non-cash payments to demand for currency, M1, and M2. The demand for currency will be affected (estimated down) with the advanced technology of non-cash payment. However, M1 and M2 expected to rise, given more money into the system banking. With the ease of non-cash payments, demand deposits and saving deposit functions almost like currency. Communities will gain higher return with the switch to the demand/ savings deposit without losing the function of currency. Thus there are substitution of currency to demand/ savings deposits, which cause a rise in M1 and M2. The impact of increased non-cash payment changes upon demand for currency, M1, and M2 can also occur in the next round. Along with the increase in GDP due to increased non-cash payments (estimated), demand for currency, M1, and M2 will be increased. On the other hand non-cash payments are also expected to increases. Increase in GDP, currency, M1, and M2 is certainly necessary lag several periods. Thus in measuring the impact of increased non-cash payment the demand for currency, M1, and M2 is more about the direct impact, which indicated by the substitution effect as mentioned above.

To estimate the effect of increasing non-cash payments on demand money, we used the model of Baumol and Tobin. Money demand from the community, both money currency and demand deposits/ savings deposits, is determined by two factors, namely: transaction cost and return from holding a type of savings or other asset.

Transaction costs (in this case is the cost of redemption) will arise when people choose to hold the assets acquired, although on the other hand the return on these assets. By holding the currency, the community lost the opportunity to get return even though on the other hand the transaction cost can be eliminated. Another alternative is to hold demand/ savings deposits, where people get the return (although not as high as if holding time deposits and assets) and on the other side of the transaction cost can be reduced, especially with the development of the tools of non-cash payment.

As mentioned before, by saving money in the form demand/ savings deposit, society do not have to face a trade-off to obtain return without charge to process transactions. Thus unlike Baumol and Tobin's initial model, transaction cost of holding currency is expected to be higher than the savings in the form of non-cash, while considering the low cost transfers between accounts than the transaction costs of payment by cash. This certainly needs to be considered in analyzing the demand for currency.

Meanwhile, in analyzing the M1 money demand, there needs to be reemphasized differences with earlier models of Baumol and Tobin, which assumes that the holding money people do not get the return. Currently, by placing their funds on demand/ savings deposit with the clearing facility, RTGS, auto-debit, and ATM community continues to enjoy the functions of currency and to obtain the return.

Therefore the hypothesis that can be drawn from this phenomenon is that demand for currency will decline as society develops further non-cash payments, and the other side of M1 and M2 money demand will rise because public may obtain the return (at least to maintain the real value of money owned), while still able to enjoy the function of currency. In connection with the unavailability of data on various types of transaction cost savings and assets, as well as the amount of transaction cost that amount is relatively small and constant in the period observation is relatively short, then the transaction cost of the money demand model normalized to zero.

2.2. Effect of Non-Cash Payments on Output and Prices

Meanwhile, the impact of non-cash payment for the economy is expected to vary, depending on the response of the community (both households and firms) in the cost, effort, and time can be saved by the use of payment non-cash. For household, there are several options, such as: adding consumption, extending working hours, or encompassing leisure time. Meanwhile, for the company, generally these savings will be used for productive activities. On the other hand the increase in non-cash payments can stimulate a variety of business activities.

Economic actors will be encouraged to trade in line with reduced barriers to trade, both in terms of costs, manpower, and time. This course will contribute increased economic activity and GDP. How big contribution in this regard will be highly dependent on its portion of the total cost, effort, and time of an activity business. In addition to its effect on the increase in GDP, non-cash payment is estimated also to affect inflation. Increased non-cash payments will reduce transaction cost that would be more efficient economy. Efficiency is certainly effect will impact on the price level. But on the other hand there are substitution effects.

With the increasing velocity of money due to increased non-cash payment, economic activity and/ or prices of goods and services also will rise. Given payment non-cash is a means of paying the price of goods and services (currency substitution), hence in this case non-cash payments is not the factor that causes inflation. Influence directs to the inflation estimated at more on speed its propagation. While it influences the amount of inflation occurs through the influence of non-cash payment to increase real GDP. Its net effect on the price level (inflation) depends on which of the two, efficiency and substitution effects, which is more dominant.

The effect of non-cash payments to the output in this case occurs because the efficiency posed by non-cash payments, so the company has a lot of money that can be used as working capital. In addition, with increasing increase in M1 and M2, banks will be able to distribute more financing for the real sector. Both of these will lead to increased output.

RESEARCH METHODOLOGY

1. Variables and Data

This study uses data from 2005-2010 with monthly periods. Data are derived from IFS, SEKI, and internal data from Bank Indonesia. Interpolations are carried out in order to obtain monthly data. Variables used in this study are:

- Real GDP *(y)*. Data is originally in the form of quarterly one, which is then carried out into data interpolation monthly using the proportional Denton method, with variable guide index of industrial production. The base year used is 2000.
- The price level *(p)*. Data is from the Consumer Price Index (CPI) with base year 2002, which is later transformed into a CPI with base year 2000.
- M1 *(m 1)* and M2 *(m 2)*. These two variables are used separately in the model, intended to see the impact of increased non-cash payments to the M1 and M2.
- Non cash *(ncs)*. In this case, the variable used is the large value payment transactions use of non-cash instruments based both cards, which include debit cards and credit cards.
- BI rate *(r)*. The interest rate of Bank Indonesia (BI rate) is used for the SBI for a period within 30 days.
- The nominal exchange rate *(s)*. It is in the form of the rupiah per U.S. dollar.
- International interest rate *(r *)*. The interest rate used is the interest rate the Federal Reserve U.S.
- The level of international prices *(p *)*. In this case, the U.S. CPI is used as a representation of the price level abroad.

2. Model

The method used for the Vector Error Correction Model (VECM). A vector error correction model (VECM) adds error correction features to a multi-factor model such as a vector autoregression model. VECM is a model that was built long term relationships between variables are

determined by the cointegration of the data. In the model the influence of using a card payment instrument on output and price, and implications for monetary policy there are two long-term relationships that can be formulated as follows:

$$Ncs_t - p_t = \alpha_{10} + \alpha_{11}t + \beta_{14}y_t + \varepsilon_{1, t+1}$$
(1)

$$M_{1t} - p_t = \alpha_{20} + \alpha_{21}t + \beta_{23}r_t + + \beta_{24}Y_t\ \varepsilon_{2, t+1}$$
(2)

The two structural equations can be explained as follows. Equation (1) shows that the magnitude of non-cash payments in the long term determined by the high level of national income and technological progress, which indicated by the time trend. The magnitude of non-cash payments in the short term is also affected by high interest rates (return). Equation (2) is which indicates that real M1 money demand is determined by the level of interest rates and real GDP. In the long shot, the amount of money demand is also influenced by the variable non-cash payment.

From the previous description, it can be concluded as the following: Improved means of payment using the card substitution effect and efficiency. Substitution effects lead to falling demand and rising currency M1 and M2. This will further affect the increasing GDP and prices. While its efficiency effects occur along with lower transaction costs, which will lead to falling prices. On the other hand, an increase in GDP efficiency also affects price. From the substitution effect and efficiency, it is predicted that there is an increase in GDP, while the effect on price depends which of the set of effects is more dominant. To get a picture of the influence of non-cash payments (LNCS) variable against money demand, output, inflation, and the implications for policy of Bank Indonesia, generalized impulse response is used. Figure 1 represents the impulse function. The generalized impulse response shows that the shock in the equal payment non-cash will lead to an increase in the demand for money (M2), a decrease of M1, real GDP, and the price level.

ESTIMATION RESULT

Figure 2. Impulse Function
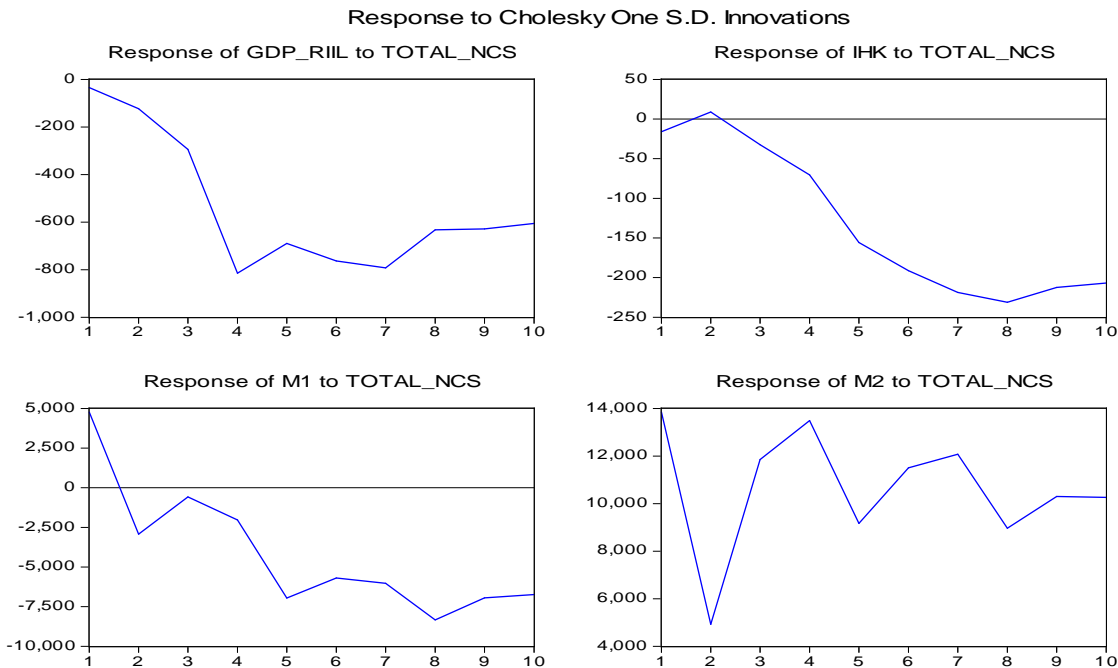
CONCLUSIONS AND POLICY IMPLCATIONS

This paper analyses, both theoretically and empirically, the impact of increasing use the card payment equipment (non-cash payment) on the Indonesian economy. Using Vector Error Correction Model (VECM), its impacts on the economy are investigated. The result shows that cash holdings decrease, while money stock M1 and M2 increase. The increase of non-cash payments also induces GDP growth and slight price decrease. Its implication for monetary policy is also analyzed, showing a decrease of BI rate and monetary policy cost. Increasing non-cash payments will affect the demand for money and the balance in the money market, as well as output and prices, which would have implications for monetary policy. Changes in interest rates, output, and that price will be certainly responded by Bank Indonesia in the form of policy monetary. The accuracy of the response of monetary policy on non-cash payments will be depended on the ability to model the influence of non-cash payments on demand money and the model effects on output and prices in capturing the level of influence these non-cash payment.

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